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ORIGINAL ARTICLE

Body Ideals and Body Dissatisfaction Among a Community Sample of Ethnically Diverse Adolescents on Kauai, Hawaii

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Abstract

Introduction: Body dissatisfaction (BD), a risk factor for eating disorders, is occurring at younger ages and among a wide range of socioeconomic and cultural groups.

Objective: To describe body ideals and prevalence of body satisfaction among an ethnically diverse population of male and female students in Hawaii.

Methods: An anonymous cross-sectional survey including biographical information and the figure drawing screen was distributed to 7th through 12th grade students.

Results: Of the 1330 completed surveys, 19% of students were significantly dissatisfied with their bodies. Males were at greater risk than females for total BD (25.8% vs. 13.3%; $p<0.001$) and for BD in the direction of wanting to be larger (11.3% vs. 2.3%; $p<0.001$). Males and females were at similar risk for BD in the direction of wanting to be thinner (14.6% vs. 11.6%; $p=0.11$). Prevalence of BD in the direction of wanting to be thinner was significantly different ($p<0.05$) among ethnic groups. There were no significant differences in BD based on grade level or SES.

Conclusions: BD exists among nearly 1 out of 5 adolescents, with differing patterns for males and females, and with certain ethnic groups being at higher risk.

Implications: Studies to understand risk and protective factors by sex and among different ethnic groups may help generate tailored prevention strategies. Further research is needed to better understand the mechanisms underlying the bidirectional BD seen in males and potential outcomes.

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Introduction

Definition and Consequences of Body Dissatisfaction

Body dissatisfaction (BD) is typically defined as the difference between one's perceived body (size and shape) and one's ideal body; the larger the discrepancy, the greater the degree of BD. BD is a major clinical concern as it is becoming more prevalent among youth and is associated with a multitude of negative physical and psychological outcomes.[1-12] BD is one of the most robust risk factors for eating disorders[1], which are often cited as having the highest morbidity and mortality of the mental health illnesses.[2-5] BD is associated with weight gain and obesity by increasing binge eating[6,7] and decreasing levels of physical activity.[8,9] BD also influences self-esteem and mood, prospectively predicting negative affect[10], onset of depressive symptoms[11], and increased suicide attempts.[12]

Pathways to BD

BD is influenced by a variety of factors including individual, family, peer, and social attributes. Individual physical characteristics exert independent influence on BD. For example, BMI is strongly correlated with BD and is a predictor for future BD.[13] Height and weight also independently predict BD and eating disorder scores, with absolute values being predictive for boys and comparative values being predictive for girls.[14] Pubertal development and Tanner stage predict onset of bulimic purging behaviors in adolescent females.[15] Psychological characteristics such as self-esteem and negative affect both predict BD and higher eating disorder scores in children.[13, 14]

Family environment and values also play an important role in BD. Children's perceptions of parental concern about weight predict eating disorder scores for boys and girls.[14] Having a father with high levels of BD predicts girls' dieting and weight change behaviors, and parental over-control of eating behavior is associated with higher levels of thin body preoccupation and social pressure to be thin.[16]

Peer perceptions, actions, and behaviors also affect BD. Weight-related teasing by peers increases risk of future BD in early adolescent females.[13] BD is also associated with having peers who are currently dieting[13] and predicted by perceived pressure to be thin from peers.[17]

Socio-cultural environment and media exposure have long been implicated in BD and resulting pathological eating behaviors. The media portrays images of thin women and muscular men with the connotation that having this ideal body equates with being lovable, successful, and happy. A randomized controlled study of college females found that exposure to thin-ideal magazine images increased BD when compared to exposure to neutral images.[18] Trying to look like media images was also found to predict bulimic symptoms among adolescent females.[15] International studies show the link between exposure to Western ideals and increasing rates of eating disorder risks, symptoms, and disorders in many countries.[19-21]

Clearly, BD is linked to a number of adverse health outcomes and is occurring at younger ages among diverse groups. For this reason, we were interested in exploring the BD among youth in Hawaii, which has not yet been reported in the literature. Hawaii has a unique blend of cultures and ethnicities, and despite their geographic isolation, we hypothesized that Kauai students would have significant rates of BD. Due to differences in cultural values and ideals surrounding food, body image and health, we also hypothesized differences in BD patterns and associations based on ethnicity. Our specific aims were to describe body ideals along with the prevalence and patterns of body dissatisfaction among an ethnically diverse population of male and female adolescents.

Participants and Methods

Setting

Kauai, a rural outer island of Hawaii, has a population of approximately 60,000 with a rich blend of different cultures and ethnicities. Given previous research showing that eating disorders tend to have their onset in adolescence[2,22], our target population consisted of community students in grades 7-12. There are 6 public schools under the Kauai District of the Department of Education that serve 7th through 12th grade. There are also small private schools in each of the major areas of the island.

Procedures

This project was approved by the University of Hawaii IRB. The Department of Education Kauai district superintendent and the principals of 4 of the private schools on the island were approached and agreed to participate in the study. Consent and assent forms were distributed to all of the 7-12th graders in these schools, either in their homeroom or science/health class. Those who signed and returned the forms properly were given a 4-page survey, which was filled out in the classroom. The survey was anonymous and included one page of biographical information and 3 short screening tools, including the figure drawing screen.

Measures

1. Demographic data were obtained by asking each student their age, sex, school type (private or public), grade level, living situation, and socioeconomic status.[23] Given the multiracial population in Hawaii, students were asked to write down their race and to list them all. They were then asked to write down the race they most identified with. The latter was used in the analysis.

Table 1: Student characteristics

CHARACTERISTIC	NUMBER (%)
Sex:	
Male	579 (43.6%)
Female	748 (56.4%)
Grade:	
7	382 (28.9%)
8	352 (26.6%)
9	177 (13.4%)
10	140 (10.6%)
11	133 (10.0%)
12	138 (10.4%)
School:	
Public	1190 (89.5%)
Private	139 (10.5%)
Live with:	
Mom only	251 (19.0%)
Dad only	70 (5.3%)
Both	879 (66.4%)
Other	124 (9.4%)
Number of working parents:	
0	45 (3.4%)
1	332 (25.0%)
2	949 (71.6%)
Number of parents with college:	
0	319 (24.9%)
1	415 (32.5%)
2	545 (42.6%)
Ethnicity:	
Filipino	320 (24.0%)
Caucasian	315 (23.7%)
Hawaiian	302 (22.7%)
Japanese	155 (11.7%)
Portuguese	42 (3.2%)
Chinese	29 (2.2%)
Other	167 (12.7%)

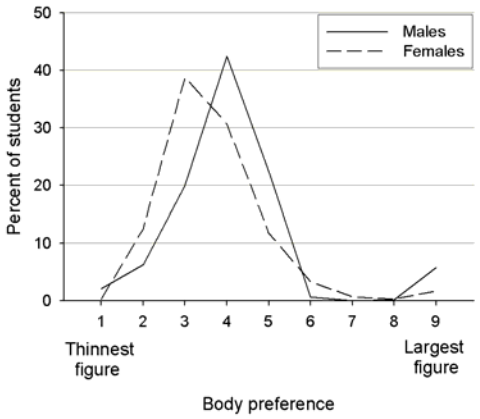
2. Body Ideals and Body Dissatisfaction: The figure drawing screen is a commonly used and validated instrument to assess body dissatisfaction. A series of nine progressively larger figures adapted from the Stunkard[24] figures were presented. The students were asked to choose the figure that most looked like them (perceived body) and then to choose the figure they would most like to look like (ideal body).

Analysis: Descriptive statistics were calculated for all variables. Chi-squared statistics were calculated to assess the statistical significance of differences in total BD based on ethnicity, sex, grade level, SES, and also by direction of BD (e.g., wanting to be thinner or larger). Logistic regression models used total body dissatisfaction, BD in the direction of wanting to be thinner, and BD in the direction of wanting to be larger as the outcomes. Sex, ethnicity, school type, and parental education were selected as the relevant independent variables. Grade level, SES, and number of working parents were not found to be significantly associated with BD, and were thus not included in the models. The reference population was the Caucasian females who responded to the survey, given previous research indicating increased rates of BD among females and most studies having a majority of Caucasian participants.

Results

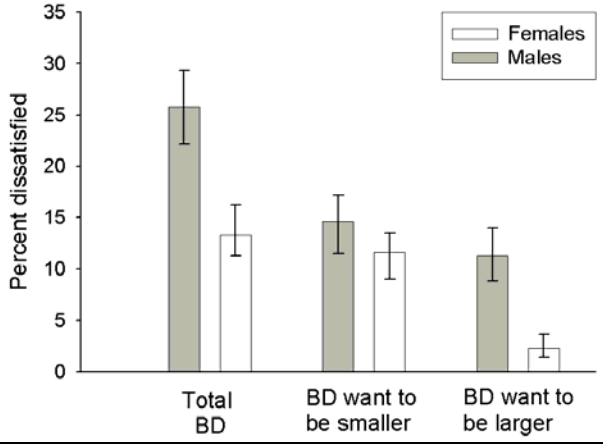
Sample: Out of 2336 consent forms that were sent out, 57% (1330) were returned completed properly, with parent consent and student assent signed. Table 1 describes the characteristics of the student sample.

Figure 1: Description of Ideal Body Preference by Gender



1=thinnest body figure, 10=largest body figure

Figure 2: Percentage of Students with Total Body Dissatisfaction (BD), BD in the Direction of Wanting to be Thinner, and BD in the Direction of Wanting to be Larger



Body Ideals: Figure 1 depicts ideal body figure chosen on the figure rating scale by gender. The student was asked to indicate which of the nine figures they most wanted to look like (ideal body). The figure drawing screen showed that most females narrowly clustered around a preference for

Table 2: Odds ratios (95% confidence intervals) for wanting to be thinner or wanting to be larger by ethnicity and gender

DIRECTION OF DISSATISFACTION	ETHNICITY	FEMALES	MALES
Wanting to be thinner	Chinese	5.7 (1.7, 18.7) [a]	0.8 (0.1, 6.8)
	Filipino	1.2 (0.6, 2.7)	1.9 (0.9, 3.8)
	Hawaiian	2.7 (1.3, 5.4) [a]	1.5 (0.7, 3.2)
	Japanese	1.8 (0.7, 4.5)	1.3 (0.6, 3.1)
	Portuguese	2.7 (0.8, 9.2)	5.7 (1.9, 17.2) [a]
	Other	1.4 (0.5, 3.5)	1.5 (0.6, 3.4)
	Caucasian	1.0	1.0
Wanting to be larger	Chinese	-- [b]	0.8 (0.1, 6.3)
	Filipino	1.4 (0.4, 5.1)	1.1 (0.5, 2.3)
	Hawaiian	0.5 (0.1, 2.8)	1.5 (0.7, 3.1)
	Japanese	1.9 (0.4, 8.7)	1.1 (0.5, 2.6)
	Portuguese	6.7 (1.4, 32.1) [a]	-- [b]
	Other	1.1 (0.2, 6.2)	1.0 (0.4, 2.4)
	Caucasian	1.0	1.0

[a] $p < 0.05$

Separate regression models were fit for females and males for both the wanting to be thinner and wanting to be larger outcomes. Models included all of the listed ethnicities.

[b] No Chinese girls or Portuguese boys wanted to be larger and, as a consequence, Chinese girls and Portuguese boys were omitted from the logistic regression model for wanting to be larger. Neither omitted group was significantly different ($p < 0.05$) from Caucasians of the same gender in wanting to be bigger, as assessed by Fisher's exact tests.

the 3rd body type (38.8%). 12.5% preferred to be like the second figure and 0.3% desired the thinnest figure. The males had a slightly wider spread and chose slightly larger figures. The majority (42.5%) chose the fourth figure, followed by the fifth (22.3%) and third (19.9%), only 2.1% of males desired to look like the thinnest figure.

Body Dissatisfaction: Based on previous research[25], a difference of 2 or more body sizes between one's ideal and current body was considered sufficient for significant body dissatisfaction. The standard deviation of this sample was 1.4, thus those with a difference of 2 body sizes or greater were more than one standard deviation from the mean. Of the 1330 completed surveys, 19% of students were significantly dissatisfied with their bodies. Figure 2 depicts unadjusted significant BD by gender. Males were at greater risk than females for total BD (25.8% vs. 13.3%; $p<0.0001$) and for BD in the direction of wanting to be larger (11.3% vs. 2.3%; $p<0.0001$). Boys and girls were at similar risk for BD in the direction of wanting to be thinner (14.6% vs. 11.6%; $p=0.11$). Boys were just as likely to be dissatisfied in the direction of wanting to be thinner (14.6%) as they were to be dissatisfied in the direction of wanting to be larger (11.3%).

The unadjusted association between ethnicity and BD in the direction of wanting to be thinner is shown in Figure 3. Prevalence of BD in the direction of wanting to be thinner was statistically different among ethnic groups, with Caucasians having the lowest BD. There were no significant differences in BD based on grade level, type of school, or SES.

Logistic Regression Models: Table 2 depicts the odds ratios for wanting to be thinner and wanting to be larger by ethnicity and gender. Separate regression models were fit for females and males for both the wanting to be thinner and wanting to be larger outcomes. Models included all of the listed ethnicities. No Chinese girls or Portuguese boys wanted to be larger and, as a consequence, Chinese girls and Portuguese boys were omitted from the logistic regression model for wanting to be larger. Neither omitted group was significantly different ($p < 0.05$) from Caucasians of the same gender in wanting to be bigger, as assessed by Fisher's exact tests. BD in the direction of wanting to be thinner was predicted by being Hawaiian or Chinese for females (OR=2.7, CI=1.3-5.4; OR=5.7, CI=1.7-18.7) and by being Portuguese for males (OR=5.7, CI=1.9-17.2). BD in the direction of wanting to be larger among all students was predicted by being male (OR=5.0, CI=2.9-8.4) and for females by being Portuguese (OR=6.7, CI=1.4-32.1).

Figure 3: Percentage of Students with Body Dissatisfaction in the Direction of Wanting to be Thinner by Ethnicity

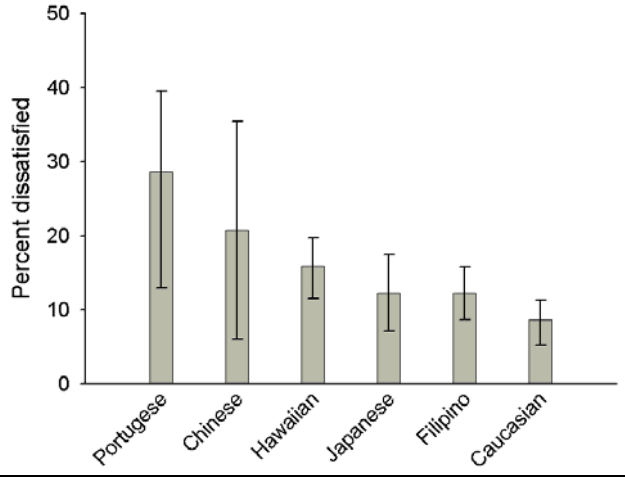


Table 3 describes the odds ratios for total BD associated with student and family characteristics. Gender, parental education, and ethnicity were included in a single logistic regression model. Predictors for total BD included being male (OR=2.2, CI=1.6-2.9), being Hawaiian or Portuguese (OR=1.8, CI=1.1-2.7; OR=2.8, CI=1.3-6.1), and a lack of parental attainment of any college education (OR=01.4, CI=1.0-2.0).

Table 3: Odds ratios (95% confidence intervals (CIs)) for total body dissatisfaction by gender, education, and ethnicity

VARIABLE	ODDS RATIO (95% CI)
Gender	
Male	2.2 (1.6, 2.9) [a]
Female	1.0
Parental education	
No college	1.4 (1.0, 2.0) [a]
Some college	1.0
Ethnicity	
Portuguese	2.8 (1.3, 6.1) [a]
Chinese	2.1 (0.8, 5.3)
Hawaiian	1.8 (1.1, 2.7) [a]
Filipino	1.4 (0.9, 2.2)
Japanese	1.4 (0.8, 2.3)
Caucasian	1.0

[a] $p < 0.05$

Gender, parental education, and ethnicity were included in a single logistic regression model.

Discussion and Clinical Implications

This is the first study to examine BD among an ethnically diverse population of youth living in Hawaii. Despite the diverse ethnic and cultural groups represented in this study, the ideal figures chosen by Kauai adolescents were similar to other studies, and also replicate the pattern of females clustering around a figure approximately one size smaller than the males.[25,26] Overall, we found a high portion of adolescents (19%) who were significantly dissatisfied with their bodies. This finding is supported by recent literature showing that children and teens are exhibiting BD, risky dieting behaviors and attitudes, as well as eating disorders more frequently and at earlier ages.[3,27,28] In our sample there was no significant difference among the grade levels, suggesting that by the time students reach seventh grade, BD is already a common concern. These results are similar to findings in the US and Canada that have shown body image concerns in childhood and early adolescence.[28,29,30] To truly prevent the onset of BD, primary prevention programs would need to begin in elementary school. This also suggests that by middle school, a significant percentage of students already have body image concerns and thus primary and secondary prevention approaches may be needed in that age group.

Our results also show that overall, boys are at greater risk for total BD and wanting to be larger, and at similar risk to females for BD in the direction of wanting to be thinner. This supports recent findings of significant BD among boys. A recent review of body image in boys examined 17 articles finding BD to be a common concern that is associated with significant distress.[31] Males also exhibit dangerous behaviors and eating pathology, being only slightly less likely than girls to engage in bulimic behaviors (self-induced vomiting or laxatives) in an effort to lose weight.[32] We also found that boys were equally likely to be dissatisfied in either direction, wanting to be thinner (14.6%) or wanting to be larger (11.3%). These results replicate the bidirectional nature of BD in males seen in at least two previous studies. Male college freshman have similar rates of desiring to lose weight (40%) and desiring to gain weight (45%).[29] Similarly, male adolescents have been shown to be "as likely to want to be heavier as lighter."[25] There is little known about the associated risks and naturalistic outcomes of BD in males. Different pathways may lead to unhealthy eating attitudes and behaviors for boys compared to girls and further research would help find key targets for interventions. Exploring other dangerous behaviors among boys (bulking agents, pro-hormones, and steroid use etc) that may be associated with BD and desiring to gain weight is another potential area for future study. Little is known about future consequences of BD in males as they complete adolescence and move into adulthood. The externalizing behaviors more frequently seen in males, such as substance abuse, aggression or conduct disturbance, might be considered as potential outcomes for future prospective studies.

In this study, the Caucasian group had the lowest risk of BD compared to the multiple other ethnic groups. This may be due in part to the absence of an ethnic "majority" in Hawaii; the state has a diverse population including many people of mixed ethnicity. Once key factors were controlled for, such as parental education and SES, the Hawaiian, Portuguese, and Chinese subgroups remained at a significantly higher risk of BD. There are likely many social and cultural (and possibly genetic) factors that relate to these findings. The meaning and cultural significance of food and health among groups may be different. There may also be discordance between familial expectations and societal pressures that lead to confusion and dissatisfaction. Little is known about BD and eating disorders in some of these groups and exploration with qualitative as well as quantitative research is warranted. Previous studies have also shown higher rates of BD, chronic dieting, and bulimic behaviors (binge eating, purging, and diuretic use) among US minorities.[32-34] The myth of eating disorders as afflictions of wealthy Caucasian females is further refuted in this study and others as BD and eating pathology are documented among a wider variety of socioeconomic and cultural groups.[32-34] International studies also give examples of pervasive BD in Japan, China, Norway, Canada, Britain, Australia, and others.[25,28,35-37] As our world becomes increasingly interconnected, so, too, will we share and be impacted by acculturative ideals regarding body shape, size and beauty.

Limitations

This study was an anonymous cross-sectional survey, and thus cannot evaluate causality, simply associations. There were no measures linking BD to poor outcomes directly in

this study, although the literature has clearly shown links to concurrent and future negative outcomes in many well-controlled studies, as reviewed above. This study shows that BD is a significant concern among adolescents of the Pacific region; however, these authors feel there is a need for further qualitative as well as quantitative research to further explore the relationships found in this study between ethnicity and BD as well as the specific issues related to male BD.

Conclusion

To our knowledge, this is the first study to examine BD among the adolescents of the US Pacific region. These results emphasize the pervasive nature of body image problems affecting youth, boys as well as girls, from a variety of cultural and socioeconomic groups. Studies to examine risk and protective factors among different groups may help tailor prevention strategies that should be targeting both sexes. This study also highlights the bidirectional nature of BD among males. Further research on BD in males to understand the etiologic pathways, potential consequences, and modifiable risk factors is warranted. It is clear that fostering healthy body esteem needs to begin early for boys and girls to be culturally effective in reaching our increasingly multicultural population. Beyond individual and family interventions to promote healthy body image, changes in policy and media will also need to be addressed.

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Eating Disorders Risk among White, Japanese, Chinese, Filipino, and Hawaiian Students Attending the University of Hawaii

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Abstract

Objective: To assess ethnic differences in eating disorder (ED) risk factors among college students attending the University of Hawaii (UH). Based on existing literature, it was predicted that Japanese, Filipino, Chinese and Hawaiian participants, regardless of gender, would be at equal or greater risk for eating disorders than their White counterparts.

Method: Undergraduate students (n = 895, 61% female) from six UH campuses comprising six ethnic groups, White (29.2%), Japanese (18.6%), Filipino (13.1%), Hawaiian (10.7%), Chinese (3.7%), and Mixed ethnicity (24.8%), completed demographic items and a variety of ED risk assessment instruments.

Results: Contrary to prediction, Japanese, Filipino, Chinese, and Hawaiian women appear to be at lower ED risk than White women. Specific differences among female ethnic groups are noted. In addition, young men may manifest ED risk in unique ways. For example, Filipino men express weight and performance concerns that are unrelated to body mass index (BMI), whereas among Hawaiian men, weight concerns, dieting, and body dissatisfaction are all strongly correlated with BMI.

Conclusions: Ethnicity and gender differences must be considered when dealing with ED risks among young non-White adults living in Hawaii.

Implications: Such differences may provide important clues to the appropriate diagnosis and/or treatment of eating- and weight-related disorders.

Keywords: Eating disorders, risk factors, ethnic differences, male, female, Hawaiian, Japanese, Chinese, Filipino, White, Eating Attitudes Test, McKnight Risk Factor Survey, Self-Loathing Subscale, Figure Rating Scale.

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Introduction

Adolescence and early adulthood are times of high risk for the development of eating disorders (EDs) and weight-related problems, especially among women.[1] Furthermore, clinically significant EDs and subclinical ED symptoms, or risk factors, are known to exist among individuals from many non-Western, non-White ethnic and cultural backgrounds.[2-4] While the bulk of current evidence seems to suggest lower rates of at least some ED risk factors among non-White students[2], available evidence remains inconclusive. Although many studies of ED risk have involved young adults, few have compared multiple ethnic groups residing in the same location and exposed to similar cultural influences, as in the present study.

Existing research on ethnic differences in ED risk suffers from several methodological problems. One serious problem has been the confounding of ethnicity with other variables. For example, many studies attributing differences to ethnicity have compared groups residing in different cultural or geographic locations. In such cases, it is impossible to know whether differences are due to ethnicity, location, cultural exposure differences, or some combination of these.

A second problem arises from the wide variety of instruments that have been used to assess ED risk and the even wider variety of attitudes and behaviors assessed. Instruments have ranged from investigator-developed scales[5], to well-validated instruments such as the Eating Disorders Inventory[6] and the Eating Attitudes Test (EAT).[7] Attitudes and behaviors assessed have ranged from concerns about body weight, shape or appearance[8-10], to abnormal eating behaviors such as excessive dieting, binge eating, and restrained eating[5,11], to measures of body dissatisfaction[12], and drive for thinness.[13] In the present study, we assess ED risk using four previously validated assessment instruments, the Eating Attitudes Test, the McKnight Risk Factor Survey, the Figure Rating Scale, and the Self-Loathing Subscale of the Exercise Orientation Questionnaire. Specific measures derived from each of these instruments are described more fully below. The following literature review focuses on previous studies using these or similar instruments.

A third problem arises from use of the term "Asian" to refer to individuals of diverse ethnic and cultural backgrounds. In the UK, for instance, the term "Asian" most often refers to individuals from the Indian subcontinent (i.e., India, Pakistan, Bangladesh, etc.), while in the US, this term typically refers to individuals from East Asia (i.e., Japan, China, Korea, etc.) or Southeast Asia (i.e., Vietnam, Thailand, Cambodia, etc.). Combining data of individuals from such diverse cultures may obscure important ethnic group differences.

According to the University of Hawaii (UH) website (http://www.hawaii.edu/about/), the largest ethnic groups comprising a total enrollment of ~54,000 at the time this study was conducted were: White (22%), Japanese (15%), Hawaiian (14%), Filipino (13%), Chinese (6%), and mixed ethnicity (11%). Of these, approximately 57% are women. Because such diversity is unique to American colleges, we chose to assess ED risk among a convenience sample of UH undergraduates in order to compare three so-called "Asian" groups (i.e., Japanese, Chinese, and Filipino) and a group of native Hawaiian participants to their White peers. Consistent with most previous literature on health disparities, we used White participants as our reference group due to their historically better health status in the US.[14] Given our primary interest in these five ethnic groups, we briefly review previous research on differences in ED risk for each of these groups compared to Whites.

ED risk among young women

Given the diversity of ethnic and cultural groups referred to as "Asian," it is not surprising that previous studies comparing ED risks for Asian and White women have yielded inconsistent results. For example, some studies have reported greater body dissatisfaction (BD) among Asian women[10,15], while others have reported Asian women have less BD than Whites[16,17], and still others have reported no differences in BD.[18-20] Similarly, using EAT total scores, Akan and colleagues[17] reported lower scores for Asian-American than White women and Lucero[21] found fewer scores above the high-risk score of 20 for Asian-American women. Sanders and Heiss[18] found no differences in EAT total scores but suggested that "Asian" women have a "greater fear of fat than Whites" (p. 15). A final group of studies compared Asian and White women in terms of dieting or restrained eating; but these studies also reported inconsistent results.[2,15-17, 22]

Despite a more specific definition of ethnicity, studies comparing Japanese to White women have also yielded mixed results. Although Mukai and colleagues[23] found higher BD scores among Japanese female students in Japan than White students in the US, a study comparing White and Japanese students in Hawaii found no differences between these groups in either BD or body/self performance concerns, using the Self-Loathing Subscale (SLSS).[20] Two studies comparing Japanese females in Japan to Whites in other countries, also found no significant differences in EAT total scores.[23,24] Taken together, these studies suggest that young Japanese women may be at similar or greater ED risk than their White peers.

Only two previous studies have directly compared Chinese and White female college students. One study found that Chinese women scored higher on measures of bulimic behaviors, but not on measures of drive for thinness (DT) or BD.[8] The other, done in Hawaii, found no difference in

either BD or body/self performance dissatisfaction.[20] Thus, although the evidence is limited, young Chinese women appear to be at similar or greater risk for at least some ED symptoms (e.g., bulimia) than their White peers.

The few studies available on young Filipino women also suggest similar or greater ED risk compared to White women. In two studies comparing White and Filipino students in Hawaii, Yates and colleagues [20,25] found no significant differences in BD, DT, or dieting behaviors. By contrast, Madanat et al.,[26] comparing Filipino college women in the Philippines to White female students on the US mainland, found Filipino women to have significantly higher EAT total scores. Similarly, Kayano and colleagues[24] found that Filipino girls in the Philippines scored significantly higher on the EAT (total and bulimia subscale) than "Western," women (i.e., British, American, and European) but significantly lower than these Western students in DT. Thus, as with young Japanese and Chinese women, existing data find Filipino women scoring similarly to their White peers on some risk measures, but higher or lower on others.

In the only previous study comparing Hawaiian college women to White women, no differences were found in BD or body/self dissatisfaction.[20] Surprisingly, the EAT has not been used previously to assess ED risk among Hawaiian college women.

ED risk among young men

Even less is known about ED risks among college-aged men than women and only a few studies have examined differences among specific ethnic groups.[27,3] For instance, Kagawa and colleagues[28] compared young Japanese men living in Japan to White men living in Australia and found lower EAT scores (total and dieting subscale) among Japanese men. However, these differences were not statistically significant when the comparison was between Japanese and White men when both groups were assessed in Australia. In another study comparing Japanese adolescent males living in Japan to "Euro-American" adolescent males living in Oman, the Japanese males reported significantly higher EAT total scores.[24] By contrast, in their study of male college students in Hawaii, Yates, Edman & Aruguete found no differences in body/self dissatisfaction among Japanese, Chinese, White, or Hawaiian men.[20] A series of studies involving Filipino students in Hawaii yielded somewhat more consistent findings. In an initial study, Yates and colleagues[29] reported a so-called "strong female pattern" (p. 42) for Filipino males, consisting of high body/self dissatisfaction. In a subsequent study, Edman and Yates[25] partially replicated these results by showing that Filipino men had significantly higher BD and DT than White men. In a third study, these investigators found the same pattern of high BD and body/self dissatisfaction among Filipino males; but differences from the White group were not statistically significant, perhaps because of the small Filipino sample size (n=20).[20] Madanat and colleagues compared male Filipino college students living in the Philippines to White males living in the Western US and found Filipino men had significantly higher EAT total scores than White men.[26] Kayano and colleagues reported similar results for Filipino high school males in the Philippines compared to a mixed group of Euro-American students in Oman.[24] It must be noted again, however, that both the Madanat and Kayano studies confounded ethnicity with country or culture in which the data were collected.

Hypotheses

The inconclusive nature of the existing literature suggested a need for the present study. Our goal was to compare ED risk factors in an ethnically diverse sample of young adults among which differences due to other factors, such as geographic location and local cultural influences, were minimized. Based on existing literature, the following three general hypotheses were tested: 1) Japanese, Chinese, and Filipino women show equal or greater ED risk than their White peers, and Hawaiian women will not differ from Whites, in ED risk. 2) Japanese, Chinese, and Filipino men will show equal or higher ED risk than their White peers, while Hawaiian men will not differ from White men, in ED risk. Finally, since the SLSS may be less sensitive to reporting bias due to its focus on athletic (or body/self) performance, 3) males will show greater ED risk as assessed by the SLSS than by the EAT-26.

Participants and Methods

Participants

Participants were 895 undergraduate students (61% female) enrolled in social science, philosophy or nursing classes at six UH campuses. Faculty members were initially contacted by email or telephone to request participation by their students in taking the survey. Those who agreed either provided regular class time for survey administration or asked their students to complete the survey after class in a similar classroom setting. No incentives for participation were provided.

Most participants identified themselves (n=547) as belonging to one of the five primary ethnic groups of interest (i.e., White, Japanese, Chinese, Filipino, native Hawaiian). An additional 127 identified themselves either as belonging to another small specific group (i.e., Black, Hispanic, Korean or Mexican; total n=39) or as "other" (n=88). Those indicating "other" were asked to provide a specific group name, which in most cases was a country of origin. In most cases the country named allowed an ethnicity assignment (e.g., Irish = White or Fijian = Pacific Islander). For the remaining participants (n=215) who did

not identify their ethnicity, we used the ethnicity reported for their biological father and biological mother to assign a likely ethnicity to the participant. In the majority of these cases, our assignment was to the mixed ethnicity ("Mixed") group. However in a few cases, assignments were made to one of the five primary groups (n=67). Participants were only assigned to the Hawaiian group if they self-identified as native Hawaiian and *also* indicated (in response to a separate follow-up question) that at least one biological parent was at "least 50% native Hawaiian." Individuals who indicated being native Hawaiian but did not also indicate that one parent was at least 50% native Hawaiian, were included in the Mixed group. Individuals who reported "other" were assign to the White, Japanese, Filipino, and Chinese groups using a similar procedure, except in these cases at least one biological parent had to be identified as having the same ethnicity as the participant. Otherwise these individuals were also included in the Mixed group. Using these assignment methods 812 (90.7%) of the participants were identified as belonging to one of the six primary ethnic groups as follows: White (n=237), Japanese (n=151), Filipino (n=106), Hawaiian (n=87), Chinese (n=30), Mixed (n=201).

Procedures

Prior to data collection participants signed a written consent form that was approved by the Institutional Review Board of the University of Hawaii. The survey packet consisted of several sections including four previously validated screening instruments. A demographics section asked students their gender, height, weight, and ethnicity, as well as the ethnicity of both biological parents. Participants who identified themselves as native Hawaiian were also asked if either biological parent was at least 50% native Hawaiian. Body Mass Index (BMI) was calculated from self-reported height (m) and weight (kg) as kg/m^2. Surveys were administered in a variety of social science, nursing, and philosophy classes. Teachers were contacted in advance and agreed to make time available either during or after classes on a voluntary basis. Students completed the surveys using paper and pencil. Trained undergraduate employees later transcribed the raw data to a database. Data analyses were subsequently carried out using SPSS 18 (SPSS Inc., Chicago, IL).

Instruments

The following five validated instruments were used to assess eating disorders risk.

Eating Attitudes Test (EAT): Originally developed by Garner et al.[7] as a measure of attitudes about dieting and exercising to control weight, as well as binge eating and purging as abnormal eating behaviors, the EAT-26 was subsequently validated in both normal and clinical populations. It has been shown to have high test-retest reliability, as well as criterion-related, convergent, discriminant, and construct validity. Items include statements about eating attitudes such as: "I feel that others pressure me to eat" and "I find myself preoccupied with food." Each item uses a six-point Likert scale with response options ranging from "never" to "always." Item scores are later converted to a 4-point scale (3=always, 2=usually, 1=often and 0=sometimes, rarely, or never). The apparent purpose of conversion to this truncated response scale was to limit the inclusion of less severe cases. The EAT Total score is the sum of scores on all 26 items. An EAT Total score of >20 indicates high risk for eating pathology. Three factors originally proposed for the EAT-26 by Garner et al[7], were referred to as: Dieting (13 items), Bulimia/Food Preoccupation: (6 items), and Oral Control or Social Pressure (7 items). Similar, although not identical, factors were derived from results of the present study using factor analysis (see Preliminary Analyses below).

McKnight Risk Factor Survey (MRFS): The MRFS is a self-report instrument originally designed to assess risk factors for the development of eating disorders among pre- and post-adolescent girls.[30] An earlier version of the MRFS (v. 3) was psychometrically validated. Because our main interest was in ethnic differences in relationships among body size, body image, and potentially risky eating behaviors, 36 items were selected from the MRFS covering the following ten presumed risk domains: Appearance appraisal (3 items), binge eating (2 items), confidence (3 items), emotional eating (3 items), media modeling (2 items), overconcern with weight (5 items), purging (3 items), support/sharing (3 items), weight control behaviors (7 items), and weight teasing by peers (5 items). Items such as, "In the past year, how often have you worried about having fat on your body?" were rated on 5-point Likert scales ranging from never (1) to always (5). Convergent validity, internal reliability, and test-retest reliability have been reported only for the overconcern with weight domain. [30] A factor analysis using data from the present study reveal a reliable 3-factor structure (see below). Items from the MRFS-IV along with a "scoring guide" are available by contacting the Laboratory for the Study of Behavioral Medicine at http://bml.stanford.edu/mcknight/.

Figure Rating Scale (FRS): Originally developed by Stunkard[31], the FRS is designed to assess body size or shape satisfaction. Participants are instructed to choose one of nine gender-specific body shape figures that appears most similar to his or her current body shape and then to choose the figure that most closely matches his or her ideal shape. The discrepancy score is taken to indicate the level of body dissatisfaction (BD). Psychometric studies have shown this method of assessing BD has moderate validity when compared to other methods of BD assessment.[32]

Self-Loathing Subscale (SLSS): The SLSS consists of four items taken from the 27-item Exercise Orientation Questionnaire (EOQ).[33] For the current study, participants completed eight items from the EOQ, including the 4-item SLSS and an additional four items, which served as distracters. The four SLSS items are: "I disliked my body before I began to exercise," "I am dissatisfied with my performance," "I hate my body when it won't do what I want," and "If I don't reach my goals I feel like a failure." The distracter items are: "I am an active person," "I feel better after I exercise," "My best friends are athletes," and "I am a good athlete". All items are scored on 5-point Likert scales ranging from 5 = "strongly agree" to 1 = "strongly disagree." SLSS total score is computed by summing the four item scores. This score, which we refer to in the remainder of the paper as a measure of Performance Dissatisfaction, is highly correlated with various ED measures.[34] On the basis of this evidence, Yates, Edman, Crago & Crowell[35] suggested that the SLSS total score might be used as a measure of eating pathology, with a cut-off score of >15 indicating clinically significant eating disorders.

Preliminary Analyses

For the purposes of statistical analysis, only those ethnic groups with at least ten individuals of each gender were examined (n=812), including: White (29.2%), Japanese (18.6%), Filipino (13.1%), Hawaiian (10.7%), Chinese (3.7%), and Mixed ethnicity (24.8%). Five cases with extreme values of the EAT Total score were removed from further analyses. Extreme values were defined as those that exceeded the upper end of the interquartile range by three or more range lengths. Average age of participants was 23.4 ± 7.6 years. A two-way ANOVA (ethnicity x age) revealed small but significant age differences among ethnic groups, $F(5, 799)=4.05$, $p=.001$ but not genders. Post-hoc tests showed that White students (M=25.0±9.0 yrs) were significantly older than Japanese (M=22.1±5.6 yrs) and Filipino students (M=22.3±6.3 yrs).

An exploratory factor analysis (principle components with varimax rotation) based on all female data partially confirmed the presumed "domain structure" of the original MRFS-IV. Of the 10 domains selected for this study, three factors were extracted. These were: "Social Support" (Cronbach's alpha=.880); "Emotional Eating" (alpha=.830); and "Weight Concerns" (alpha=.875). Reliability analysis using the same three extracted factors for male participants also indicated good reliability as follows: Social Support (alpha=.856); Emotional Eating (alpha=.757); and Weight Concern (alpha=.866).

As noted above, three factors were originally proposed for the EAT by Garner et al[7], which they referred to as: Dieting (13 items), Bulimia/Food Preoccupation: (6 items), and Oral Control/Social Pressure (7 items). Using female data from the present study, a confirmatory factor analysis (principle components, varimax rotation), also revealed three factors similar to those originally proposed by Garner et al.[7] However, not all 26 items loaded reliably on one of these factors. Only three items loaded reliably on the so-called Oral Control/Social Pressure factor. Since all three of these items related to the social control of eating (e.g., "Others would like me to eat more.") we refer to this factor, in the following pages, simply as the Social Pressure factor. Thus, the three EAT factors and their reliabilities for female participants were as follows: Dieting (12 items; alpha=.845), Food Preoccupation (4 items; alpha=.773), and Social Pressure (3 items; alpha=.760). For men, these same three factors had acceptable but slightly weaker reliability: Dieting (alpha=.715), Food Preoccupation (alpha=.567), and Social Pressure (alpha=.760).

For the purpose of subsequent analyses, each of the factor scores derived from the MRFS and EAT-26 were treated as individual ED risk factors. In addition, a score derived for the SLSS (i.e., Performance Dissatisfaction) and a score derived from the FRS (i.e., Body Dissatisfaction) were also

Table 1: Correlations among ED risk factors for participating women (above diagonal) and men (below diagonal)

#	Variable Name	1	2	3	4	5	6	7	8	9	10
1	BMI		0.071	0.084	-0.255	0.017	0.163	-0.072	0.333	0.197	0.653
2	Dieting	0.288		0.614	0.017	0.943	0.311	-0.055	0.691	0.558	0.376
3	FoodPreocc	0.079	0.237		-0.026	0.702	0.476	-0.115	0.429	0.377	0.285
4	SocPress	-0.264	-0.120	0.040		0.216	0.039	-0.001	-0.124	0.008	-0.319
5	EAT Total	0.186	0.851	0.406	0.238		0.321	-0.066	0.614	0.520	0.291
6	EmoEat	0.103	0.227	0.443	0.068	0.256		-0.142	0.394	0.383	0.274
7	SocSupp	-0.068	0.110	-0.028	-0.038	0.066	0.009		-0.012	-0.139	-0.115
8	WtCon	0.463	0.683	0.179	-0.233	0.503	0.288	0.079		0.606	0.620
9	SLSS	0.173	0.326	0.159	0.083	0.338	0.263	-0.157	0.377		0.448
10	Body Dis	0.648	0.475	0.135	-0.344	0.318	0.134	-0.055	0.636	0.228	

Note: Pearson bivariate correlations. All correlations > ± 0.200 are significant ($p < .001$). BMI = Body mass index (kg/m^2), Dieting = Dieting subscale of EAT, Food Preocc = Food Preoccupation subscale of EAT, SocPress = Social Pressure subscale of EAT, EAT Total = 26 item EAT total score, EmoEat = Emotional Eating subscale of the MRFS, SocSupp = Social Support subscale of the MRFS; WtCon = Weight Concerns subscale of the MRFS; SLSS = Self-Loathing subscale of the EOQ, Body Dis = Body Dissatisfaction score based on the FRS difference score.

entered into these analyses as risk factors.

Results

Correlations among Dependent Variables (DVs)

Table 1 shows bivariate Pearson correlations among ten DVs, including the eight factor scores, EAT Total score, and BMI. Most of the risk factor scores were significantly correlated (p<.001) both for women (above the diagonal) and men (below the diagonal). Exceptions were Social Support and Social Pressure, both of which showed only selective associations with other DVs. Regardless of gender, BMI was most strongly positively associated with Body Dissatisfaction, Weight Concern, and Performance Dissatisfaction. In addition, among men, BMI was most strongly associated with the Dieting and the EAT Total score. Among women, BMI was significantly associated with Emotional Eating and Performance Dissatisfaction.

Risk Factor Analyses

Multivariate analyses of variance (MANOVAs) were carried out to assess ethnic group differences in each of the ten DVs. Independent variables (IVs) were the six ethnic groups: White, Japanese, Filipino, Hawaiian, Chinese, and Mixed. An initial MANOVA assessed overall gender and ethnicity differences. Multivariate differences were significant for ethnicity (p<.05) and gender (p<.001) with no interaction. Tests of between-subjects effects revealed significantly higher scores for women than men on six DVs: EAT Total (p<.001), Dieting (p<.001), Food Preoccupation (p=.004), Weight Concerns (p<.001), Body Dissatisfaction (p<.001), and Social Support (p<.001).

Given these significant gender differences and no interaction with ethnicity, all subsequent analyses were gender-specific. For each gender a MANOVA was first carried out using BMI and the above nine risk factors as DVs and the six ethnic groups as IVs. Univariate ANOVAs and planned contrasts were then used to compare the White group to each of the other ethnic groups.

For women the Wilks' Lambda multivariate value (0.826) was significant (F=1.82, p<.001), indicating a significant overall difference in ED risk among female ethnic groups. Tests of between-subjects effects revealed that female groups differed significantly only on four DVs: BMI (p=.002), EAT Total (p=.042), Food Preoccupation (p = .002), and Emotional Eating (p=.005). Differences for Dieting were marginally significant (p=.078). Subsequent planned comparisons revealed the specific group differences shown in Table 2. As can be seen, Hawaiian women had higher BMI scores than all other groups and significantly higher BMI scores than White women (p=.001). Japanese (p=.030) and Chinese (p=.006) women had significantly lower EAT Total scores than their White peers, while Japanese (p<.001), Hawaiian (p=.006), Chinese (p=.012), and Mixed (p=.007) women had significantly lower Food Preoccupation scores than Whites. In addition, Hawaiian (p=.017), and Chinese (p=.036) women had significantly lower Emotional Eating scores than White women. Finally, although the multivariate Dieting differences were only marginally significant, planned comparisons revealed significantly less Dieting by Chinese (p=.015) than by White women.

For men the Wilks' Lambda multivariate score (0.796) was marginally significant (F=1.34, p=.057), indicating a nearly significant overall difference in ED risk among male ethnic groups. Nevertheless, tests of between-subject effects revealed marginally significant ethnic group differences among males in BMI (p=.055) and two ED risk factors: Weight Concerns (p=.042), and Performance Dissatisfaction (p=.069). Subsequent ANOVAs and planned contrasts revealed the specific differences shown in Table 3. As can be seen, Hawaiian men had the highest mean BMI score of all groups and a significantly higher mean BMI than White men (p=.003); other groups did not differ significantly from Whites. Both Filipino (p=.007) and Hawaiian (p=.027) men reported significantly more frequent Weight Concerns than White men. In addition, Filipino men had higher mean Performance Dissatisfaction scores than all other male groups and expressed significantly greater Performance Dissatisfaction (p=.003) than White men.

Table 2: Ethnic Differences in ED Risk Factors for Female Participants

Ethnicity	BMI M (SD)	EAT Total M (SD)	Diet M (SD)	Food Preocc. M (SD)	Emo Eat. M (SD)
White	23.45 (4.88)	9.49 (9.58)	5.82 (6.99)	1.32 (2.33)	2.29 (0.82)
Japanese	22.39 (4.89)	**6.90 (6.77)**	3.99 (4.95)	**0.36 (0.98)**	2.10 (0.78)
Filipino	23.91 (5.02)	8.20 (7.24)	5.03 (5.47)	0.88 (1.74)	2.42 (0.78)
Hawaiian	**26.44 (6.23)**	6.87 (7.43)	4.12 (5.16)	**0.46 (1.50)**	**2.02 (0.75)**
Chinese	23.43 (4.96)	**3.80 (3.19)**	**2.05 (2.44)**	**0.20 (0.41)**	**1.91 (0.75)**
Mixed	24.36 (6.04)	8.38 (8.32)	5.35 (6.14)	**0.73 (1.76)**	2.25 (0.76)
Total	23.88 (5.45)	8.09 (8.17)	4.95 (5.97)	0.81 (1.82)	2.22 (0.79)

Note: For ease of reading, significant differences are shown in bold. BMI = Body mass index (kg/m²), EAT Total = EAT total score, Food Preocc = Food Preoccupation, Emo Eat = Emotional Eating. Statistical significance, Dunnett's C, p < .05.

Discussion and Clinical Implications

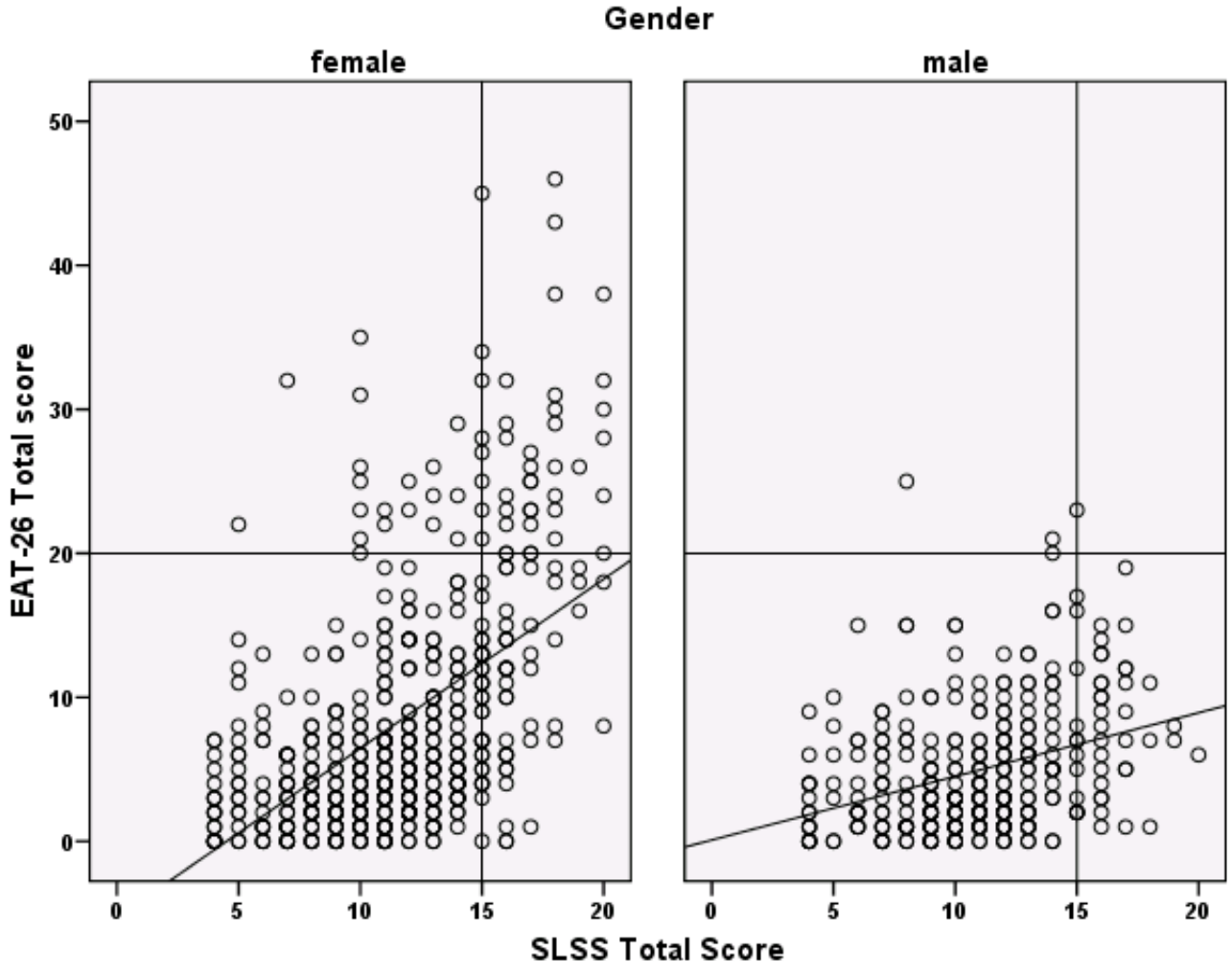
ED Risk among Women

As demonstrated in numerous previous studies, young adult women, regardless of ethnicity, are at greater risk for EDs than men. In the current study, significantly higher scores for women on several risk factors including excessive dieting, food preoccupation, weight concerns, and body dissatisfaction confirmed this finding. What is somewhat surprising is the fact that women report having significantly more Social Support than men ($p<.001$), including having someone to "count on when [they] need to talk," "share private worries with" and "help with important problems." This together with the weak correlations between Social Support and most other ED risk factors suggests that the lack of social support may not be a primary ED risk factor.

Despite the diversity of previous research findings on ED risks, we hypothesized that Japanese, Chinese, and Filipino women would be at equal or greater risk for EDs than their White peers and that Hawaiian women would not differ from their White peers. Surprisingly, we failed to confirm these hypotheses. On most measures showing a significant difference between Whites and other ethnic groups, Whites appeared to be at *greater* risk. In the case of females, the only exception was BMI, which was higher for Hawaiian women than for other ethnic groups and significantly higher than for Whites. However, the lack of higher scores for Hawaiian women on any other ED risk factor, suggests Hawaiian women are not at particularly high risk for EDs overall. Interestingly, the only risk factor correlated with BMI among Hawaiian women was Body Dissatisfaction ($r = .642$, $p<.001$).

These findings are consistent with conclusions reached by Wildes et al.[2] in their 2001 meta-analytic review. Contradictory findings notwithstanding, White women are apparently at greater ED risk than any of their non-White peers. In the present study, White women scored higher than women of other ethnic groups on four ED risk factors, including the Total Dieting and Food Preoccupation scores of the EAT, and the Emotional Eating score of the MRFS.

Figure 1: EAT Total score by SLSS score scatter plots for female and male participants.



Wildes and colleagues suggested that exposure to the thin body ideal in the media or pressure to be thin from peers might be greater among White women. To the extent that White women in the present study may have spent more time on the Mainland (i.e., continental US), they too may have been more influenced by mainstream American norms or media. However, given that only ~9% of the UH population comes from the Mainland, such differential exposure to American cultural norms seems unlikely to explain the great ED risk among White women.

ED Risk among Men

Although college men in Hawaii are apparently at much lower risk for eating disorders than college women, there are some important caveats to this generalization. First it should be noted that higher BMI scores have been shown to increase ED risk in at least some male groups (e.g., American Indians) but not others (e.g., Blacks and Pacific Islanders).[27] In the current study, Hawaiian men had higher BMI scores than all other ethnic groups and significantly higher mean BMI scores than White men. They also scored significantly higher than Whites in terms of Weight Concerns. As was true for women, BMI scores for men overall were strongly correlated with Weight Concerns and Body Dissatisfaction (see Table 1). In addition for Hawaiian men, three other ED risk factors were very strongly positively correlated with BMI, including Dieting (r=.629, p<.001), Weight Concerns (r=.692, p<.001), and Body Dissatisfaction (r=.693, p<.001). Thus, it appears that Hawaiian men may be at somewhat greater ED risk than both other male groups and Hawaiian women due to their concerns and behaviors related to excessive weight.

The only other notable differences among male groups were the significantly higher Weight Concerns and Performance Dissatisfaction (i.e., SLSS) scores for Filipino men. Two previous studies have found higher mean SLSS scores for Filipino than White men, but in neither case were these differences statistically significant.[25, 20] Moreover, in both studies, Filipino men had higher BMI scores than Whites. In the present study by contrast, Filipino males had normal BMI scores and their BMI scores were not significantly correlated with their SLSS scores (r = .416). Thus, Filipino men are apparently dissatisfied with their performance or with themselves for reasons other than excessive body weight. One possibility is that, especially in the multi-ethnic culture of the Hawaiian Islands, their relatively small stature[36] may contribute to a perception of competitive disadvantage in situations requiring athletic or social performance. Future research will obviously be needed to confirm this speculation.

Table 3. Ethnic Differences in ED Risk Factors for Male Participants

Ethnicity	BMI M (SD)	Wt Con M (SD)	Performance Dis. M (SD)
White	23.93 (4.88)	2.31 (0.55)	10.22 (3.37)
Japanese	25.18 (5.27)	2.31 (0.60)	10.87 (2.87)
Filipino	24.81 (3.95)	**2.64 (0.67)**	**12.28 (3.5)**
Hawaiian	**27.39 (8.48)**	**2.63 (0.73)**	11.00 (4.14)
Chinese	23.56 (4.81)	2.28 (0.62)	11.90 (3.41)
Mixed	23.56 (4.81)	2.38 (0.61)	10.48 (3.24)
Total	24.99 (5.53)	2.39 (0.62)	10.78 (3.37)

Note: For ease of reading, significant differences are shown in bold. BMI = Body mass index (kg/m^2), Food Preocc = Food Preoccupation, Emo Eat = Emotional Eating, Wt Con = Weight Concerns, Performance Dis = Performance Dissatisfaction. Statistical significance (LSD, p < .01): a = greater than White; b=greater than Japanese; c=less than White. Statistical significance, Dunnett's C, p < .05.

Differential Association between SLSS and EAT Scores

Yates and colleagues[34,35] have suggested that the SLSS may have an advantage over traditional ED risk assessment instruments because its items refer to athletic performance satisfaction rather than eating attitudes or behaviors. They argued that individuals, who may otherwise be reluctant to disclose weight or shape concerns, may nevertheless reveal their athletic performance concerns. The fact that the SLSS score is highly correlated with EAT Total score and other measures of ED risk (see Table 1) also supports the idea that the SLSS score may be a valid measure of ED risk. In further support of this idea, scatter plots in Figure 1 illustrate the association between EAT Total and SLSS scores for female (left) and male (right) participants. The horizontal and vertical lines in each panel show suggested ED cut-off scores for each instrument. The strong association between the EAT and SLSS scores for both genders is obvious. Also clear, however, is that while approximately the same number of women scored above the ED cut-offs for both DVs, virtually no men scored above the EAT-26 cut-off, despite the fact that many *did* score above the SLSS cut-off. This may suggest that men are less likely to reveal their eating-related concerns than their athletic performance concerns compared to women. Thus, the much lower EAT scores for men may suggest that instruments, which focus specifically on eating behaviors and attitudes may be less robust indicators of true ED risk among males than instruments, such as the SLSS that focus on body or athletic performance. If this is true, men may be at greater ED risk than traditional assessment instruments have suggested.

Possible Reasons for Inconsistent Previous Research

We noted in the introduction that the existing literature on ethnic differences in ED risk suffers from a number of problems including the failure to control for differences in geographic location or culture when comparing different ethnic groups. The uniqueness of the University of Hawaii students examined in the present study is that they are less likely to differ on these factors than has been true in

previous studies. Many of these students, regardless of ethnicity, are of similar age and have been exposed to the same general culture of Hawaii. Moreover, they have many of the same intellectual and aspirational characteristics, since they are all attending the same university. Despite these similarities, our participants remain diverse in characteristics other than ethnicity. Some come from rural and others from urban communities. Some live at home while attending smaller college campuses; whereas others lived in dormitories or apartments, while attending a large university campus. Moreover, there are many micro-cultures in Hawaii such that although individuals may be exposed to the same general culture of the Hawaiian Islands, they may still be segregated into smaller cultural groups within the larger Hawaiian culture. Thus, while participants in the current study may differ less in terms of factors confounded with ethnicity than in previous studies, such difference have not and probably cannot be eliminated completely. Nevertheless, we believe the present results provide a more reliable assessment of actual ethnic differences than most previous studies.

Limitations

Like most survey research aimed as assessing ED risk, the current study has limitations. One of the problems facing researchers in this area is the selection of appropriate survey instruments. These range from widely accepted instruments, such as the EAT-26, to more specialized instruments such as the SLSS. While we certainly have not tapped into all possible dimensions of ED risk, we feel the instruments used here provide a reasonably broad assessment of ED risk in this ethnically diverse college student sample.

A more serious limitation of the current study is the possibility that our results may not generalize to samples of students from the same ethnic backgrounds residing in other countries, cultures, or locations. In some sense, this is an inevitable result of our desire to hold the location of data collection constant. By doing so we hoped to avoid confounding ethnicity with location, which has been a problem in several previous studies. On the other hand, it is also possible that because the students in our study all reside in one geographic area, and are therefore exposed to many of the same environmental, social and cultural stimuli, differences due to ethnicity or cultural factors associated with country of ancestral origin may be blunted by the experience of living in Hawaii. Furthermore, since we did not distinguish between US citizens and non-citizen students and did not ask students their place of birth or how long they had lived in Hawaii, we were unable to assess possible differences within ethnic groups due to these other factors.

Obviously, we cannot be certain whether the results we have reported here generalize to other age groups or are unique to young adults of college age. Several previous studies have examined ED risk factors in this age group, but far fewer have examined individuals who are much younger (i.e., children) or much older. Nevertheless, given that the risk for developing an EDs seems to be greatest for individuals in their teens and early twenties, the current study does address a key segment of the most vulnerable population.

Conclusion

Given the inconsistencies in the results of previous studies of ethnic differences in ED risk, the goal of the present study was to examine ethnic differences among individuals representing a more homogeneous population (i.e., college undergraduates) with limited differences due to other factors such as local culture and geographic location of data collection. Consistent with previous literature, we found college women at greater ED risk than men. Likewise, consistent with Wildes et al.[2], we found that White women were generally at greater risk for EDs than Japanese, Filipino, Chinese, or Hawaiian women. However, certain specific differences among groups were notable. Such differences may be important to recognize when counselors and others charged with diagnosis and treatment of EDs are dealing with members of non-White groups. In particular BMI, which may be a risk factor for EDs among White females, may be less so among at least some non-White groups, such as native Hawaiians. It is also notable that men may manifest ED risk in unique ways depending on ethnicity. For instance, Filipino men may express excessive concerns about their social or athletic performance, regardless of BMI. Hawaiian men may respond in potentially maladaptive ways to excess body weight with increases in weight concerns, body dissatisfaction, and dieting. Finally, the present study suggests that future research will be needed to clarify the relative importance of factors often confounded with ethnicity including local or micro-cultural factors and the specific geographic localities where data are collected.

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Areca (Betel) Nut Chewing Practices in Micronesian Populations

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Abstract

Objective: To describe the areca nut/betel quid chewing practices of Micronesian chewers living in Guam.

Design: Two studies were conducted using qualitative data from focus groups and quantitative cross-sectional data from the 2007 Guam Behavioral Risk Factor Surveillance System (BRFSS). Ten focus groups included 49 men and women aged 18–60 years living in Guam in 2007. Participants were areca nut/betel quid chewers selected to reflect Guam's age and ethnic group (Chamorro, Chuukese, Palauan, and Yapese) distributions. Salient themes were extracted from transcripts of the sessions by three expert reviewers. A second method, latent class analysis, was used to identify unique groups of chewers. The groups were then compared on demographics and chewing-related behaviors.

Results: Areca nut and betel quid recipes collected from the focus groups showed that Chamorros had a preference for the ripe nut and swallowed the nut, whereas, the Chuukese, Palauan, and Yapese groups preferred the unripe nut and did not swallow it. Similarly, latent class analysis resulted in the identification of two groups of areca nut/betel quid chewers. Group 1 was all Chamorros. Compared to Group 2, the chewers in Group 1 preferred red and ripe nuts, did not add slake lime (calcium hydroxide) or tobacco, and swallowed the masticated areca nut (with or without Piper betle leaf).

Conclusion: The quantitative analysis confirmed the qualitative exploration of areca nut/betel quid chewers in Guam, thus providing evidence that chewing practices vary among Micronesian populations.

Implication: If future research should include an intervention, the differences in chewing practices among Micronesian populations should be taken into consideration to ensure programmatic success.

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Introduction

Approximately 600 million people worldwide[1] chew areca nut from the *Areca catechu* palm tree. The proper terms are "areca fruit" in reference to the fibrous drupe containing the seed, "areca nut" in reference to the seed only, and "betel quid" in reference to the areca fruit or areca nut combined with the *Piper betle* leaf and other additives. The two major chemical components of areca nut are polyphenols, which contribute to the nut's astringency and bitterness, and alkaloids, which are biologically the most important chemicals present in the nut.[2] Arecoline, the main alkaloid produces both cholinergic effects (enhanced effects of the parasympathetic nervous system) and anthelmintic effects (expulsion of parasitic worms) in the body.[3] The nut is also chewed for cultural reasons among populations in regions where the practice is endemic, such as the Indian Subcontinent, East and Southeast Asia, and the Pacific Islands.

Betel quid chewing is common in places such as India, Taiwan, and Melanesia. Epidemiologic studies on betel quid chewing have been conducted extensively in these places, and have shown consumption of betel quid to be associated with an increased risk for various chronic diseases[4-7] and overall mortality.[8] In particular, areca nut and betel quid have been classified as Group 1 human carcinogens by the World Health Organization.[2] However, evidence suggests that slake lime and betel leaf (two components of betel quid) are not carcinogenic.[2]

Areca nut and betel quid chewing is common in Micronesia, a group of islands where documentation on chewing practices is limited. The common term used in this region is "betel nut", regardless of its reference to the areca nut or betel quid. Micronesia is located in the Western Pacific and is comprised of the following islands: five island nations (including the Federated States of Micronesia, Kiribati, Nauru, Republic of Palau, and Republic of the Marshall Islands), two territories of the United States (Guam and Wake Island), and the Commonwealth of the Northern Mariana Islands. The Federated States of Micronesia is home to the natives of Chuuk, Kosrae, Pohnpei, and Yap. Guam is home to the native Chamorros, and the Commonwealth of the Northern Mariana Islands is home to native Chamorros and Carolinians. It has been noted elsewhere that Chamorros and Non-Chamorro Micronesians have different preferences for areca nut varieties and maturities.[9]

Guam, the island in Micronesia with the largest population, is diversely inhabited with different Micronesian ethnic subgroups. As of 2000, the Micronesian ethnic subgroups living in Guam (and their populations) were: Chamorros [57,297, 84.2%], Chuukese [6,229, 9.2%], Palauans [2,141, 3.1%], Pohnpeians [1,366, 2.0%], Yapese [686, 1.0%], and Kosraean [292, 0.4%].[10] A recent survey has shown a large increase in the Non-Chamorro Micronesian population in Guam, from 9,831 migrants in 2003[11] to 18,305 migrants in 2008.[12] The prevalence of areca nut/betel quid chewing may increase as the numbers of migrants from other Micronesian islands continue to increase, and so will the need to understand the chewing practices in order to monitor trends. Therefore, the objectives of this study were to 1) describe the areca nut/betel quid chewing practices of selected Micronesian populations living in Guam and 2) test the differences in chewing preferences.

Methods

This report is derived from a qualitative exploration of areca nut/betel quid chewing practices combined with quantitative analysis of patterns of areca nut/betel quid chewing in Micronesian populations in Guam. Ethical approval for this study was obtained from the Human Subjects Committee of the University of Guam and the University of Hawaii. The methods for this study are described in detail elsewhere.[13]

Focus group study

Participants

Adult areca nut/betel quid chewers, 18 years and older, participated in ten focus groups designed to examine the chewing practices among selected Micronesian populations living in Guam. Participants were recruited from the community using the judgment (or purposive) sampling technique, which is similar to quota sampling but without a sampling frame.[14] Since the purpose of the focus groups was known prior to sampling, the use of judgment sampling was appropriate.

Prior to recruitment, a meeting was held with outreach employees and researchers from the University of Guam and the Cancer Research Center of Hawaii to discuss appropriate target groups. The consensus was that the Chamorros, Palauans, and Yapese were the predominant areca nut/betel quid chewers; Chuukese were also included because they were the most populous Non-Chamorro Micronesian group on Guam.

Selected participants included those who responded to announcements that were advertised in local newspapers, radio talk shows, and flyers posted in the community. Interested participants were recruited if they: 1) chewed areca nut or betel quid within the past year (Summer 2006 to Summer 2007); 2) identified as Chamorro, Chuukese, Palauan, or Yapese; and 3) were at least 18 years old during

the study period. Forty-nine areca nut/betel quid chewers participated. They included eighteen (36.7%) Chamorros, eleven (22.5%) Chuukese, nine (18.3%) Palauans, and eleven (22.5%) Yapese. These groups were targeted based on chewing practices and adequate population size on Guam.

Focus group methods

The focus group script was pilot-tested with a group of university students to train the facilitator. Pilot data were used to improve the focus group methodology. For example, the last of ten questions in the practice focus group script asked about "other family members who chew betel nut." The answer to the question was consistently discussed with the second question on "first experience chewing betel nut," since most of the students described learning from family members. These two questions were consequently placed together in the final focus group script.

Ten focus groups were conducted throughout June and July of 2007 at the Cancer Research Center of Guam using the methodology described by Krueger.[15] Separate focus groups were conducted for males and females, and for each of the four ethnic groups. A male facilitator led the male focus groups and a female facilitator led the female focus groups to alleviate any gender-related cultural issues that may exist among the ethnic groups. The Chamorro and Palauan focus groups were conducted in English. The Chuukese and Yapese focus groups were facilitated by a bilingual male or female, and conducted in the appropriate language of the participants. Group discussions, which ranged from forty-five minutes to more than two hours, were tape recorded with hand-written notes by an assistant. Subsequently, a translator transcribed the tapes from the Chuukese and Yapese groups into English.

The focus group questions examined cultural beliefs about areca nut/betel quid chewing, past and current chewing practices and recipes, chewing etiquette, and reasons for chewing and continuing to chew. Some of the questions that were used as probes are listed on Table 1. Written areca nut/betel quid recipes were voluntarily submitted by focus group members following open-ended discussions.

Behavioral Risk Factor Surveillance System Study

Participants

Areca nut and betel quid chewers who participated in the 2007 Guam Behavioral Risk Factor Surveillance System (BRFSS) survey were included in the quantitative analysis. The BRFSS is a national health survey administered annually by the Centers for Disease Control and Prevention (CDC)[16]. Participants were selected by a complex sampling method, which is described in detail elsewhere.[16] There were 657 Guam residents who participated in the 2007 Guam BRFSS, which represented approximately 1% of its adult population. Of 362 (55.1%) participants who answered the areca nut-related questions, 132 (37 ± 3 %) reported ever chewing areca nut/betel quid in their life. Detailed information on chewing practices was available only for current chewers; 43 (12 ± 2 %) were current chewers. Former chewers were excluded from the analysis.

Table 1: Questions used in the focus groups and the Behavior Risk Factor Surveillance System.

Focus Groups
Prompts for discussion
How old were you when you first chewed betel nut?
Who or what encouraged you to chew betel nut?
What kind (variety) of betel nut did you first start chewing?
What other ingredients did you put on your betel nut?
Since then, why did you decide to continue chewing betel nut?
Prompts for recipes
What kind (variety) of betel nut do you currently chew?
What other ingredients do you add?
How much of each ingredient?
Describe what you do with the betel nut (mixture).
Do you swallow the betel nut or do you spit it out?
Behavioral Risk Factor Surveillance System
Have you ever chewed betel nut in your life?
Do you now chew betel nut?
How often do you chew betel nut?
Do you include lime when you chew betel nut?
Do you include tobacco when chewing betel nut? (Tobacco can be twist tobacco, cigarettes, or canned tobacco.)
Do you include *pupulu* or pepper leaf when chewing betel nut?
What variety of betel nut do you most often chew?
Do you ingest (swallow) your chew?

Survey

The 2007 Guam BRFSS was comprised of three components: a core component, an optional module, and state-added questions. Demographic data, alcohol consumption, and smoking status were gathered from the core component. Areca nut and betel quid use was gathered from the state-added questions (Table 1). An ethnicity questionnaire was included as a state-added option, and allowed for the categorization of areca nut/betel quid chewers into Micronesian subgroups. The optional

component provided information on diabetes, and does not pertain to this study.

Analysis

Focus groups

Focus group sessions were transcribed immediately after each session. Detailed notes taken by an assistant were used to fill in sections that were difficult to understand. The sessions were transcribed and analyzed using elements of the grounded theory, developed by Glaser and Strauss[17], to identify themes. A modified version of the technique outlined by Bernard[14] was used. The number of focus groups was small enough for the transcriptions to be reviewed by expert reviewers. Three qualitative research professionals with training and experience in anthropology, public health, and nutritional epidemiology were invited to review the focus group transcripts. Each reviewer was given a packet containing the transcriptions and instructions for a systematic approach.[15] The instructions asked the reviewers to read the transcripts and recipes (one focus group at a time); look for emerging themes (by question, and then overall); develop, code, and sort the themes; diagram the analysis; and consider revisions. All three reviewers were Non-Micronesian and non-chewers; however, all have worked with Micronesians. Only themes reported by two of the three expert reviewers were summarized, categorized into appropriate overlapping themes, and presented in a conceptual model.

Latent class analysis

Latent class analysis was used to analyze data from the 2007 Guam BRFSS. Latent class analysis is a statistical modeling method used to evaluate the relationship in categorical data where latent (unobserved) variables are identified from observed variables.[18] This model uses independent variables (continuous and categorical) to assign membership to a set number *k* of groups by maximum likelihood, while adjusting for covariates.[19] The Mplus® software (Version 3, Los Angeles, California) was used to perform these analyses. The variables used to identify patterns of areca nut/betel quid chewing among the 43 chewers were (coded yes or no): addition of lime, addition of tobacco, addition of betel leaf, cigarette smoking, and alcohol consumption. These variables were chosen to describe the combinations of ingredients used when chewing a betel quid. The analysis was sex-adjusted. The classes *(k)* were identified based on conditional probabilities of the selected variables. Results of each subject that was placed into a specific class were exported into a Microsoft Excel spreadsheet, and merged with the original 2007 Guam BRFSS data set. Weighted estimates (for the overall mean and stratified by class) were calculated.

Results

Areca nut and betel quid preferences

Recipes that were collected from the focus groups revealed differences in chewing patterns among ethnic groups (Table 2). The Chamorros preferred to chew the ripe (or hard), red areca nut variety (with betel leaf on occasion), and usually ingested the areca nut. They also distinguished between areca nut varieties of *ugam* (red) and *changnga* (white). The ripe areca nut used by the Chamorros was larger than the areca nut used by the Non-Chamorro Micronesians, and the husk was always removed. One nut could be divided into fourths or eighths, and eaten spaced apart throughout the day.

The Chuukese, Palauan, and Yapese chewers preferred to chew the unripe (or soft) areca nut, which they referred to as "green betel nut" or "Yapese betel nut." The Chuukese and Palauan preferred the *changnga* variety of areca nuts; the Yapese did not demonstrate a preference for either variety. The entire areca fruit (husk plus the young nut) was chewed as a whole or split into halves. Betel leaf, lime, and tobacco from cigarettes were often added. The tobacco from cigarettes was added as a piece of the cigarette (with the wrapper intact) that was torn to approximate the length of the nut.

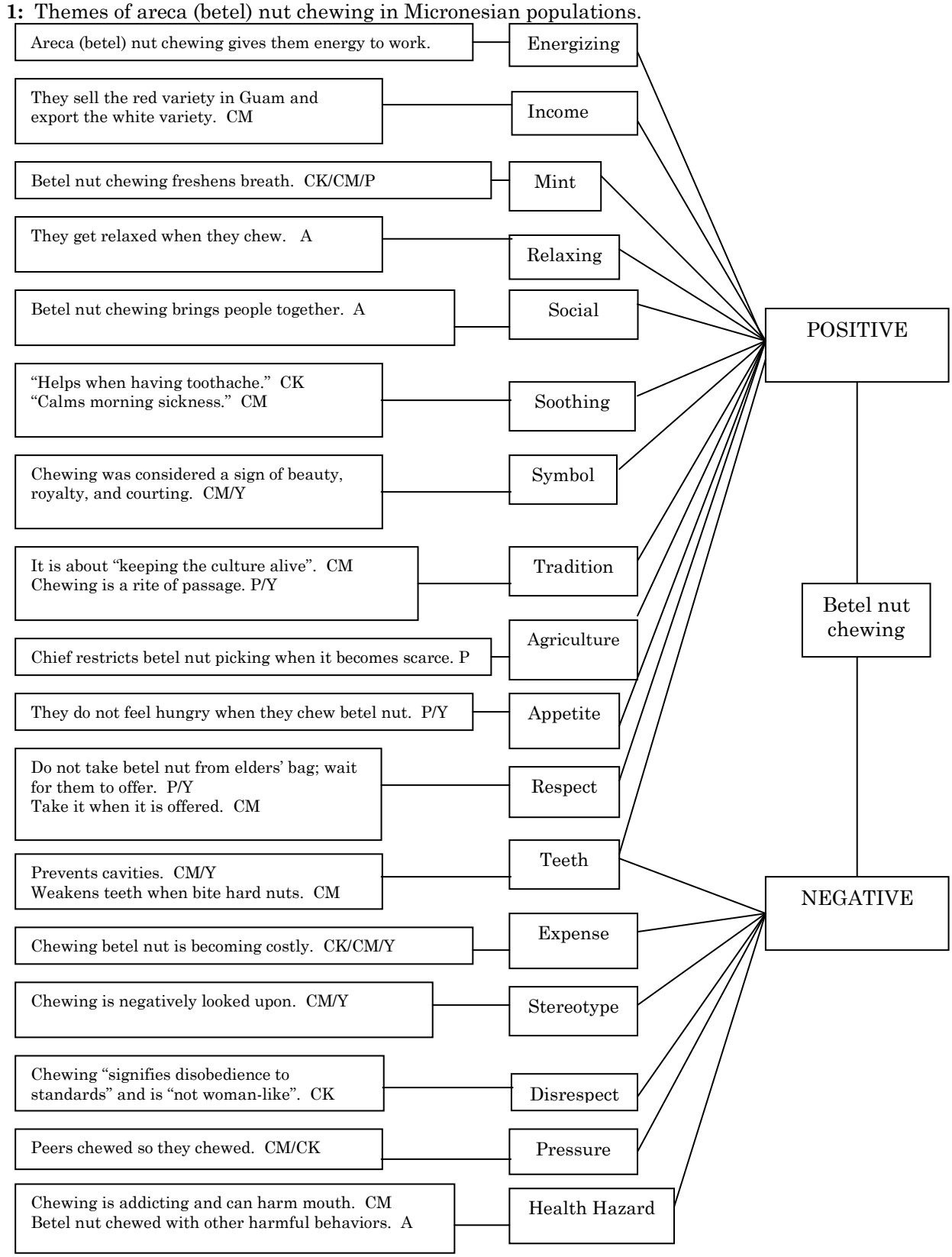
The focus groups resulted in seventeen areca nut/betel quid chewing overarching themes that were identified in the analysis by expert reviewers (Figure 1). Some of the positive themes frequently cited were that chewing areca nut/betel quid had energizing, relaxing, and soothing effects:

> "It re-energizes me, makes me feel stronger, and keeps me awake at work."
>
> "I get relief, relaxation, or overcome tension and stress, especially at work."
>
> "I chew betel nut for stomachache and headache."

All four ethnic subgroups commented on how chewing brings people together. The Chamorros, Palauans, and Yapese discussed chewing in the context of respect for tradition and social promotion:

> "The wisdom is in the betel nut bag… carrying the bag means you are able to make decisions for your whole family."
>
> "It's part of my ability to keep my culture alive…it helps me speak my language even better."
>
> "Chewing betel nut initiates that binding we all long for, especially from a small culture."

Figure 1: Themes of areca (betel) nut chewing in Micronesian populations.



Legend: CK = Chuukese, CM = Chamorro, P = Palauan, Y = Yapese, A = All

The Chuukese men had mixed feelings about the culture of chewing. They described social promotion within the context of family and friends:

> "When relatives or close friends call me for a meeting that I don't feel like going to, they mention betel nut. It influences my decision."

> "It helps maintain my friendship and close association with my buddies and co-workers."

They also noted that the practice was introduced to the Chuukese culture. The habit was considered by some to be culturally unacceptable, but that it served as a mechanism for social adaptation:

> "It signifies disobedience to standards."

> "I chew to fit in with everyone."

The Chuukese women used social promotion, primarily in the context of peer interaction:

> "The hardest part to ignore is when I see my friends chewing that I just want to be like them and enjoy chewing together."

There were positive and negative references to the effect of chewing on teeth. The Chamorros and Yapese discussed how chewing prevents cavities:

> "The lime is like a dental filling, so I don't go to the dentist because I don't have cavities."

The Chamorros who consumed the ripe areca nut noted that biting the nut weakens the teeth over time.

The association of areca nut/betel quid chewing and poor oral health was raised in all the focus groups. All groups admitted to hearing about associations of chewing with oral conditions such as oral cancer, teeth stains, and sensitive gums. However, not all groups, primarily the Chamorro men, agreed with the link to oral cancer:

> "If you're going to say that chewing is bad or cancerous…how…if it's just the nut itself?"

> "You never hear of our elderly having cancer problems because of chewing betel nut."

Patterns of areca nut and betel quid chewing

The average age of the areca nut/betel quid chewers included in the BRFSS latent class analysis was 43 years. Two distinct patterns of areca nut/betel quid chewing were identified and their users were grouped into classes for analysis. The first class consisted of 31 chewers and the second class consisted of 12 chewers. Demographic and behavioral characteristics were compared between the two classes (Table 3). More of the chewers in Class 1 had post-secondary education (41 ± 11%) compared to Class 2 (11 ± 10%), though this difference was only marginally significant (p<0.10). All the chewers in Class 1 were Chamorros. Most of the chewers in Class 1, compared to Class 2, preferred the ripe areca nut (93 ± 7% versus 22 ± 12%) of the red variety (99 ± 1% versus 50 ± 16%). Less than half (35 ± 10%) of the chewers in Class 1 chewed the areca nut with the betel leaf, and the majority of them (86 ± 7%) ingested the areca nut/betel quid. No one in Class 1 added lime or tobacco with the areca nut compared to Class 2 where 96 ± 4% added lime and 60 ± 16% added tobacco. There were no differences in alcohol consumption or cigarette smoking between Class 1 and Class 2.

Table 2: Summary of areca (betel) nut recipes submitted by focus group participants.

Ethnic group	Number of Participants	Ingredients reported	Swallow quid	Comments
Chamorro	18	Nut, red variety, ripe Betel leaf	Yes	One male used areca nut (white, soft variety), lime (calcium hydroxide), and tobacco from cigarette.
Chuukese	11	Nut, white variety, unripe Betel leaf Lime Tobacco from cigarette (not smoked)	No	One male did not use tobacco. Two males added ginger. One female added ginger and cardamom. Two males added vodka.
Palauan	9	Nut, white variety unripe Betel leaf Lime Tobacco from cigarette (not smoked)	No	Two females added cardamom.
Yapese	10	Nut, unripe Betel leaf Lime Tobacco from cigarette (not smoked)	No	One female sometimes swallowed the betel quid. Two males added cardamom. One male added vodka.

Note: One participant refused to submit a recipe.

Discussion and Clinical Implications

Areca nut has not been traditionally grown in Chuuk as it has in Guam, Palau, and Yap. This is evident in the types of products recently exported from each state in the Federated States of Micronesia. In 2007, Yap's major exports were garments and areca nut, whereas, Chuuk's major exports were cooked food and reef fish.[22] The Chuukese natives typically acquired the betel quid chewing habit as a way of socializing with other groups when they migrated to neighboring islands. The Chuukese in this study explained that young adults adopted the habit when they traveled to other islands in Micronesia to attend school. The Chuukese males in this

study found the habit to be unladylike and disrespectful among women. The Chuukese females acknowledge the habit as untraditional and unacceptable, especially among the elders in their community, but continue to chew:

> "Back home in Chuuk, when I chewed betel nut, particularly at a funeral site for a relative of mine, it seemed as though everyone was saying, she must have come from somewhere; it (chewing habit) is foreign and belongs to certain places like Yap, Palau, Saipan, etc."

> "Chewing betel nut calls attention. But if you were a Non-Chuukese lady, it is not a big deal and you would not get as much negative attention."

> "Chewing is kind of embarrassing especially in front of your relatives. To me, I would only chew secretly. Gender makes a difference in my culture, as far as chewing betel nut."

The women continue to chew betel quid to fill boredom and loneliness, and keep energized. It is also encouraged by their peers:

> "Lonely times are influential…this is when betel nut chewing comes in."

> "Some people say that I look cool when I chew and that encourages me to keep me chewing. On the contrary, the elders in my community oppose betel nut chewing."

> "People in my age group are affirmatively supporting chewing betel nut. That makes me keep chewing and it is addicting."

In addition to culture, health issues related to areca nut/betel quid use were raised during the focus group discussions. Areca nut and betel quid chewing may impart different health risks, depending on the combinations of ingredients used. For example, tobacco smoking[23] and betel quid, prepared with[24] or without tobacco[2], have been classified as human carcinogens, and both habits act synergistically on oral cancer.[2] Kennedy has reported on the oral cancer rates of Pacific Islanders.[25] Of all the Pacific Islanders reported, men from Papua New Guinea had the highest oral cancer incidence rate of more than 30 cases per 100,000 people. The second and third highest rates were Yapese (of more than 20 per 100,000) and Palauans (of more than 15 per 100,000), respectively. Chuukese had the lowest rate (of less than 5 cases per 100,000), preceded by Guam Chamorros (of slightly more than 5 cases per 100,000). Higher oral cancer rates in Yap and Palau may be partially explained by the habit of adding other ingredients to the betel quid such as tobacco from cigarette or smokeless tobacco. Lower rates among Chamorros may reflect the possible absence of smokeless tobacco in the Chamorro betel quid. In fact, the Chamorro population in Guam is atypical in their preference for chewing the ripe areca nut by itself. This unique behavior may be useful in understanding the effects of areca nut chewing (by itself) on risk for oral cancer in human populations. Although Chuukese chew betel quid similarly to Yapese and Palauans, their low oral cancer incidence rate is perhaps related to the recent introduction of betel quid chewing to the Chuukese culture.

Beliefs

Culturally, the Chamorros, Palauans, and Yapese in the focus groups were proud to claim their areca nut/betel quid chewing custom, and most were eager to pass it on. They all agreed that chewing promotes socialization. However, some of the chewers shared that they felt stigmatized when chewing areca nut/betel quid while socializing with non-chewers. When asked, "What made you start chewing betel nut?" a Chamorro female and Chuukese male both responded by describing how peer pressure influenced them to chew. Areca nut and betel quid chewing symbolized the "spirit of brotherhood" and a sense of welcoming, even among first-time acquaintances.

Table 3: Comparison of demographic and behavioral characteristics (weighted mean ± standard deviation or weighted mean % ± standard error) of the two types of areca (betel) nut chewers in Guam.

	Overall n = 43	Class 1 n = 31	Class 2 n = 12
Demographics			
Age, years	43 ± 3	44 ± 3	40 ± 4
Education, % with post-secondary	32 ± 8	41 ± 11	11 ± 10
Ethnicity, % Chamorro	88 ± 5	*100	58 ± 15
Gender, % males	56 ± 9	58 ± 10	52 ± 16
Marital status, % married	65 ± 9	64 ± 11	66 ± 14
Behavioral Characteristics			
% that chew mature nut	73 ± 8	*93 ± 7	22 ± 12
% that chew red variety	85 ± 6	*99 ± 1	50 ± 16
% that swallow betel quid	63 ± 9	*86 ± 7	7 ± 7
Characteristics used to determine classes			
% that add *Piper betle* (betel leaf)	41 ± 9	35 ± 10	57 ± 16
% that add lime (calcium hydroxide)	27 ± 8	*0	96 ± 4
% that add tobacco	17 ± 6	*0	60 ± 16
Alcohol drinks per month	144 ± 59	154 ± 62	122 ± 47
% smoke cigarettes	62 ± 8	66 ± 10	51 ± 16

*Statistically different from Class 2 at p<.05 level.

Betel quid has been used as a peace-maker and has been known to improve critical thinking processes[20], especially during group meetings. According to the Palauan men, when there is tension at a meeting, the chief interrupts the meeting for a betel quid break. Immediately after chewing, the men feel relaxed and ready to continue the meeting. The effects of improved concentration and relaxation have been documented elsewhere[21], although the exact mechanisms are not fully understood.

Both the Chamorro and Yapese groups believed that betel quid provides a coating on the teeth that prevents cavities. This cultural belief is supported by anthropological evidence[26,27] and clinical observation[28-30], where evidence of dental caries was low among areca nut/betel quid chewers; however, a study that controls for other lifestyle practices that may confound the relationship is warranted. Gerry and colleagues[31] found that among areca nut/betel quid chewers on Guam, the prevalence of dental caries was less than in non-chewers. It may be that constant mastication of the nut assists in removing foodstuff and other debris from between the teeth. Furthermore, areca nut/betel quid chewers traditionally use the areca nut husk as a toothbrush to help cleanse the mouth after chewing[31]; thus, nuances of chewing practice may also influence risk for dental caries. While areca nut/betel quid may protect against dental caries, the effect on the oral gingiva is less favorable as chewing is associated with periodontal disease[32, 33]. Furthermore, biting hard areca nuts may weaken the teeth.

The Palauans and Yapese in this study believed that betel quid chewing reduces appetite by suppressing hunger during work hours or until it is convenient to eat. Though areca nut may suppress hunger[34], other literature suggests an association between areca nut/betel quid chewing and elevated measures of obesity[7,35], possibly due to an increase in appetite.[7]

Practices

Areca nut chewing practice among the Chamorros was distinct from the other Micronesians (Chuukese, Palauan, and Yapese). Most of the Chamorros preferred the *ugam* (ripe red areca nut variety), which is also most prized among Chamorro avid chewers. Some of the Chamorros also chewed the areca nut with betel leaf, and often ingested the masticated wad and juice. The other Micronesians (Chuukese, Palauan, and Yapese) generally preferred the unripe nut with the betel leaf, lime, and tobacco. According to Staples and Bevacqua[37], the alkaloid levels are highest in the unripe fruits, and thus they provide a better stimulating effect. The strength of the areca nut may be a contributing factor to its preference among certain ethnic groups. For example, the other Micronesian groups consistently referred to the young areca nut as "Yapese betel nut." The Yapese women believed that their areca nut is stronger than any other areca nut. The women chewed the young nut, however, preference for a particular variety was not mentioned:

> "Yapese betel nut is stronger than any betel nut."
>
> "Some of the local (Guam) betel nuts taste… kind of sweet, but Yapese, does not."

A young Chamorro male considered the habit of chewing to be an alternative to smoking.

> "I don't like to smoke marijuana or cigarette so I would chew the young one."

However, the betel quid recipes obtained from the focus groups included harmful ingredients such as tobacco, and recently, alcohol. Those who added alcohol claimed it enhanced the experience. Betel quid chewing can become a habitual practice where tolerance increases with habituation.[36] The addition of tobacco and alcohol to betel quid may have resulted from habituation over many years of usage. The Yapese women believed that the addiction to betel quid chewing resulted from the addition of tobacco to the quid:

> "I think we get addicted when we start chewing it with cigarette."
>
> "When it is just betel nut, leaf and the lime, you can quit. But when you chew it with cigarette you get the nicotine from it and you get addicted."

A few of the Non-Chamorro Micronesians added cardamom, ginger, and vodka to their betel quid. Cardamom and ginger were added primarily because they "make the breath smell good," though cardamom provided additional sweetness and ginger imparted spiciness. One Chuukese and one Yapese participant had developed a relatively new habit of spiking their ingredients, such as the tobacco or areca nut, with vodka to enhance the euphoric effects. Swallowing was generally not practiced among the other Micronesians, probably due to the complex mixture of ingredients used with the unripe nuts and the physical impossibility of swallowing the large masticated husk.

These chewing differences were supported by quantitative analysis of the 2007 Guam BRFSS data. Two classes of chewers were identified from the latent class analysis. Information gathered from the focus groups and latent class analysis suggests that Chamorros are more likely to chew the ripe, red areca nut; and swallow the masticated wad (and juice) even if the betel leaf is added. The Chuukese, Palauans, and Yapese are more likely to chew the unripe, areca fruit (nut and husk) with betel leaf, lime, tobacco (from cigarette), and other spices; and spit out the juice and betel quid. These behavioral differences and the reasons for such differences should be taken into account when

developing interventions targeted to Micronesian communities.

Chewing practices among the Chamorros seems to have evolved over the years. Chamorros are believed to have originated from Southeast Asia[38,39], where betel quid chewing is also believed to have originated. If the ancient Chamorros chewed as their Southeast Asian ancestors did, a plausible suggestion based on anthropological evidence of betel stains in the teeth of the remains of ancient Chamorros[26,27,40], then the chewing patterns of today reflect hundreds of years of cultural change and adaptation. It would be useful to understand the factors that drive such changes. Effects of Western contact, and whether or not areca nut and betel quid use can be applied as a phenotypic marker for acculturation, are worth exploring. One hypothesis is that as the island adopted more Westernized thoughts, chewing became less attractive, and resulted in decreasing popularity. Modern simplification, or the removal of ingredients from the betel quid, as reflected in the practice of modern day Chamorros who chew only areca nut, may have been for convenience and the desire to be more attractive (less obvious). This may also explain the preference for swallowing. Other Micronesian islands remain less westernized than Guam, and may be less acculturated to Western customs. As Micronesians continue to migrate, they may also bring their practices with them. The effects of such migration on chewing practices and prevalence (in other countries) are areas for further research.

Strengths and Limitations

The strengths of this study were the ethnic diversity of the participants in the focus groups and the use of population-based data from the BRFSS to quantify the areca nut/betel quid chewing patterns that were gathered from the focus groups. This study was limited in the number of areca nut/betel quid chewers who completed the BRFSS areca nut-related questionnaire. A larger number of areca nut/betel quid chewers may have resulted in more than two classes of chewers.

Conclusion

Micronesian areca nut/betel quid chewers on Guam have key ethnic differences in chewing practices. The quantitative analysis confirmed the qualitative exploration of areca nut/betel quid chewing, and has provided further evidence of the variability in chewing practices among Micronesian populations. If future research should include an intervention, the differences in chewing practices should be considered for the intervention to succeed. For example, betel quid chewing cessation may be more successful in the Chuukese community, a relatively new group of chewers, than in the Chamorro, Palauan, and Yapese communities where chewing is culturally embedded.

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Diabetes Self-Management Support Needs and Concerns for the Future Among Employed Adults on Oahu

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Abstract

Objective: The Disablement Process Model suggests that diabetes can lead to functional limitations and impair an individual's ability to work. A first step to preventing the progression of diabetes is to understand the self-management needs of working adults with diabetes, and their concerns about the impact of the disease on their health and well-being.

Methods: In this cross-sectional side study, working adults with diabetes (n=190) completed demographic, self-reported health, and employment surveys, as well as biometric assessments. Another survey explored diabetes self-management support needs and concerns for future implications of the disease.

Results: T-tests indicated that persons with a higher blood glucose level had poorer functioning (t = 2.64, p < .01). In turn, persons with poorer functioning had lower levels of work productivity (t=3.74, p< 001). Participants expressed concerns regarding the future implications of the disease and indicated a need for support, and a desire to maintain a healthy weight (73%) and achieve blood glucose control (74%).

Conclusions: Results suggest that diabetes is associated with reduced physical functioning and poor work productivity. Working adults with diabetes showed concern for the future impact of the disease and needed support to successfully manage their blood glucose and weight.

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Introduction

Diabetes is the seventh leading cause of death in the State of Hawaii.[1] Approximately 72,000 to 100,000 residents have the disease.[3] Individuals with diabetes are at an increased risk for developing related complications such as blindness, cardiovascular disease, renal failure, stroke, neuropathy, and amputation. If poorly managed, diabetes can also lead to functional limitations and disability. The Disablement Process Model[2] conceptualizes disability as the endpoint in a linear chain that begins with pathology due to illness, disease, or injury. One metric for diabetes is the percentage of hemoglobin A1c (A1c) in the blood which provides a snapshot of one's overall glucose control. Pathology that is not adequately managed can lead to impairments and functional limitations. Past research indicates that diabetes is directly related to reduced physical function and the increased use of mobility aids.[4]

The endpoint of the chain, disability, can prevent an individual from performing daily activities including self-care and household duties, recreation activities, socializing, and employment. In fact, employment is often used as a gauge to determine or assess independence. Persons with diabetes may face difficulty maintaining employment and being productive at work. Individuals with insulin-dependent diabetes have a lower rate of employment (49%) than those who are not insulin dependent (88%), higher rates of absenteeism (14 days per year versus 3), and report more frequent use of health care services.[5] Among persons with Type 2 diabetes, reduced work performance is often experienced long before increased work absences, or departure from the workforce.[6]

Persons with diabetes may be concerned about the disease's potential impact on employment and independence, both now and in the future. Patients perceive potential future complications from diabetes (e.g., angina, major stroke) as having a considerable negative impact on quality of life.[7] Both prevention and management of complications requires effective diabetes self-management to help individuals take control of their diabetes and its progression.[8] However, significant knowledge and skill deficits exist in approximately 50 to 80% of persons with diabetes.[9] Understanding the relationship between health and disability combined with individual perceptions about the disease's potential impact on future employment and independence, and their ability to manage their disease, offers opportunities to effectively intervene.

Hawaii Demonstration to Maintain Independence and Employment (Hawaii DMIE)

Authorized under the Ticket to Work and Work Incentives Improvement Act of 1999 and administered by the Centers for Medicare & Medicaid Services, in 2006 and 2007 the Demonstration to Maintain Independence and Employment (DMIE) awarded funds to states to develop, implement, and evaluate interventions for workers with potentially disabling health conditions. Given the potential impact of diabetes on disability and employment, the Hawaii DMIE conducted a randomized controlled trial to determine how access to life coaching, pharmacy services and other support (i.e., certified diabetes educator, nutrition counseling) impacts the health and employment of persons with diabetes.[10] Hawaii DMIE targeted employed adult diabetics with the intent of preventing future disability and reliance on government assistance programs. This paper is a cross-sectional study that used Hawaii DMIE data to a) explore the relational pathway of A1c (as a measure of diabetes severity) to physical functioning to employment (Figure 1), as proposed by the Disablement Process Model, b) examine concerns about the future impact of diabetes on functioning and employment, and c) describe participants' needs for support with diabetes self-management.

Methods

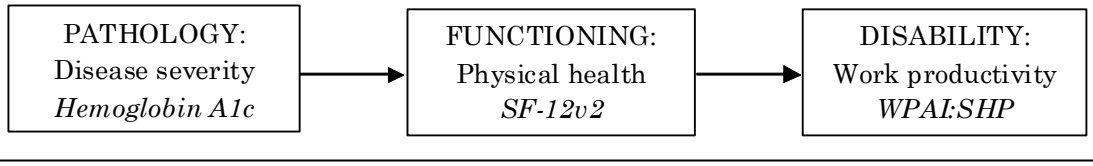
Study Enrollment and Eligibility

Between April and September 2008, 190 participants enrolled in the Hawaii DMIE. Eligibility requirements included: a) residency on Oahu, Hawaii, b) a diabetes diagnosis or hemoglobin A1c level of >6.5%, a level considered to be above normal, c) age range of 18 to 62 years, d) employment of at least 10 hours per week for four consecutive weeks, e) earned wages at or higher than the federal minimum wage, and f) non-receipt of Supplemental Security Income or Social Security Disability Insurance. Individuals were recruited through newspaper ads, human resources departments, diabetes–related public events, placards in the public transportation system, fliers at various pharmacies, and by word of mouth. Informed consent was obtained from all participants in accordance with the University of Hawaii Institutional Review Board.

Measures

Standardized questionnaires were administered to obtain baseline self-reported demographic, health, and employment information. Level of work productivity was assessed using the Work Productivity and Activity Impairment Questionnaire: Specific Health Problem (WPAI:SHP).[11] WPAI:SHP scores indicate the impact a disease has on work productivity and can range from 0 (no effect) to 10 (prevented me from working). Earnings information was obtained from the Hawaii Department of

Figure 1: Specific Disablement Process Model Pathway Investigated



Labor and Industrial Relations. Functional limitation was operationalized using the SF-12v2 Health Survey[12], with physical and mental composite scores calculated. Physical and mental health composite scores had a potential range from 0 to 100, with a higher number indicating better health. Participants were also asked if they had any difficulty (yes or no) with activities of daily living (ADL; i.e., bathing, dressing, eating, getting in and out of bed or chairs, walking, getting outside, and toileting) and instrumental activities of daily living (IADL; i.e., preparing your own meals, shopping, managing money, using the telephone, light housework, heavy housework, getting to places outside of walking distance, and managing medications). The Diabetes Empowerment Scale-Short Form (DES-SF)[13] is a psychosocial self-efficacy indicator with eight items. DES-SF scores can range from 1 to 5, with a higher score indicating higher self-efficacy. Additional participant health information, such as hemoglobin A1c, weight, and height, was obtained from healthcare providers.

To examine Disablement Process relationships, disease severity, physical functioning, and disability measures were identified and operationalized (Figure 1). Hemoglobin A1c was utilized as the indicator for disease (diabetes) severity, with higher A1c indicating greater severity. Physical functioning was operationalized using the SF-12v2 Health Survey[12] physical health composite score. As mentioned previously, disability can prevent persons from performing daily activities, including employment. Work productivity was operationalized using the WPAI:SHP.[11]

Six months post-enrollment, participants were given a follow-up survey that included a list of 10 diabetes self-management behaviors recommended by the Centers for Disease Control and Prevention[14] and asked whether they needed support to engage in these behaviors. The survey also included questions about whether the participant believed that diabetes would impact their future a) independence and b) employment.

Analysis

Descriptive statistics were used to analyze demographic, employment and health characteristics of participants. T-tests were used to compare SF-12v2 physical and mental health composite scores to national norms for persons with diabetes[15] and the mean hemoglobin A1c with the American Diabetes Association (ADA) diabetic recommendation. Chi-square tests were used to compare participants' demographic and health characteristics with the 2005-2008 Hawaii Behavioral Risk Factor Surveillance Survey (HBRFSS) in order to test the representativeness of the Hawaii DMIE sample.

A series of t-tests were used to examine relationships proposed in the Disablement Process Model. To examine the relationship between disease severity and physical functioning, A1c levels were dichotomized (A1c less than

Table 1: Hawaii DMIE Participant Demographic and Employment Profile

Mean Age (Range: 20 to 62 yrs)		48 yrs
Female		63%
Race/Ethnicity		
Asian		36%
Japanese	18%	
Filipino	7%	
Chinese	6%	
Other Asian	5%	
Native Hawaiian or Pacific Islander		35%
Native Hawaiian (Part or Full)	32%	
Other Pacific Islander	3%	
White		17%
Mixed (not Native Hawaiian)		8%
All Other Categories Combined		4%
Education Level		
High School Graduate or GED		12%
Some College or 2 Year Degree		37%
Four Year College Graduate		23%
> Four Year College Degree		27%
Personal Earnings		
Mean Earnings in 2007 (Range: $0 to $188K)		$44,356
Mean Earnings in 2006 (Range: $0 to $185K)		$41,324
Hours Worked		
Mean Hours Worked Each Week - Past Month (Range: 0[a] hrs to 168 hrs)		38 hrs
Work Productivity		
Mean effect diabetes has on work productivity (Range: 0 [no effect] to 8 out of 10 [completely prevented me from working])		1.5

[a] The zero hours worked in the past month comes from some participants, particularly teachers and instructors, enrolling while they were on summer break

Table 2: Hawaii DMIE Participant Health, Functioning, and Diabetes Empowerment Profile

Diabetes Type	
Pre-Diabetes	2%
Type 1	12%
Type 2	86%
Mean Years Since Diabetes Diagnosis (Range: 0.5 to 39)	8 yrs
Mean Hemoglobin A1c (Range: 5.1% to 12.4%)	7.8%
Body Mass Index (BMI)	
Underweight or Normal Weight	14%
Overweight	25%
Obese	61%
Mean Physical Health Composite[a] (Range: 21 to 64)	46
Mean Mental Health Composite[b] (Range: 12 to 67)	47
Activities of Daily Living (ADL) Limitations	
None	56%
One or Two	31%
Three or more	13%
Instrumental Activities of Daily Living (IADL) Limitations	
None	47%
One or Two	32%
Three or more	21%
Mean Diabetes Self Efficacy (Range: 1 [poor] - 5 [excellent])	3.8

[a]SF-12v2 Physical Health Composite; diabetic norm = 42
[b]SF-12v2 Mental Health Composite; diabetic norm = 47

7%, A1c greater than or equal to 7%) to determine whether persons with a high A1c have poorer physical functioning than persons with a lower A1c. The cutoff of 7% was chosen because the American Diabetes Association (ADA) recommends that diabetics ideally maintain A1c levels of less than 7%. To examine the relationship between physical functioning and employment (work performance), the SF-12v2 physical health composite score was dichotomized according to the norms for persons with diabetes (mean score less than or equal to 41.52, mean score greater than 41.52)[15] to determine whether persons with poor physical functioning had a lower level of work productivity than persons with normal or high physical functioning. To examine diabetes self-efficacy, the DES-SF was dichotomized (scores of four or greater defined as high self-efficacy).

Finally, chi-square analyses were used to examine whether perceived need for diabetes self-management supports or concerns about future functioning and employment differed when participants were categorized by disease severity and self-efficacy. Analysis was conducted using the SAS 9.2 (SAS Institute Inc., Cary, NC) program, and p-values less than .05 were considered statistically significant.

Results

All participants (n=190) completed the baseline survey which included self-reported demographics, employment, work productivity, functioning, and diabetes self-efficacy. Study staff obtained baseline A1c and body mass index information on 172 and 173 participants (91%) respectively. Baseline earnings and unemployment benefit information was obtained on 161 participants (85%), and 157 participants (83%) responded to the follow-up survey.

Profile of Participants

Overall, participants represented an ethnically diverse, educated, securely employed population (Table 1). The majority (87%) were ethnic minorities, including Asians (36%) and Native Hawaiians or Pacific Islanders (35%). All participants had at least a high school diploma or equivalent; and half had at least a four-year college degree. The average participant worked 38 hours per week and earned over $44,000 in 2007. Participants reported that diabetes had little or no effect on their work, with a mean work productivity score of 1.5.

Most participants had Type 2 diabetes (86%) and averaged 8 years since diagnosis (Table 2). Although the average A1c was 7.8%, which was significantly above the ADA diabetic recommendation of 7% or below ($p < .0001$), the average diabetes self efficacy score was fairly high. The average SF-12v2 physical health score was significantly higher than the norm for diabetics ($p < .0001$). Its counterpart, the mental health score, was similar to the diabetic norm ($p = .88$). Forty-four percent reported at least one ADL limitation, and just over half (53%) reported at least one IADL limitation. Over 80% of participants were overweight or obese.

Relationships between Disease, Functioning, and Employment

The pathway of A1c levels to functioning, and functioning to employment, was examined to determine whether there was evidence of the relationships proposed by the Disablement Process model. T-test results indicated that a high A1c level was associated with poorer physical functioning. Participants with a high A1c level had a lower mean physical health score ($M = 44.87$, $SD = 9.63$) than participants with a lower A1c ($M = 48.91$, $SD = 8.58$; $t = 2.64$, $p<.01$). In turn, poorer functioning among participants was associated with lower mean work productivity. Diabetes had a more detrimental impact on work productivity among persons with poor physical health ($M = 2.45$, $SD = 2.37$) than persons with better physical health ($M = 1.11$, $SD = 1.70$; $t = 3.74$, $p < .001$).

Concerns for the Future and Support Needs

Findings also indicated that participants were concerned

Table 3: Participants' Stated Need for Support with Diabetes Self-Management Behaviors

Behavior	Proportion Needing Support
Maintain healthy blood glucose levels	74%
Maintain a healthy weight	73%
Exercise regularly	66%
Maintain healthy cholesterol levels	57%
Manage stress	55%
Maintain a healthy blood pressure	48%
See a healthcare professional regularly	31%
Take medication as prescribed	22%
Get a flu shot every year	17%
Not smoke	6%

about the progressive nature of the disease. Over half (57%) believed their diabetes would affect their independence, activities, or functioning in the future. Among these participants who expressed a concern about their future independence, 74% had a higher than recommended A1c level ($\chi^2 = 3.92$, $p = .048$). Concerns for future independence did not vary by level of diabetes self-efficacy. Only a third (34%) thought their diabetes would affect their future employment. Participants' concerns about future employment did not vary by A1c level or diabetes self-efficacy.

In responding to questions related to the CDC's recommended diabetes self-management behaviors, most participants reported needing support to maintain healthy blood glucose levels (74%) and maintain a healthy weight (73%). Participants also indicated that they needed help in order to exercise regularly (66%) and maintain healthy cholesterol levels (57%). Few stated that they needed support to get a flu shot (17%) or to stop smoking (6%) (Table 3). The need for support related to the participant's A1c level and diabetes self-efficacy for two behaviors: controlling blood glucose and exercising regularly. Among participants who needed support maintaining a healthy blood glucose level, 74% had a high A1c level ($\chi^2 = 7.22$, $p < .01$) and 63% had low diabetes self-efficacy ($\chi^2 = 10.54$, $p < .01$). Among those who needed support to exercise regularly, 63% had low diabetes self-efficacy ($\chi^2 = 6.62$, $p = .01$).

Discussion and Clinical Implications

Hawaii DMIE participants represented an ethnically diverse group of working adults with diabetes on Oahu. Participants had an average A1c of 7.8%, above the ADA goal of less than or equal to 7%, indicating a population that is less than successful in managing their disease. Participants also had average levels of physical functioning, and over half reported having no ADL limitations. Most reported that diabetes had little to no effect on work productivity. Nevertheless, diabetes is a progressive and a potentially disabling condition. Using the Disablement Process Model to situate chronic illness/diabetes within the spectrum of disability, we found evidence that diabetes was associated with poor physical functioning and work productivity within our sample. In support of the disablement process, greater disease severity was associated with poorer physical functioning. The link between functioning (defined in this study as employment, specifically work productivity) and disability was also established because persons with poor physical functioning had lower levels of work productivity. For these individuals, functional limitations impeded their ability to work. A combination of better diabetes self-management and supportive workplace policies may prevent further losses and unemployment.

This study had a few limitations. First, the examination of these relationships provided a point-in-time snapshot of the linkages between diabetes, functioning, and employment, not a longitudinal look at the progression of the disease if it remained unmanaged. However, results demonstrated that greater impairment was associated with progression to later steps in the disablement process. Second, the sample was not representative of employed adults with diabetes in Oahu. Comparison with 2005-2008 HBRFSS data indicated that the age distribution ($\chi^2 = 7.13$, $p = .07$) of Hawaii DMIE participants and the proportion with health coverage ($\chi^2 = 1.17$, $p = .28$) were similar. In addition, the proportion of Hawaii DMIE participants who took a prior course on diabetes self-management was similar to employed adults with diabetes in Honolulu ($\chi^2 = 2.30$, $p = .13$). However, the Hawaii DMIE enrolled significantly more Whites ($\chi^2 = 19.14$, $p < .001$), more females ($\chi^2 = 40.55$, $p < .0001$), and more persons with higher levels of education ($\chi^2 = 54.00$, $p < .0001$). Hawaii DMIE participants were also in poorer health ($\chi^2 = 28.61$, $p < .0001$) and had a higher BMI ($\chi^2 = 7.74$, $p < .02$) than adults with diabetes working in Honolulu. Nevertheless, the recruitment of participants to the Hawaii DMIE project was not intended to be representative and the present study has important implications.

Given the progression of the disease and its potential impact on employment, understanding the needs and concerns of working adults with diabetes is important. Participants most frequently reported the need for help in order to maintain a healthy weight and manage their blood glucose levels. These needs were especially evident among those with low diabetes self-efficacy. Targeting working adults with low diabetes self-efficacy is important because persons need to feel empowered in order to successfully manage their disease, both now and in the future. Results indicate that participants were cognizant of potential complications of diabetes, and many expressed concern that diabetes would impact future independence and employment. Understandably, participants with a high A1c level were particularly concerned about their future independence. These needs and concerns of working adults

reinforce the need for supportive workplace policies. Employers could sponsor diabetes education and self-management programs and implement flexible schedules for employees with diabetes to improve work productivity and reduce absenteeism. Moreover, all employees could benefit from opportunities and incentives for health promotion and wellness. Such workplace programs and policies will be beneficial to employees who are already juggling work and family.

The present study has implications for Hawaii and the Pacific. In Hawaii, diabetes is more prevalent among Native Hawaiians, Filipinos, and Japanese residents.[2] The strength of this study is that it captures the diabetes support needs and concerns among working adults from diverse ethnic backgrounds. Addressing support needs and concerns through targeted, individualized interventions for working adults may prevent or limit the impact of diabetes on work productivity and continued employment. Uncontrolled diabetes and diabetes-related disability impose significant costs to the individual, healthcare system, and the workforce. The present study improves our understanding of the relationship between health and employment. Furthermore, identifying individuals' needs for diabetes self-management support and perceptions about the disease's potential impact highlights opportunities to intervene in the disablement process.

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Social and Demographic Factors Associated with Diabetes and Hypertension in Hawaii: Multinomial Logit Model

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Abstract

Objective: To examine associations between selected social / demographic factors and diabetes or hypertension, alone or in combination, among Hawaii's adults.

Methods: Odds ratios were calculated for selected demographic/social independent variables and (1) diabetes alone, (2) hypertension alone, and (3) diabetes and hypertension in combination using a multinomial logit model (MNLM). Data from the 2005 Hawaii Health Survey (HHS) was used in the model.

Results: The 2005 HHS had an actual sample size of 13,889, and a weighted sample size of 898,593. As expected, lower household income and lower education, which were used together as a proxy measure of socioeconomic status (SES), were positively associated with diabetes alone, hypertension alone, and diabetes and hypertension in combination. Interestingly, those with lower income and higher education and conversely, those with lower education and higher household income were less likely to have diabetes or hypertension when compared to those who were less educated and lived in households with lower income. When compared to the referent group (Whites), Native Hawaiians were more likely to have diabetes alone or both diabetes and hypertension in combination, while Filipinos and Japanese were more likely to have hypertension alone.

Discussion: Low SES was associated with diabetes, hypertension, and a combination of diabetes and hypertension. The findings of this study suggest that the association between disease prevalence and low household income may be weakened by higher educational attainment, and conversely, the association between disease prevalence and low educational attainment may be buffered by high household income.

Key words: multinomial logit model, diabetes, hypertension, Hawaii, public health, SES

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Introduction

Diabetes and hypertension have been known for their high comorbidity.[1-4] It has been estimated that 20-60% or more of diabetic complications can be attributed to hypertension.[2,4] Also, the prevalence of hypertension in diabetic individuals appears to be 1.5 to 3 times higher than in non-diabetic age-matched groups.[2,3]

In addition, these two diseases are very common in the United States in general as well as in Hawaii, and their prevalence is increasing.[5-7] On average, approximately 8% of Americans reported that they had diabetes in 2007[8,9]; around 28% of Americans reported that they had hypertension.[10,11] The percentages and the increasing patterns for both diseases in Hawaii reflect what is occurring nationally.[6,9,11]

Although diabetes alone is associated with a considerable increase in cardiovascular risk, the presence of hypertension in the diabetic individual markedly increases morbidity and mortality. People with both diabetes and hypertension have approximately twice the risk of cardiovascular disease as non-diabetic people with hypertension.[1,4,12]

Generally, both diseases are more common among males, the elderly, and non-White groups,[13-15] including Pacific Islanders and Asians in Hawaii[6,16-18]; and among those who are less educated, earn less, and are less satisfied with their general health status.[1,6,15,16] It is not clear whether place of residence is associated with diabetes and hypertension in combination.[9] What is known is that diabetes prevalence is similar across all Hawaii's counties.[6]

Despite the clinical importance of diabetes and hypertension as co-morbid conditions, the descriptive epidemiology of these two diseases taken together has not been well documented in Hawaii or in the U.S. as a whole. The Hawaii Department of Health (DOH) monitors diabetes and hypertension prevalence and trends[6,7,9]; however, they are tracked as separate conditions. As such, the goal of this paper is to examine the associations between pre-defined social and demographic measures with diabetes alone, hypertension alone, and diabetes and hypertension as co-morbid conditions in the Hawaii adult population. The hypothesis of this study is that age and minority status will demonstrate positive, whereas marriage, higher SES statuses, and residence in a less populous county will demonstrate negative correlations with the prevalence of diabetes and hypertension, alone or in combination. Moreover, it is hoped that the findings of this study will contribute to the current body of knowledge relating to the social and demographic factors associated with diabetes and hypertension, particularly among Hawaii's adults.

Participants and Methods

The data used in this study was obtained from the 2005 Hawaii Health Survey (HHS). The HHS is a representative-sample survey based on households, administered by telephone interview to adult residents in more than 6,000 households each year. The HHS survey is modeled after the National Health Interview Survey (NHIS) conducted by the National Center for Health Statistics (NCHS). All survey respondents are adult residents of the state of Hawaii and supply information on all members of the household. The principle objective of the survey is to provide statewide estimates of population parameters that describe (1) the current health status of the population; (2) respondents' access to and utilization of health care; and (3) the distribution of the population by age, sex, and ethnicity.[19,20]

This study employed a multinomial logit model (MNLM) and STATA 10.0 for statistical analysis. To do this, two dependant variables, diabetes and hypertension, were combined into a single variable with four categories: diabetes alone, hypertension alone, both diabetes and hypertension, and neither diabetes nor hypertension. In other words, persons with diabetes were divided in two groups, those who had diabetes without hypertension and those who had both diabetes and hypertension. This process was also followed for those with hypertension. This transformed the dependent variable into a multinomial variable with four categories. The reference group for the analysis consisted of those individuals with neither diabetes nor hypertension. This paper treated the dependent variable as multinomial, because the set of categories created by these two diseases were not measured in an ordered way. The technique has its strengths and has been used successfully elsewhere.[21-27]

The independent variables used to predict diabetes and hypertension included the person's age, sex, race/ethnicity, marital status, county of residence, and SES (a composite of education and household income), all of which have been identified as contributing factors to these diseases.[1,3,6,8,10,13,14,16,18] Age was measured in years (only adults 18-years-old and over were included). Five variables were created for race/ethnicity: Native Hawaiian, Japanese, Filipino, and Other, with Whites as the reference group. Residence was based on Hawaii's four counties: Hawaii, Kaua'i, Maui, and Honolulu. Education and income have been used as important predictors of diabetes and hypertension in previous studies.[28-30] To avoid multicollinearity and gauge SES more accurately, the two variables were combined into one variable with four categories: high school education with lower household income (under $55,000), high school education with higher household income (over $55,000),

college education (including some college) with lower household income, and college education with higher household income. The SES group consisting of families with only a high school education and household income below $55,000, which was the mean household income, was used as the reference group.

Results

Descriptive analysis showed an adult prevalence of diabetes of 7.7% and a prevalence of hypertension of 21.0%. Approximately 2.8% of Hawaii adults reported that they had diabetes alone, 16.1% had hypertension alone, 4.9% had both diseases, and 76.2% had neither disease. Altogether, 64% of adults with diabetes also reported having hypertension and 23% of adults with hypertension also reported having diabetes.

Table 1 presents frequency distributions of the 2005 HHS survey. The average age of the adult population was 47.6 years old. Half were male (49%). Six out of 10 adults were married (60%). One out of four adults was White (25%), one out of five adults was Native Hawaiian (21%), 22% were Japanese, and 15% were Filipino; the remaining 17% were classified as "Other". Almost one third of adults in Hawaii were categorized as having low education with lower household income (30%), slightly over one third were categorized as having low education with higher household income (35%), about 10% were categorized as having higher education with lower household income, and 25% were categorized as having higher education with higher household income. More than two thirds of adults lived in Honolulu County (70%); 13% lived in Hawaii County, followed by Maui County (12%), and Kaua'i County (5%).

Table 1: Descriptive Statistics (N=898,593, weighted)

Variable	Mean	SE
Age	47.60	.0186
Male	0.49	.0005
Married	0.60	.0005
Race/Ethnicity		
Whites	0.25	.0005
Hawaiian	0.21	.0004
Japanese	0.22	.0004
Filipino	0.15	.0004
Other	0.17	.0004
SES (Education ×Income)		
High school Education-Lower Income	0.30	.0005
High school Education-Higher Income	0.35	.0005
College Education-Lower Income	0.10	.0003
College Education-Higher Income	0.25	.0005
Residence (County)		
Honolulu	0.70	.0005
Hawai'i	0.13	.0004
Kaua'i	0.05	.0002
Maui	0.12	.0003

Table 2 presents the results of the multinomial logistic regression analysis. The first column presents the log odds of having diabetes only versus having neither diabetes nor hypertension. For example, the first logit coefficient shown in the first column is for age (0.05). The logit coefficient is interpreted to mean that for every year's increase in age, there is an increase of 0.05 in the log odds of having diabetes only compared to having neither diabetes nor hypertension. Often, the estimated parameter effects are easier to interpret when converted into odds ratios (done by exponentiating the coefficients).[21,31] If we convert the coefficient for age (0.05) into odds ratio, the odds ratio is 1.05, suggesting that for each additional year of age, the odds of having diabetes only compared to having neither diabetes nor hypertension increased by 5%.

Males were more likely than females to have diabetes, hypertension or both diseases (OR: 1.211; 95% CI: 1.180-1.242 for diabetes only; OR: 1.267; 95% CI: 1.252-1.283 for hypertension only; OR: 1.213; 95% CI: 1.188-1.238 for both).

Married individuals showed a higher likelihood of having either diabetes only (OR: 1.128; 95% CI: 1.098-1.160), or hypertension only (OR: 1.064; 95% CI: 1.051-1.078), compared to having neither disease. The likelihood of having both diseases was not statistically different when comparing married and non-married individuals.

Native Hawaiians, when compared to the referent group (Whites), were at higher risk for all dependent variables (OR: 1.636; 95% CI: 1.571-1.703 for diabetes only; OR: 1.150; 95% CI: 1.128-1.172 for hypertension only; OR: 2.206; 95% CI: 2.134-2.281 for both). Similar patterns were seen for Filipinos and Japanese, with rates of either or both disorders in these populations exceeding that in Whites.

Compared to the referent group (i.e. low education/low income), the remaining SES combinations (low education/high income, high education/low income, high education/high income) were negatively associated with diabetes alone, hypertension alone, and diabetes and hypertension in combination.

In general, diabetes alone, hypertension alone, or diabetes and hypertension in combination were negatively associated with living in the neighboring counties (Hawaii, Kaua'i, Maui) when compared to the referent group of Honolulu County (the most populated county), with one exception.

Table 2: Logit Coefficients and Odds Ratios from Multinomial Logistic Regression of Diabetes & Hypertension versus None, on Selected Social and Demographic Factors: Hawaii Health Survey, 2005

Variables	Diabetes only (1)			Hypertension only (2)			Diabetes & Hypertension (3)		
	Coef.	OR	95% CI	Coef.	OR	95% CI	Coef.	OR	95% CI
Age	0.05 *	1.047	1.046 1.048	0.06 *	1.057	1.057 1.058	0.07 *	1.069	1.069 1.07
Male	0.19 *	1.211	1.18 1.242	0.24 *	1.267	1.252 1.283	0.19 *	1.213	1.188 1.238
Married	0.12 *	1.128	1.098 1.16	0.06 *	1.064	1.051 1.078	0	1.002	0.981 1.024
Race/Ethnicity									
Hawaiian	0.49 *	1.636	1.571 1.703	0.14 *	1.15	1.128 1.172	0.79 *	2.206	2.134 2.281
Filipino	0.43 *	1.539	1.48 1.601	0.29 *	1.34	1.318 1.364	0.73 *	2.075	2.011 2.141
Japanese	0.39 *	1.477	1.412 1.544	0.29 *	1.342	1.316 1.37	0.72 *	2.063	1.99 2.139
Other	0.42 *	1.521	1.459 1.586	-0.03 **	0.966	0.947 0.985	0.59 *	1.807	1.745 1.871
SES (Education × Income)									
High School Education-High Income	-0.44 *	0.641	0.621 0.661	-0.08 *	0.924	0.91 0.938	-0.07 *	0.932	0.91 0.955
College Education-Low Income	-0.89 *	0.411	0.39 0.433	-0.21 *	0.814	0.797 0.831	-0.2 *	0.82	0.792 0.849
College Education-High Income	-0.56 *	0.572	0.552 0.593	-0.15 *	0.86	0.845 0.875	-0.49 *	0.611	0.592 0.63
Residence									
Hawaii	-0.13 *	0.882	0.847 0.918	0	1.001	0.982 1.019	-0.17 *	0.842	0.816 0.87
Kauai	-0.06	0.945	0.891 1.002	-0.06 *	0.938	0.912 0.964	-0.25 *	0.777	0.74 0.816
Maui	0.21 *	1.239	1.194 1.287	-0.04 *	0.963	0.945 0.982	-0.07 *	0.931	0.901 0.962
Constant	-5.79 *			-4.63 *			-6.77 *		
	Number of Observation = 898,593								
	Model chi-square (df) = 154,199.6* (39) Pseudo R2 = .115								

*: p<.001; **: p<.01

Reference group on dependent variable is "neither of the two diseases."

Maui County residents were more likely to have diabetes (OR: 1.239; 95% CI: 1.194-1.287).

Discussion and Clinical Implications

Diabetes and hypertension are highly co-morbid conditions[1-4]; furthermore, negative cardiovascular health outcomes are much higher in persons with diabetes and hypertension.[1,4,12] As expected, the study found a considerable number of adults in Hawaii with co-morbid diabetes and hypertension. In addition, the overall model was a good fit, and most of the logit coefficients were statistically significant (Table 2). Furthermore, except for marital status, the coefficients showed the expected associations with diabetes and hypertension. Being married did not reduce the likelihood of having either diabetes or hypertension in this study.

This study supports the current body of knowledge that a negative relationship between socioeconomic status and diabetes and/or hypertension exists. Socio-economically disadvantaged individuals are clearly more likely to have these diseases, as other studies have indicated.[29,30,32] Where the results are interesting and unexpected, however, is the differential impact SES has on these diseases within SES groups. The negative associations between higher SES and the diseases were expected, but the results showed that education and income might have buffering effects on each other. For example, despite lower education, for those who lived in a household with a higher income, the likelihood of having diabetes, hypertension or both was lower when compared to those with lower education and lower household income. Conversely, despite living in a household with lower income, those who attained a higher level of education, were also less likely to have diabetes, hypertension, or both.

While this study does not provide the information necessary to make statements regarding causal pathways, it is postulated that in a person with lower education, having access to adequate financial resources may translate to better access to healthcare and social support, and thus be protective. Conversely, a person who lacks adequate financial resources, but has a higher level of education, may have a higher level of health literacy, and thus be protected as well.

This leads us to consider the social circumstances and lifestyles of each SES group and the roles they play in determining health status. It is well documented that both hypertension and diabetes are related to the diet and lifestyle, and that changing lifestyle and/or diet can reduce their risk.[17,33-36] The lifestyle and diet of college-educated and high-income groups probably differ from those of their counterparts, who often eat a poor diet of unhealthy food, such as fast food.[35,37-39] It is very important to note that social environments also play a large role in determining population and individual health. So while interventions aimed at influencing individual lifestyle choices are important, improving the social environment where inequities exist is crucial for positive change to occur.

When examining race/ethnicity, all of the major ethnic groups (Japanese, Filipino, Native Hawaiian) had a higher risk of diabetes or hypertension alone or in combination when compared to the referent group (Whites). This finding is consistent with other studies.[6,7,16,18] Native Hawaiians had the highest risk for diabetes only and diabetes and hypertension in combination, and Filipinos and Japanese had a higher risk for hypertension only. It is postulated here that race/ethnicity and SES may be interconnected rather than independent variables.

Based on the results of this study, target groups for diabetes and hypertension prevention strategies in Hawaii should include those on the lower end of socioeconomic strata (lower household income, lower educational attainment), as well as the three major non-White ethnic groups (Native Hawaiian, Filipino, Japanese).

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Health Care Reform Truths Revealed

Riana Riffle[1]

Abstract

In 2010, a dramatic Health Care Reform Act was signed into law by President Obama. That Health Care Reform Act is now under attack in the Courts. Moreover, the 2010 elections changed the dynamics of health care reform, and the Republican controlled House of Representatives is in the process of attempting to dismantle the Health Care Reform Act. Recent polls show that Americans are deeply divided over the current law, and have widely divergent views regarding the topic of health care reform in general. The topic of health care reform is now front and center in the American political arena, and is one of the lead stories on national news nearly every day. With this focused attention, there is a window of opportunity to carefully consider health care reform. Serious analysis and consideration of all health care reform alternatives is in the best interest of our country.

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Introduction

Health care reform involves several complex and widely misunderstood issues. Sadly, the general public does not have a good understanding of the issues or the legislation. The recently enacted health care reform act ended up being compromised legislation. Many liberal politicians are disappointed by the legislation, because they wanted "single payer" health care, and even broader coverage. Many conservative politicians wanted no reform at all, or reform which would significantly reduce costs. On January 19, 2011, the House of Representatives voted 245 to 189 to repeal the Health Care Reform Act.[1] While the Democratic controlled Senate will likely not follow suit, the 245-189 vote in the House is indicative of just how deeply divided our country is on health care issues.[1] In commenting on the Repeal Act, Senate Majority Leader Harry Reid, a Democrat from Nevada, said:

> "Republicans are voting to take tax breaks away from small businesses, raise prescription drug prices for seniors and let insurance companies go back to denying coverage to sick children. This is nothing more than partisan grandstanding at a time when we should be working together to create jobs and strengthen the middle class."[1]

In sharp contrast, Republican Frank Lucas, who presided over the House during part of the debate on the Repeal Act, said:

> "It is time to sit down and start over with reforms that don't scare employers from hiring, reforms that allow the American people to have a choice in their health care, and save rather than cost the people…money."[1]

Despite all this controversy, one thing is certain. If and when this reform is fully implemented, it will dramatically expand the number of people who have health care coverage in the United States (U.S.).[2] In light of the Repeal Act, and various court challenges to the Health Reform Act, there are now more questions regarding the certainty and scope of health care reform than ever before.

Martin Luther King, Jr. said that "Of all the forms of inequality, injustice in health care is the most shocking and inhumane."[3] While there is widespread sentiment that it is necessary to expand health care coverage to those who truly cannot afford such coverage, many fear the dramatic changes in our health care system contained in the healthcare reform legislation could have an overall negative impact. The potential costs associated with the health care reform legislation are staggering. Many commentators have argued that the legislation failed to enact sufficient cost control provisions to make the system more efficient. It has been argued that the legislation is really not "reform," in the true sense of the term, but rather a massive expansion and increase in taxation, with no promise that our system will become more efficient or more effective.[4] It is also unclear whether an adequate, unbiased comparison of nationalized health care systems in other countries was performed before the Reform Act was passed. On the other hand, many have argued that the reform legislation did not go nearly far enough, asserting that true universal health care, with a "single payer" (i.e. government) model, is the optimal solution.[5] Before proceeding any further down this path towards dramatic "reform," we need to think critically about our unique cultural expectations of health care, whether the recently enacted health reform legislation places us on the right track, and whether there are other measures that can be taken which will have a positive impact on health care reform.

Overview of Current Health Care System in United States

The current health care system in the United States includes a combination of employment-based health insurance, private insurance, and government funded insurance. It is obvious that the current United States health care system has problems. Runaway inflation in the medical field outpaces any other area of our economy.[6] The United States spends more on health care than any other country, in both total dollars, and in percentage of Gross Domestic Product (GDP). The U.S. spent 16% of its GDP on health care in 2008.[7] Despite ranking highest in terms of percentage of GDP spent on health care, the U.S. ranked 72nd out of 191 countries by the World Health Organization (WHO) in terms of health performance based on level of health. The United States is also ranked 24th in terms of life expectancy.[7] Additionally, 46.3 million (or approximately 15.4%) of Americans were uninsured as of 2008.[8] These statistics do not reflect favorably upon the health care system of the United States.[8] However, these statistics might not be an accurate reflection of the relative efficiency and quality of our current health care system, which has unique aspects and qualities not found anywhere else in the world.[9]

The Reform Act

On March 21, 2010, the House of Representatives passed the Senate's version of the Patient Protection and Affordable Care Bill. On March 23, 2010, President Barack Obama signed the Patient Protection and Affordable Care Act into law, along with the Health Care and Education Reconciliation Act of 2010.[10] The Patient Protection and Affordable Care Act (PPACA) and the Health Care and

Education Reconciliation Act of 2010 (HCERA) together constitute the health care reform legislation ("Reform Act"). A consolidated version of these two acts created by the House Office of the Legislative Counsel can be accessed at the National Conference of State Legislature's website (www.ncsl.org).[11] The Reform Act contains a mandate for citizens to obtain health insurance by imposing penalties for non-compliance. Individuals who are financially unable to purchase health care will be given credits or vouchers to assist them in obtaining coverage. Employers who already offer health care coverage must meet the regulations specified by the new Reform Act. Employers who do not offer insurance will be subject to additional penalties and taxation. Some exceptions will be available for small businesses. Funding for the health care reform will come from taxation. There will be a 40% excise tax on high-cost group insurance. Taxes will also specifically target high-income taxpayers by imposing an additional Medicare payroll tax for taxpayers earning at least $200,000, or $250,000 for taxpayers filing a joint return. There will also be additional fees for health related industries. There will be insurance market reforms, including the elimination of exclusions based on pre-existing conditions; premium ratings based on individual or family coverage, area, age, or tobacco use; and prohibition of discrimination based on health status.[11] The insurance mandate aspect of the Reform Act was originally claimed to not be a tax. However, in order to defend the Reform Act against claims that it is an unconstitutional mandate, an acknowledgement has now been made that it is, indeed, a tax.[12,13] The major objective of the Health Care Reform Act was to increase coverage.

> 'The RAND analysis estimates that 28 million Americans will be newly insured by 2016 under the provisions of the Patient Protection and Affordable Care Act. The law builds on the existing structure of health insurance in the United States, which is a combination of private and public sources of coverage.'[2]

Analysis of Health Care Reform

Measures need to be taken to curb the increases in the rate of health care expenditures as a percentage of GDP. We must ask whether the new Reform Act is the best way to resolve health care issues. There is no doubt that massive expenditures will occur as a result of health care reform.[14] There is no assurance that any outcomes will be improved as a result of the Health Reform Act. This paper explores 6 critical points that every American needs to understand in order to evaluate whether the current Health Reform Act is the best solution, and whether it could result in serious adverse consequences. It is clear that our health care system is in need of substantial improvement. All available programs and provisions should be thoroughly evaluated in an effort to truly and dramatically improve health care in the United States. The Reform Act is a largely controversial topic, and much opposition has arisen from people of all political perspectives. According to one recent poll, "43 percent say they want the law changed so it does more to re-engineer the health care system. Fewer than one in five say it should be left as it is."[15] These bipartisan criticisms (with over 80% not content with the current health reform act) provide a true opportunity to explore the best alternatives for efficient reform.[15] Some of the criticisms and concerns which have been raised regarding the Reform Act include the following:

1. An analysis of nationalized health care systems implemented in other countries shows problems in every such system with respect to cost and delivery of health care to its citizens. These issues must be considered in determining the optimal solution to health care reform in the U.S.

Many individuals in America, including some of the politicians who passed the bill, believe that health care systems in other countries (such as Canada) are better than the American system, based on statistics reported by the WHO, and believe that driving the United States towards these other systems is the best way to improve our health care.[16] However, there is a concern that the results of nationalized or universal health care in other countries were not thoroughly analyzed before embarking on such a massive governmental program.[16] An analysis of universal health care systems in other countries provides insight into understanding the Reform Act. Universal health care involves government action aimed at extending access to health care. Universal health care includes legislation and regulation regarding what care to provide, to whom care should be provided, and on what basis care should be provided. The other aspect of universal health care is taxation to pay for the expenses. Another funding option is compulsory insurance. Under universal health care, the overall population is paying for their own health care through the payment of taxes, so the term free is misleading when applied to universal health care.[17] Universal health care can more accurately be described as a system pursuant to which health care costs are shifted to those who pay more taxes.[18] In order to provide health care coverage to those who cannot afford to pay, that cost needs to be spread to those who can bear the additional burden. This cost shifting occurs even without health care reform, as indigent patients are treated at medical facilities, and a large part of that cost is shifted to paying consumers in the form of higher costs for treatment. According to the Center for American Progress, the failure to have universal health care coverage actually results in approximately $1,100 a year in higher insurance premiums for insured families in the United States.[19]

There are several areas of comparison that can be studied when analyzing health care systems of nations which have implemented some form of universal health care. Some of these issues include cost, types of services covered, quality of care and responsiveness, and health care outcomes. Before coming to any conclusions based on health care systems of other countries, a note of caution is in order. Health care systems are difficult to compare because many health related statistics are impacted by factors outside of the health care system, including socio-economic, environmental, and lifestyle factors.[20] Significant examples of these lifestyle factors include obesity and cigarette smoking, both of which, unfortunately, are prevalent in the United States. There are also philosophical differences among the countries (including expectations of technology, outcomes, and waiting times) that must be taken into consideration when making a comparison.[21]

The first important factor to compare is cost. Universal health care in other countries is, of course, supported by taxation. The citizens of each country are paying for their health care through imposition of substantial taxes. Health care costs continue to climb in every country, and many countries with universal health care are in financial turmoil, to the point that they are now reforming their health care systems. The outcome in Germany is that they have the fourth most expensive health care system in the world, and their costs are rising unsustainably.[22] Canada is also facing extreme financial burdens that could cause them to reassess their system.[22] Public health care costs consumed 40 percent of the Canadian provincial budget at $174 billion (C$183 billion) in 2009.[22] Data from Canada and Germany indicate that the implementation of universal health insurance resulted in an increase in taxation. Therefore, if universal health insurance were introduced in the United States, the consequences on taxation may well be the same.

There are several reasons why the U.S. spends so much more on health care than most other countries. 'Prominent among the reasons are higher U.S. per capita gross domestic product (GDP) as well as a highly complex and fragmented payment system that weakens the demand side of the health sector and entails high administrative costs.'[23] According to the Organisation for Economic Co-operation and Development (OECD), there is a trend that the countries with more money will spend a larger percentage of their GDP on health care.[7] The United States also has high expectations of service and standards of care that tend to increase costs.[24]

Another topic of comparison is the types of services provided by the different health care systems. There is a discrepancy between the current health care system in the United States and other countries in the types of services offered. The United States provides more technological services than any other country.[9] The U.S. performs the most diagnostic tests, including CAT scans and MRI tests.[9] These diagnostic tests are expected in the U.S., but are rarely available in other countries.[9] Because many other countries limit their diagnostic tests, they have lower costs. This has a negative impact on the morbidity and mortality rates due to diseases that could have been diagnosed through such tests.[9] There are many more choices and personal options in the U.S. system. You can choose your physician, and the doctors usually give you treatment options. The U.S. also provides more outpatient care. In some countries with nationalized health care, there are limited options for choice of physician, and treatment is determined by set standards.[25]

The Reform Act sets the goal of expanding Medicare/Medicaid qualifications, while at the same time plans to pay for the cost of reform with cuts in Medicare and Medicaid. The Centers for Medicare and Medicaid Services Office of the Actuary Report from April 2010 predicts an increase in projected spending by over 1%.[26] The report shows that Medicare cuts could be unrealistic and unsustainable. These cuts could put 15% of hospitals into a serious debt position, jeopardizing care for the elderly.[26]

The quality of care provided by the different health care systems varies greatly among countries. The quality of care in nationalized health care systems is seriously lacking in terms of promptness of care, at least by U.S. standards.[27] Many countries with nationalized health care have serious problems with scheduling and waiting periods.[27] A Canadian doctor, Dr. Brian Day, stated the following about Canada's health care system: "This is a country in which dogs can get a hip replacement in under a week and in which humans can wait two to three years."[28] "Access to a waiting list is not access to health care," wrote Chief Justice Beverly McLachlin of Canada after ruling in favor of the private sector of medicine.[29] The Court's majority ruled that "waiting lists for health care services have resulted in deaths, have increased the length of time that patients have to be in pain and have impaired patients' ability to enjoy any real quality of life."[30] Americans are much too fast paced and want results quickly, and will not tolerate drastic changes in availability of health care services. Based on the experience in Canada, a strong argument can be made that the United States is not ready for this kind of nationalized medicine.

In Germany as well, most citizens have long waiting periods for office visits and hospital care. If the quarterly medical budgets are exceeded, the patients are subjected to postponed care.[31] The global budgets imposed on German doctors require them to close their doors to patients after they reach the maximum amount of their budget. The care these doctors provide after they have used up their budget is not reimbursed.[31]

The final point of comparison is health care outcomes. A simple review of statistics in this regard as shown in the table below does not appear to reflect well on the current United States health care system. This chart actually shows that superior health care outcomes are recorded in some of the other countries that have universal health care. However, as discussed elsewhere in this paper, these statistics are misleading for many reasons, including societal, recording, and lifestyle differences.[32] According to World Health Organization statistics, a very high number of annual deaths in primarily developed countries are due to heart disease (30%), cancer (21%), and stroke (14%).[32] Fourteen percent of annual deaths are due to cigarette smoking.[32] The deaths in these categories are particularly subject to lifestyle and environmental factors, and undoubtedly have a profound impact on any statistical comparison of the health care systems of the various countries.[32] Despite the statistics in the table below that shed a negative light on the U.S. health care system, countries with nationalized health care systems are moving toward the U.S. health care system. The National Health Service (NHS) of England is planning to allow patients more options. This change is moving in the direction of encouraging competition, which is the basis of our current capitalist health care system in the United States.[33] The fact that their system is moving towards ours provides reason for questioning whether a move toward nationalized health care is a reasonable endeavor.

In Germany, it has been reported that the population does not have equal access to health care as the universal health care system mandates. The unequal care problem stems from the 10% of the German population that can afford private insurance plans getting priority and not having to wait.[31] Private insurance is offered to civil servants, judges, and soldiers. Civil servants include employees of the federal government or state as well as professors. These categories constitute 14% of the German workforce and 80% of the private insurance coverage.[31]

Universal health care reform is supposed to provide equal coverage to all citizens. However, the legislators who passed the Reform Act have exempted themselves from the stipulations they are mandating for the rest of the population.[34] The argument has been raised that if the very people who wrote the legislation for health care reform refuse to comply with it, then most likely the majority of U.S. citizens will not want to comply with it.[34] This aspect parallels the system in Germany, where the public must wait lengthy periods, but government officials are allowed easy access to care.[31] Similar to Germany, where they offer health insurance to government employees creating unequal coverage and treatment, the U.S. might fall into the same problem by providing health coverage to Congress and their staff (see Table 1).[31]

The implications of the struggles of universal health care in other nations are foreboding for the United States. Income taxes in countries with nationalized health care are significantly higher than income tax rates in the United States. Providing broader tax supported coverage will place an even larger monetary burden on the taxpayers of the United States. Arguments have been made that the nationalized health care systems in other countries are unrealistic models for the United States. According to these arguments, the cost will be higher and will increase national debt.[14] Universal health care is not free in any country. It is largely funded by tax dollars, paid by the citizens.[35] Many citizens of the United States do not realize that the health care standards and responsiveness rates of the countries with universal health care are lower than what would be acceptable in the United States.[5] A drastic change in availability of services would undoubtedly be difficult for most Americans to accept. Just as in other countries with universal or nationalized health care, it is possible that these systems will not work in the United States.

2. Analysis should be done to evaluate the impact the Reform Act will have on the quality of health care and patient choice.

Within a few months of the Reform Act's enactment, there were already reports stating that the health care reform critics might have had sound arguments that were previously dismissed.[36] Some of their predictions that have been proven are the extremely high expenditures, the "dramatic expansion of government control," and rationing. Insurers have incorporated the new mandates, which have resulted in decreased options for patients. There are some doctors in Texas refusing to participate in Medicare because the government is not providing them adequate reimbursements.[36] These reimbursement rates will be cut even more with President Obama's plan to cut costs in Medicare. Some people are concerned that the health care reform will ultimately push the U.S. towards a heavily regulated and rationed single-payer system.[36]

Under the new Reform Act, the United States is already moving toward limiting patients' choices of doctors. The largest insurers in the nation are promoting insurance plans that narrow the selection of doctors and hospitals. Despite the reassurances from the presidential administration that consumers would be able to maintain a variety of choices, the tradeoff is that individuals will be required to pay higher prices to choose or keep a physician who is not in the new network. One example of this is Haro Bicycle Corporation in California, which switched to an insurance plan that excludes certain medical groups.[37] If employees decide to go to a doctor who is excluded from the plan, they have to pay the entire bill on their own. In order

to opt for a more traditional plan with more personal liberty, employees are subject to higher deductibles and out-of-pocket expenses that could add thousands of dollars to their health care costs.[37]

A transition toward nationalized health care could impact the overall quality of care. The United States in general honors the value and worth in all individuals. This causes conflict between individual and societal needs. Health care reform may lead to further cuts in services to the disabled, particularly the mentally handicapped. According to the "Health Dialogues" of KQED public radio's California Report, the cuts in health care could negatively impact the developmentally disabled.[38] The reporter states that efforts from both the state and local levels to cut back on services could affect the developmentally disabled citizens.[38] Overall, the Reform Act has the potential to negatively impact quality of care and patient choices.

3. There is currently controversy and debate over the constitutionality of the Reform Act's mandate to obtain health insurance, as well as the violation of individuals' First Amendment rights.

One of the main arguments against the Reform Act is the claim that it is unconstitutional to mandate the purchase of health insurance. The battle has been waged between state and federal law, and the debate is taking place in both the legislative and judicial branches of government. Members of at least 39 state legislatures have opposed the federal Reform Act, most challenging the mandates that require the purchase of health insurance, and have proposed legislation to limit or alter certain governmental actions. Thirty states have proposed a state constitutional amendment by ballot question. Idaho proposed a federal constitutional amendment of adding a Twenty-eighth Amendment to the U.S. Constitution stating that the "Congress shall make no law requiring citizens of the United States to enroll in, participate in or secure health care insurance or to penalize any citizen who declines to purchase or participate in any health care insurance."[39] The state of Arizona adopted a state constitutional amendment called the National Health Care Nullification Act that included the following language:

> "To preserve the freedom of all residents of the state to provide for their own health care… A law or rule shall not compel, directly or indirectly, any person, employer or health care provider to participate in any health care system … A person or employer may pay directly for lawful health care services and shall not be required to pay penalties or fines for paying directly for lawful health care services..."[39]

This is the first such constitutional amendment to pass the legislative process on November 2, 2010. Sixteen states

Table 1: Comparative Health Care Related Statistics

Country	USA	UK	Canada	Denmark	Germany	France	Singapore	Taiwan
Ave. educational level (Years)	16	16	17	17	16	16	*	*
% Literacy (over 15 yr old can read)	99%	99%	99%	99%	99%	99%	93%	96%
Infant mortality (per 1,000 births)	6.14	4.78	4.99	4.29	3.95	3.31	2.32	5.26
Longevity/Life Expectancy (Years)	78.1	79.5	80.7	78.4	80.0	81.0	81	*
GDP per capita ($)	$46,400	$35,200	$38,400	$36,000	$34,100	$32,800	$50,300	$29,800
% GDP expenditure on health care	16%	9%	10%	10%	11%	11%	*	*
GNI (Gross National Income) per capita (current $US)		$46,040	$43,640	$58,800	$42,710	$42,000	$34,760	*
Median household income ($)	52, 029	$39,000	$51,951	*	*	*	$30,000	*
Average expenditure on health care per person ($)	$7,538	$3,129	$4,079	$3,540	$3,737	$3,696	*	*
Income tax (%): single, 0 children	29%	34%	32%	41%	52%	50%	*	*
Income tax (%): married, 2 children	12%	27%	22%	30%	36%	42%	*	*
% health care costs paid by government	45%	82%	70%	*	77%	79%	*	*

Statistics acquired from World Health Organization's Global Health Observatory, OECD, Nation Master, and World Bank.[7, 35]
*Not available.

proposed bills to revise state law rather than their state constitution.[39]

Numerous judicial challenges to the Reform Act are currently pending, and two federal judges have already ruled that the Reform Act is unconstitutional. A Florida lawsuit involving Attorneys General from 26 states argues that "Congress is attempting to regulate and penalize Americans for choosing not to engage in economic activity. If Congress can do this much, there will be virtually no sphere of private decision-making beyond the reach of federal power."[40] U.S. District Judge Roger Vinson declared on October 14th in Florida that the legal challenge to the reform law from Washington and 25 other states could move forward. In that ruling, Judge Vinson openly expressed his view that the health care reform act could be deemed unconstitutional.[41] Judge Vinson's prediction set the stage for the ruling from a Federal Court in Virginia. On December 14, 2010, Judge Henry E. Hudson in Virginia, a federal district court judge who was appointed by President George W. Bush, ruled that the mandate for Americans to purchase health insurance was unconstitutional.[42] Judge Hudson sided with Virginia, finding that "an individual's personal decision to purchase - or decline to purchase - health insurance from a private provider is beyond the historical reach of the Commerce Clause" and that the mandate "is neither within the letter nor the spirit of the Constitution."[42] Judge Hudson also agreed with the State of Virginia on its argument that the law's fine for people who refuse to buy coverage is an illegal penalty, and not a tax.[42] The federal district court judge did not invalidate the entire law. However, without the mandate for the Americans to purchase health care, the rest of the legislation simply does not work. On January 31, 2011, Judge Vinson declared the entire Health Reform Act to be unconstitutional.[43] The Virginia and Florida federal courts' opinions are directly contrary to the two opinions by democratically appointed federal judges who have concluded that the entire law is constitutional. There are approximately two dozen cases in the federal courts across the country that challenge various aspects of the Reform Act.[42] Given the number of active court challenges, the status of the Reform Act is likely to be impacted frequently in the coming months as these cases reach resolution at the federal district court level and proceed to the appellate courts. The normal procedure would be for these cases to be appealed to the Circuit Courts of Appeals.[44] However, there is a rarely used procedure to bypass the appellate courts, and have the cases decided directly by the United States Supreme Court.[44] In both cases where the law has been found unconstitutional, an immediate appeal to the United States Supreme Court has been sought.[44,45] Leading Republicans have been calling for expedited appeal.[45] The Obama Administration, through the United States Justice Department, has opposed the expedited appeal.[44-45] Many people on both sides of the issue believe that an expedited appeal is advisable, so that there is certainty about the fate of the Health Care Reform Act. In fact, one Democratic Senator has sponsored a resolution calling for expedited Supreme Court review, and has asked his colleagues to back the resolution.[45] Some states have indicated that they will not implement or enforce the Health Care Reform Act, in light of the rulings declaring it to be unconstitutional.[45] It would appear that expedited appeal would be in the best interest of all concerned, to alleviate the considerable uncertainty and confusion surrounding the Health Care Reform Act. The final decision regarding the constitutionality of the Reform Act will undoubtedly be determined by the U.S. Supreme Court. The outcome of that decision is uncertain, as is the timing.[44,45]

Several states, including Virginia, Idaho, Utah, Georgia, Missouri, Oklahoma, and Louisiana, have enacted or signed statutes as of July 21, 2010, seeking to avoid implementation of the Reform Act in their states.[39] The Virginia statute became law on March 10, 2010 stating:

> "Health insurance coverage [is] not required. No resident of this Commonwealth, regardless of whether he has or is eligible for health insurance coverage under any policy or program provided by or through his employer, or a plan sponsored by the Commonwealth or the federal government, shall be required to obtain or maintain a policy of individual insurance coverage. No provision of this title shall render a resident of this Commonwealth liable for any penalty, assessment, fee, or fine as a result of his failure to procure or obtain health insurance coverage."[39]

When President Obama was running for President, he promised that the health care reform would not be paid for by a tax increase, saying "for us to say that you've got to take responsibility to get health insurance is absolutely not a tax increase."[12] A lawsuit has been filed by 26 states stating that the mandate to purchase health insurance is unconstitutional.[26] In order for the Reform Act to survive this challenge, the mandate must be termed a "tax."[12] In defense of the judicial challenges to the Health Reform Act, President Obama has now acknowledged that the Reform Act is in fact a tax, and "an exercise of the government's power to lay and collect taxes."[12] There is a distinct possibility that the Reform Act could ultimately be ruled to be unconstitutional by the United States Supreme Court, consistent with Judge Hudson's decision in the Virginia case, and Judge Vinson's decision in the Florida case.[42,43]

Another contention regarding the Reform Act is that it violates the 1st Amendment Right to freedom of religion. Opponents of the Health Reform Act claim that it violates the right to practice religious beliefs that oppose nationalized health care, and provides funding for abortion.

Under the Reform Act, critics claim that taxpayer money could be used to fund abortions.[46] The opponents say it unconstitutionally recognizes certain religious groups, but not others. As a compromise, President Obama agreed to sign an executive order which essentially provides that federal funds will not be used for abortions. However, the executive order can be rescinded at any time, by the president who is then in office.[46] Opponents still remain concerned that federal funds will be used to fund abortions under the current legislation. The day after the House of Representatives voted to repeal the Health Reform Act, the "No Taxpayer Funding for Abortion Act" was introduced in the House, to make permanent the Executive Order prohibiting taxpayer funding of abortion.[47]

4. The Reform Act could result in a dramatic increase in the overall cost of health care, increase taxes, and be detrimental to our economy.

While claims were initially made that the Reform Act would decrease national debt, it could actually pose extreme financial burdens on the U.S., digging the nation deeper into debt.[14] According to many critics, the reform advocates based their arguments on "clearly-rigged cost estimates from the Congressional Budget Office (CBO) (which must use assumptions dictated by Democratic Congressional leadership without regard to whether those assumptions are plausible or even possible)."[36] Many businesses and other groups have strongly opposed the Reform Act. The U.S. Chamber of Commerce is one organization that did not support the Reform Act. According to Katie Strong Hays, Executive Director of Congressional and Public Affairs for the U.S. Chamber of Commerce, current health care reform legislation fails to address the essential issue of getting costs under control. Katie Strong Hays said "'Congress has the opportunity to do a lot of good, but we don't want to risk making the system even worse.'"[48] The U.S. Chamber of Commerce does not have confidence in the governmental regulation being objective. Another aspect of the Reform Act that the U.S. Chamber of Commerce does not support is the employer mandate to provide health insurance. The U.S. Chamber of Commerce objects to all the proposed funding for health care reform, stating that the Congressional Budget Office most likely underestimated total future spending under the Reform Act.[48] Katie Strong Hays also raised the question of how many of the 47 million uninsured patients in the country actually need and are entitled to subsidized health insurance. She stated that 8 million of these uninsured individuals are illegal immigrants who Congress does not seek to cover, 11 million are eligible for a subsidized program but are not enrolled, and another 18 million make over $50,000 per year but opt out of or choose not to purchase coverage. Therefore, under her analysis, there are only about 10 million uninsured patients who truly need and are entitled to assistance. The U.S. Chamber of Commerce wishes to increase coverage, emphasize preventative health measures, and improve the system efficiency, but does not believe that the Reform Act accomplishes all of these goals.[48]

A major contributing factor to the higher cost of health care in the U.S. is the cost of labor.[49] According to a Fitch Ratings report including 215 not-for-profit hospitals, the cost of labor as a percentage of overall costs incurred by the hospital in delivering services (labor ratio) was 52.2%.[49] The health care system is one of the largest employers in the U.S. Health care provided 14.3 million jobs in 2008 and includes 10 out of the 20 fastest growing occupations.[50] The expected increase in new jobs generated between 2008 and 2018 is 3.2 million.[50] Other benefits of health care related jobs are that they employ skilled and educated workers and offer higher than average earnings. In light of the current unemployment problem, if the U.S. is spending more money on health care because it is providing skilled jobs, then an argument can be made that this is a legitimate and beneficial expenditure.[50]

There are reports that the health care reform legislation will supposedly reduce the deficit by $143 billion in 10 years, according to the Congressional Budget Office (CBO). However, in order to cover more people, it has been projected that the reform will actually cost $940 billion over 10 years.[51] This money will come from taxes and fees. Health care reform will potentially increase national debt and expenditures rather than decrease them.[14] Donald Marron served as a member of the President's Council of Economic Advisers and is a former director of the Congressional Budget Office. According to Donald Marron, the $940 billion estimate only refers to the legislative expansion, and does not include other expenditures such as closing the "donut hole," and funding community centers and prevention methods.[14] Under Medicare part D, for prescription drugs, a participant has up to a $310 deductible, and then a copayment up to the amount of $2,840. From that $2,840 amount, until the Medicare Part D participant reaches the amount of $4,550 in prescription costs, there is no coverage. This is what is referred to as the "donut hole." After the $4,550 limit has been reached, the coverage gap ends. In 2011, participants will receive a 50% discount on brand name prescription medicines purchased in the donut hole. Also, as a result of the Reform Act, Medicare Part D participants will receive up to a $250 rebate to offset expenses incurred in the donut hole.[52] "Add it all up and the ten-year cost of health reform is about $1,072 billion."[14] That is over $1 trillion! This is an astounding revelation that was never truly considered prior to the enactment of the Reform Act.

5. Our current health care system has many unique and beneficial aspects that the Reform Act could potentially jeopardize.

Abraham Lincoln said that the United States is the last best hope of earth.[53] The U.S. is the last best hope of mankind in large part because we are a very philanthropic country, and we are committed to protecting the rights of others against oppression and injustice. According to the Hudson Institute's 2010 Index of Global Philanthropy and Remittances, the United States philanthropy to developing countries in 2008 was $37.3 billion.[54] Scott W. Atlas, M.D., a senior fellow at the Hoover Institution and a professor at the Stanford University Medical Center, has outlined *10 Surprising Facts about American Health Care*.

> Fact No. 1: Americans have better survival rates than Europeans for common cancers.
>
> Fact No. 2: Americans have lower cancer mortality rates than Canadians.
>
> Fact No. 3: Americans have better access to treatment for chronic diseases than patients in other developed countries.
>
> Fact No. 4: Americans have better access to preventive cancer screening than Canadians.
>
> Fact No. 5: Lower income Americans are in better health than comparable Canadians.
>
> Fact No. 6: Americans spend less time waiting for care than patients in Canada and the U.K.
>
> Fact No. 7: People in countries with more government control of health care are highly dissatisfied and believe reform is needed.
>
> Fact No. 8: Americans are more satisfied with the care they receive than Canadians.
>
> Fact No. 9: Americans have much better access to important new technologies like medical imaging than patients in Canada or the U.K.
>
> Fact No. 10: Americans are responsible for the vast majority of all health care innovations.[9]

Our capitalist system that encourages innovation and excellence continues to be a haven for foreign patients who need and can afford the best medical treatment, most of which they are unable to acquire in their homelands.[55] "The top five U.S. hospitals conduct more clinical trials than all the hospitals in any other single developed country. Since the mid-1970s, the Nobel Prize in medicine or physiology has gone to American residents more often than recipients from all other countries combined. In only five of the past 34 years did a scientist living in America not win or share in the prize. Most important recent medical innovations were developed in the United States."[9] If we convert to the nationalized system of medicine, the United States may no longer be the world's innovator and leader in the field of medicine. Atlas concluded that "Despite serious challenges, such as escalating costs and the uninsured, the U.S. health care system compares favorably to those in other developed countries."[9]

We must not lose our American values, expectations, and achievements. According to a new Rasmussen Reports national telephone survey, only 51% of voters believe the United States is the last best hope of mankind.[56] Even scarier is the fact that the "political class" has a less positive view of the United States than mainstream Americans.[56] There is a serious problem if half the country's population does not have faith in the United States. The most disconcerting statistic is that over half of the voters under 30 reject the belief that the United States is the last best hope for mankind.[56] Our younger generation must reaffirm our American values. If we do not take personal responsibility for improving the world in which we live, who will?

Our current system is not perfect, and is in need of improvement, but a private health care system does have certain advantages. What price are we willing to pay for health care reform? Certainly, we should not be willing to sacrifice the benefits of our current system. One prominent physician who has had the opportunity to observe the English and United States systems offered the following observation:

> "As the old proverb advises, 'Don't throw out the baby with the bath water.' Reformers should keep in mind that the U.S. healthcare system has engendered extraordinary innovation and creativity--and this has benefited not only the U.S. population but populations around the world as well."[57]

6. There may be better ways to improve our current health care system than the drastic changes that will be brought about by the Reform Act.

According to the Organisation for Economic Co-operation and Development (OECD), there is room in all OECD countries to make health care spending more efficient.[7] In addition, no one health care system performs systematically better than the rest in terms of providing health care that is cost effective.[7] Therefore, many commentators argue that "big bang reforms" are unwarranted. "Wholesale adoption of international approaches to health care delivery and reimbursement — even those proven successful — is unrealistic for cultural, political and economic reasons."[58] The best method to improve health care spending efficiency would be to adopt successful elements from the systems that are the most comparable in other countries.

What is the last best hope for the United States? The last best hope for the United States is education. Educated populations statistically have better health.[7] Therefore, the public must receive a well rounded education. People must

also understand health care reform. Once they understand what our current health care system provides, and the changes that will be enforced with the new Reform Act, they can make an informed decision about what is best for our country. According to Ronald Reagan:

> "The United States remains the last best hope for a mankind plagued by tyranny and deprivation. America is no stronger than its people -- and that means you and me. Well, I believe in you, and I believe that if we work together, then one day we will say, 'We fought the good fight. We finished the race. We kept the faith.' And to our children and our children's children, we can say, 'We did all what could be done in the brief time that was given us here on earth.'"[59]

If America is no stronger than its people, we must strengthen our younger generation, and instill these values and faith. Then we must work together to create the hope for the future.

People have to learn to take care of themselves. Just because the U.S. does not have the top health statistics does not mean our system is bad. These statistics are largely a reflection of the population not taking care of their health. The United States has the highest rate of obesity, at 33.8% in 2008.[7] This increases the risk for diabetes, heart disease, and asthma.[7] Society must learn preventative health measures including healthy diet, exercise, abstinence from tobacco/drugs, and healthy environments and habits that will decrease the need for clinical care.

A substantial cost driver that is commonly overlooked, but which many people believe must be addressed, is tort reform. Physicians spend more money on costly tests in an overly cautious effort to prevent lawsuits.[60] This is known as defensive medicine. The prevalent fear of lawsuits drives costs of medical services higher. As one element of effective health care reform, many commentators believe that physicians must be better protected from frivolous lawsuits.[60] Katie Strong Hays, representing the U.S. Chamber of Commerce, believes that provisions and programs that could reduce costs, such as medical liability reform and payment reform, must be addressed, especially in the Medicare fee-for-service system, in which physicians are not rewarded based on quality of care.[48]

Another vital component to improving the future of health care is to foster the cooperation between public health and clinical medicine. I performed a mentorship in Hawaii with Dr. Chiyome Fukino in which I investigated the intersection between public health and clinical medicine to provide health care to the entire population of Hawaii. Public health and clinical health involve unique perspectives on health care that must be combined to share the best view of treating the population. Public health focuses on the health of the population, while clinical medicine focuses on the health of an individual. Both are important viewpoints. If public health and clinical medicine can work together to address the needs of the population, bringing together their unique knowledge sets, they can effectively educate and treat the consumers of the health care system. This could dramatically improve the quality of the health care system. An example of a beneficial intersection between public health and clinical medicine has been recognized by the Vital Statistics Division of the Department of Health. They have noted the rising number of infants who have died from Sudden Infant Death Syndrome (SIDS). The Vital Statistics Division can use this data to inform pediatricians of this devastating trend, and sensitize medical professionals and parents of newborns to the phenomenon, its causes, and potential ways to avoid SIDS. By fostering communication between public health and clinical medicine, we can improve the efficiency and effectiveness of the health care system.

Conclusion

The current Health Reform Act is controversial. The problems of our nation's health care system are complicated and the Health Reform Act will certainly not solve all those problems. Overall, our nation may be better off making specific but limited and gradual changes to our current system, instead of drastically changing our system with no likelihood that the system will improve, and a real possibility that the drastic changes will be detrimental.[57] The goal of expanding coverage is noble. It addresses Martin Luther King, Jr.'s well stated concerns regarding inequality in availability of health care. However, the current legislation could very well hurt more than it will help. The Reform Act could increase costs and debt more dramatically than we can imagine.[14] As a nation, our approach to the health care problem should be to address the roots of the problem, instead of blanketing the entire population with reform. We should incorporate tort reform to address a major cost driver. We should work on outreach programs to include the millions of individuals who are already eligible for Medicare or Medicaid but are not enrolling. We should also focus on the educational component of prevention methods. Teaching people to take better care of their own health so that they do not end up needing medical services will be an incredible cost saver. Health inequalities are driven by socio-economic factors. According to the OECD, studies have shown that individuals with less education, lower income, and less prestigious jobs are more likely to be ill or die at a younger age.[7] Therefore, the way to address this issue at the root of the problem is not necessarily through health care reform, but education reform which could provide these individuals with a better future. Reducing the need for, and in turn the use of, health care services is the best way to successfully reduce health care expenditures. Moreover, the United

States has an obligation to uphold its philanthropic and innovative contributions. We cannot look to other countries for a model of a perfect health care system, not only because it does not exist, but also because of each country's unique culture requirements. All approaches to health care improvement and reform should be carefully considered. We must have faith in our own country that we can make it through these hard times to provide a better future, and an improved health care system, to our children and grandchildren.

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Discrimination in Hawaii and the Health of Micronesians

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Abstract

Micronesian people are migrating to Hawaii in increasing numbers and are experiencing discrimination in the society at large and in the health care system. General aspects and underlying causes of discrimination against Micronesians in Hawaii are described as background to the experience of the most recent migrants in the health system. The State itself discriminated against Micronesians by disenrolling them from Medicaid, but the State's actions were found unconstitutional in federal court. Further steps toward surmounting discrimination are proposed.

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Hawaii residents congratulate themselves for their post-racial attitudes. Discrimination continues, however, in the society at large and within health care. The brunt of discrimination in contemporary Hawaii is borne by Micronesians. Here we refer to as "Micronesian" the people who trace their lineage to the three Compact Nations [after the Compacts of Free Association (COFA)]: Palau, the Marshall Islands, and the Federated States of Micronesia.

The Roots of Discrimination

The Compacts allow Micronesians free entry into the U.S. and the ability to work. Many migrants with limited English and education engage in unskilled labor. Some are exploited by recruiters whose practices border on human trafficking.[1,2] In Hawaii's tight housing market, Micronesians are discriminated against – as uncovered by testers calling landlords.[3]

Micronesians have encountered difficulties with other marginalized groups. Thus, a December 2007 incident in which a Micronesian man stabbed and killed a Samoan teenager led to tension between the two communities. Subsequently, Micronesian pastors adopted the Samoan custom of *ifoga* (ritual apology) and asked for forgiveness at the teenager's funeral.[4]

Authorities in Hawaii maintain that Micronesians utilize resources out of proportion to their numbers. Thus, a Hawaii House resolution calling for more federal Compact impact aid tallied $101,163,113 of State expenditure on COFA migrants in 2007.[5] A shelter director notes the unfairness of a "preponderance of public housing to be occupied by COFA families when so many of our local residents are also in need," adding that the Compacts stipulate that "those who cannot show sufficient means of support in the US are deportable."[6]

Such pronouncements are paralleled by popular discourse. Consider a blog post that appeared on the Honolulu Advertiser's website commenting on a story on Micronesians in homeless shelters.[7] The blogger claims that few members of the large Micronesian family in the neighborhood appear to work. He or she decries state subsidies for their health care, housing, and subsistence – noting that it was the U.S. government that conducted nuclear testing in Micronesia and calling upon the federal government to take care of the health consequences within the jurisdictions.

The blogger echoes elite discourse, bemoaning the expenditure of state funds – though all workers in Hawaii, including Micronesian workers, pay payroll taxes, and everybody pays excise taxes. However, even this blogger, his or her mind colonized by ideologies that divide peoples, recognizes the historical injustice.

Health Discrimination

Within health care, discrimination takes the form of inferior care or denial of services. Micronesians often complain of impersonal, brusque treatment. Health center physicians attempting to refer patients to hospitals are told, "We don't take patients from your clinic."[8] Front desk staff have been overheard saying that Micronesians are given undesirable appointment times because "they're not going to keep it anyway."[9] A medical student notes that many opine that "everybody is sick of caring for and wasting their taxes on these people that have no appreciation for what is being done for them, and fake their illnesses to stay in the hospital for free food and board." The student was even told by an attending physician, "We shoulda just wiped the islands off the earth when we had the chance."[10]

Discriminatory attitudes are rationalized by reference to poor patient adherence, which is often secondary to poor health literacy. However, much non-adherence is because practitioners communicate ineffectively, often because interpreters are not utilized. For their part, some Micronesians harbor suspicions that they are being subjected to unnecessary procedures for the sake of physician profit or experimentation.[11]

The Hawaii State administration itself discriminated against Micronesians by purging them from Med-QUEST, its Medicaid program. Prior to July 2010, the State had included COFA migrants in Med-QUEST. In the face of budget constraints, the State disenrolled them from Medicaid and placed them in a severely inadequate program called Basic Health Hawaii (BHH). On behalf of Micronesian plaintiffs, Lawyers for Equal Justice (together with Austin, Hunt, Boyd, & Ing, and Bronster & Hoshibata) brought a complaint against BHH in August 2010. In November and December 2010 U.S. District Court Judge Michael Seabright found against the state, striking down BHH because it cut health benefits to individuals because of their alienage and national origin - in violation of the Equal Protection clause of the 14th Amendment of the US Constitution. Med-QUEST for Micronesians was thus reinstated in January 2011.

What is to be Done?

How should we address these pathologies? Why should resources be devoted to the care of the disadvantaged? Indeed, because they're deprived, they are more deserving. Will medicine's advances be delivered or denied to those who need them most? What good are the political rights generally considered "human rights," if one cannot live free of want and disease? On what basis should care to the

underprivileged be delivered? Farmer favors the social justice perspective, the view that the poor are not poor because of their shortcomings but because they are victims of structural violence, large-scale social forces that create and enforce their poverty.[12]

Galtung notes that the main form that structural violence took in the Pacific region was colonialism. In Hawaii the indigenous people are a minority and settlers the majority.[13] In Micronesia, the indigenous people remain in the majority, but they are migrating toward the center. The sharing of historical experiences among Pacific Islanders will bring the commonalities to light.[14,15]

The first task is cross-cultural bridge-building. We need more initiatives like the example set by the Micronesian pastors vis-à-vis the Samoan community. Then comes serious examination of large-scale social forces and understanding that we are inextricably bound together. When legal protections can be mobilized to combat discrimination, we must utilize them. More collective action to counter the prevailing social forces comes next.

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