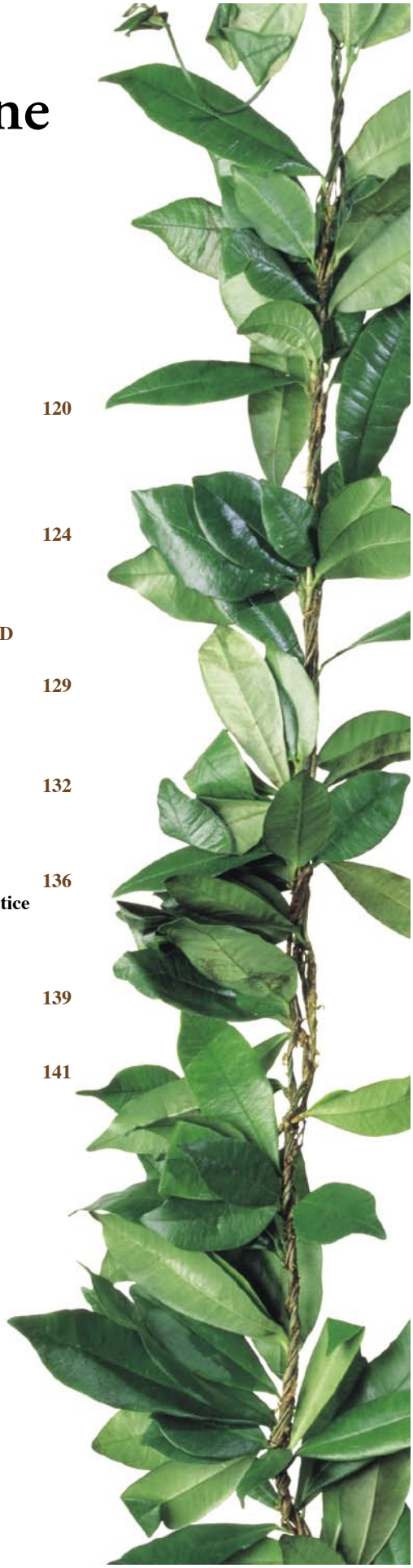
Hawai‘i Journal of Medicine & Public Health

A Journal of Asia Pacific Medicine & Public Health

May 2012, Volume 71, No. 5, ISSN 2165-8218



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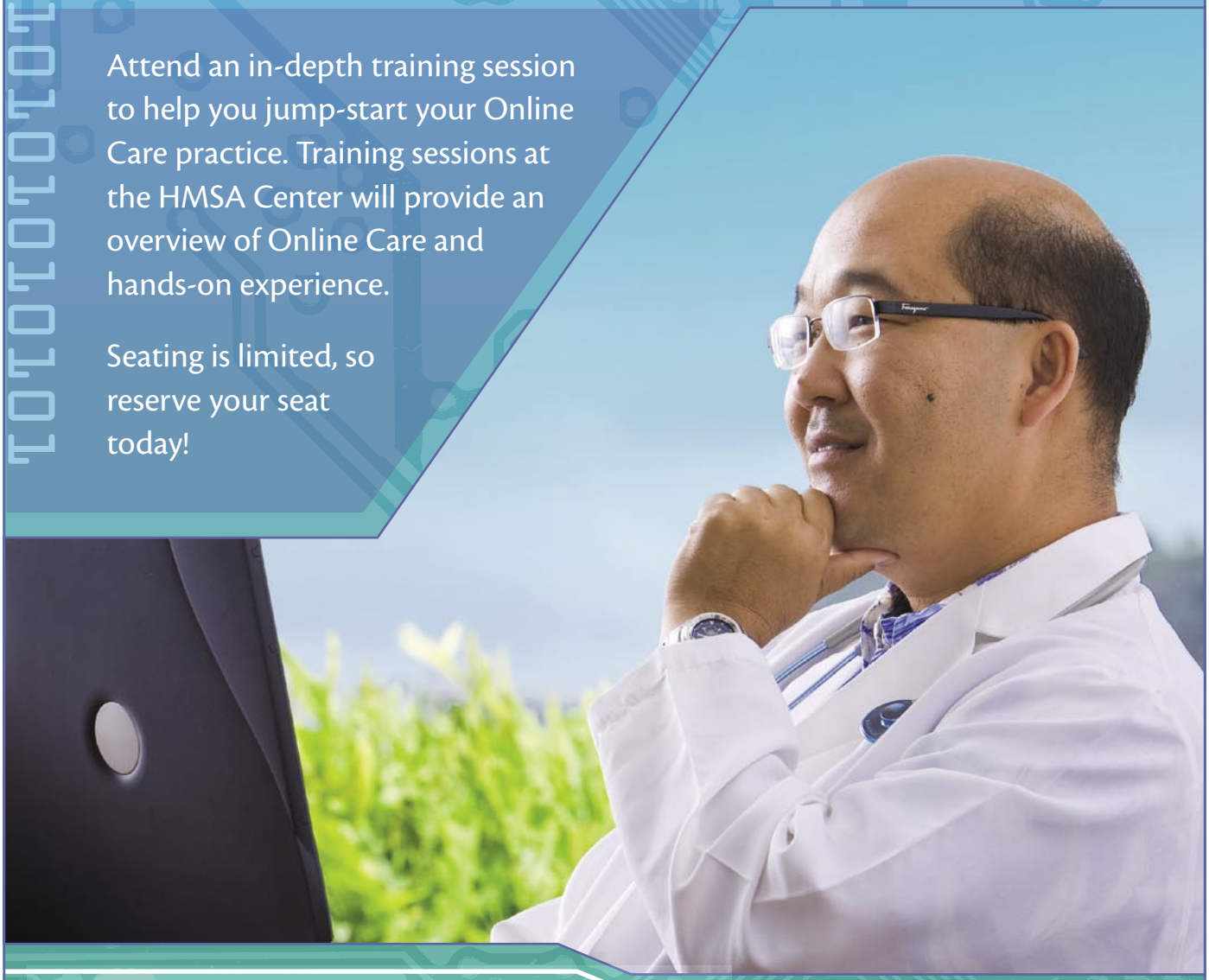

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Hawai'i Journal of Medicine & Public Health

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ISSN 2165-8218 (Print), ISSN 2165-8242 (Online)

The Journal's aim is to provide new scientific information in a scholarly manner, with a focus on the unique, multicultural, and environmental aspects of the Hawaiian Islands and Pacific Rim region.

Published by University Clinical, Education & Research Associates (UCERA)

Hawai'i Journal of Medicine & Public Health
677 Ala Moana Blvd., Suite 1016B
Honolulu, Hawai'i 96813
http://www.hjmph.org
Email: info@hjmph.org

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Dry Eye Syndrome Due to Botulinum Toxin Type-A Injection: Guideline for Prevention

Omar K. Ozgur MD; Daniel Murariu MD, MPH; Alan A. Parsa MD; and Fereydoun Don Parsa MD, FACS

Abstract

Dry eye syndrome is a potential complication of botulinum toxin type-A injection (BTX-A) into the lateral canthal rhytids (crow's feet). The early manifestations of this syndrome are subtle and are rarely reported to the treating physician. A guideline for early detection of dry-eye state is proposed, in order to avoid more troublesome adverse effects that may develop with repeated injections of BTX-A into the crow's feet region. If suspected early, clinical manifestations remain minor and are reversible. However, delayed diagnosis may lead to troublesome and persistent symptoms. A novel and practical grading scale of lower eyelid snap-back and distraction tests is offered that helps in documenting patient's clinical progress and in deciding when BTX-A injections should be delayed or discontinued.

Keywords

Botulinum toxin and dry eye syndrome; causes of dry eye syndrome; prevention of botulinum toxin type-A adverse effects; guideline in the use of botulinum toxin; Botox complications; snap-back test; distraction test; botulinum toxin and tearing; ectropion and botulinum toxin; classification of snap-back and distraction tests.

Introduction

Dry eye syndrome due to botulinum toxin type-A (BTX-A) injection for treatment of blepharospasm or after blepharoplasty and peri-orbital surgery has been previously reported in literature.[1-12] In contrast, dry-eye state due to BTX-A injection into the lateral canthal region for correction of crow's feet has received little attention.[3] In comprehensive studies such as the "Botox Consensus Group," no reference is made to dry eye syndrome.[13] A more recent publication on causes of dry eye syndrome is also remiss in identifying BTX-A injection as a possible cause of this condition.[7]

Discussion

Our clinical observations for the past 11 years indicate that persistent signs and symptoms of dry eye syndrome frequently develop when BTX-A is injected regularly into the crow's feet region. The earliest symptoms include occasional eye irritation and foreign body sensation accompanied by mild intermittent tearing particularly in air-conditioned or dry and windy environments. If examined closely, very subtle blink dysfunction and lagophthalmos may be detected at this early stage that may be classified as "mild" with a grade of 1+ (Figure 1). These early symptoms and signs are typically either ignored or are self-treated by patients with over-the-counter eye lubricants and moisturizers with good relief. If BTX-A treatment is continued despite these subtle early changes, further symptoms may occur including red eye, lid edema, moderate epiphora, and scleral show. These changes may be classified as "moderate" with a grade of 2+ (Figure 1). If BTX-A is still continued in the face of these changes, advanced complications may occur including severe epiphora, pain, photophobia, ectropion, lower lid herniation, and corneal erosion. These are classified as "severe" changes with a grade of 3+ (Figure 1).

With worsening symptoms, patients generally seek medical attention and are often treated by their primary care physician for various conditions such as "dry eyes," "blepharitis," "eye allergy," or are referred to an ophthalmologist. We have found that patients rarely return to their original surgeon for the above complaints and the correlation between BTX-A injection and dry-eye state, and thus a causal link is typically not suspected by patients or their primary care physician.

It is our contention that the aforementioned manifestations are due to botulinum neurotoxin's chemodenervation of the orbicularis oculi muscle that, in turn, leads to poor blink mechanism, lagophthalmos, and ectropion that may result in corneal dryness with the resulting symptoms of eye irritation, foreign body sensation, and epiphora. The etiology of epiphora is likely due to a combination of factors including dry eye syndrome causing reflex tearing, hypotonicity of the medial pretarsal fibers causing decreased outflow of tears, and malposition of the eyelids, causing impaired retention of tears. If BTX-A treatment is continued in the presence of these early symptoms, increased tearing with possible redness and lid edema may result that could potentially lead to corneal erosion and even ulceration as its most ominous manifestation (Figure 1).[2,3]

Paradoxically, BTX-A has also been found useful in treating dry eye syndrome.[5,12] In these reports, BTX-A was injected into the periorbital area including the medial portion of the orbicularis muscle and not solely into the lateral canthal region, for the treatment of existing dry eye syndrome. The mechanism of action of BTX-A on lacrimal drainage in such instances has been postulated to involve a paralysis of the orbicularis oculi muscle acting on the canaliculi with a decreased compression of these structures as well as weakness of apposition of the puncta during blinking.[12] Counterintuitively however, the increase in tear collection from diminished punctal drainage is incapable of improving the symptoms of advanced dry eye syndrome and other forms of treatment are often necessary.[2-4]

It has been suggested that the injection of BTX-A directly into the lacrimal gland may diminish states of hyperlacrimation as seen in Frey's syndrome or gustatory tearing, or in cases of lacrimal duct obstruction, by blocking the release of acetylcholine from presynaptic parasympathetic nerve fibers that innervate the gland, similar in mechanism to the injection of BTX-A in the treatment of palmar and axillary hyperhydrosis.[15-18] Therefore, one may theorize that a portion of BTX-A that is injected into the lateral canthal area could diffuse into the lacrimal gland and thus diminish tear production aggravating the dry-eye state and its manifestations.

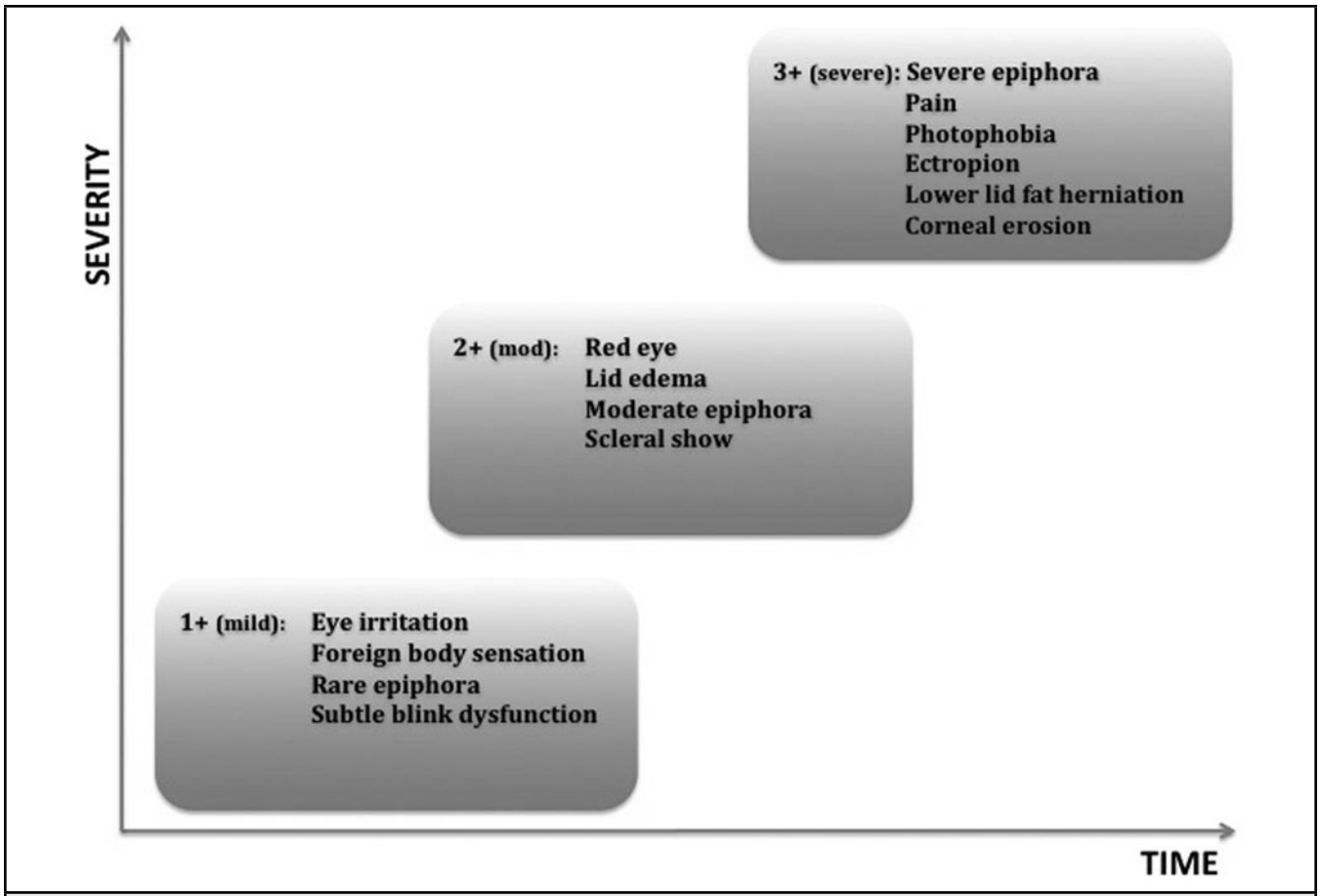

Figure 1. The manifestations of dry eye syndrome with continued injections of BTX-A into the lateral rhytid regions are shown in this figure. One or more of these findings are commonly present simultaneously.

In animal experiments, changes of contractile force in skeletal muscles of cats and rabbits were studied and showed changes in strength, muscle mass, and contractile ability after BTX-A injections.[19-21] Unfortunately none of these animal studies evaluated long-term adverse effects of repeated BTX-A injection on muscles. In clinical settings, there is clear evidence that permanent weakness or paralysis of facial muscles may result when facial muscles are denervated longer than 1.5 to 2 years as reported by Terziz and others.[22,23] For this reason, we may assume that continued injection of BTX-A over a period of 1.5 to 2 years may cause permanent weakness of the orbicularis muscles as has been observed in several of our patients.

Our current practice consists of grading and documenting any eye symptoms or findings prior to BTX-A injection as illustrated in Figure 1. In addition, we document the results of snap-back and distraction tests before any injection. The snap-back test is performed by pulling the lower lid inferiorly while patient looks straight ahead without blinking. Upon releasing, if the recoil is not immediate before the next blink, the snap-back test is positive and is documented in seconds. The test is considered mildly positive with a grade of 1+ if the lower lid returns back to the globe in 1 to 2 seconds, as moderate with a grade of 2+ if it returns in 2 to 4 seconds, and finally as severe with a grade of 3+ if it returns to the globe with the next blink. The snap-back test measures muscle tone and must not be confused with lower lid distraction test that measures lid laxity resulting primarily from the stretching of canthal ligaments.[8] The distraction test is performed by pulling the lower lid forward gently away from the globe with the thumb and index fingers and is considered normal if the distance between globe and central lid margin is less than 2 mm. If it measures between 2 and 4 mm, it is considered mild with a 1+ grade. If it is between 4 and 6 mm, it is considered moderate with a 2+ grade. A distance greater than 6 mm is considered severe with a 3+ grade (Table 1).

By questioning the patient about any early symptoms such as eye irritation, foreign body sensation, or tearing that were not present previously and/or by noticing any change in snap-back and distraction tests during the treatment course, we have been able to avoid advanced manifestations by temporarily discontinuing BTX-A injections into the lateral canthal rhytids. These early "mild" changes have been noted in approximately 5% of our patients undergoing injections of up to 10 Units of BTX-A into each lateral canthal region and all have reversed within approximately 3 to 6 months of observation. Prior to the use of this approach, we witnessed persistent moderate changes in approximately 1% of patients receiving BTX-A injections

Table 1. Grading of snap-back and distraction tests.		
Proposed classifications for snap-back and distraction tests for patients receiving BTX-A injection		
Grade	**Snap back test***	**Distraction test****
1+ (mild)	1 to 2 seconds	<2 mm
2+ (moderate)	2 to 4 seconds	4 to 6 mm
3+ (severe)	next blink	>6 mm

*Test accomplished by pulling the lower lid inferiorly while patient looks straight ahead and measuring the time it takes for the lower lid to return to globe.
**Test accomplished by pulling the lower lid forward away from the globe with thumb and index fingers and measuring the distance between the globe and central lid margin.

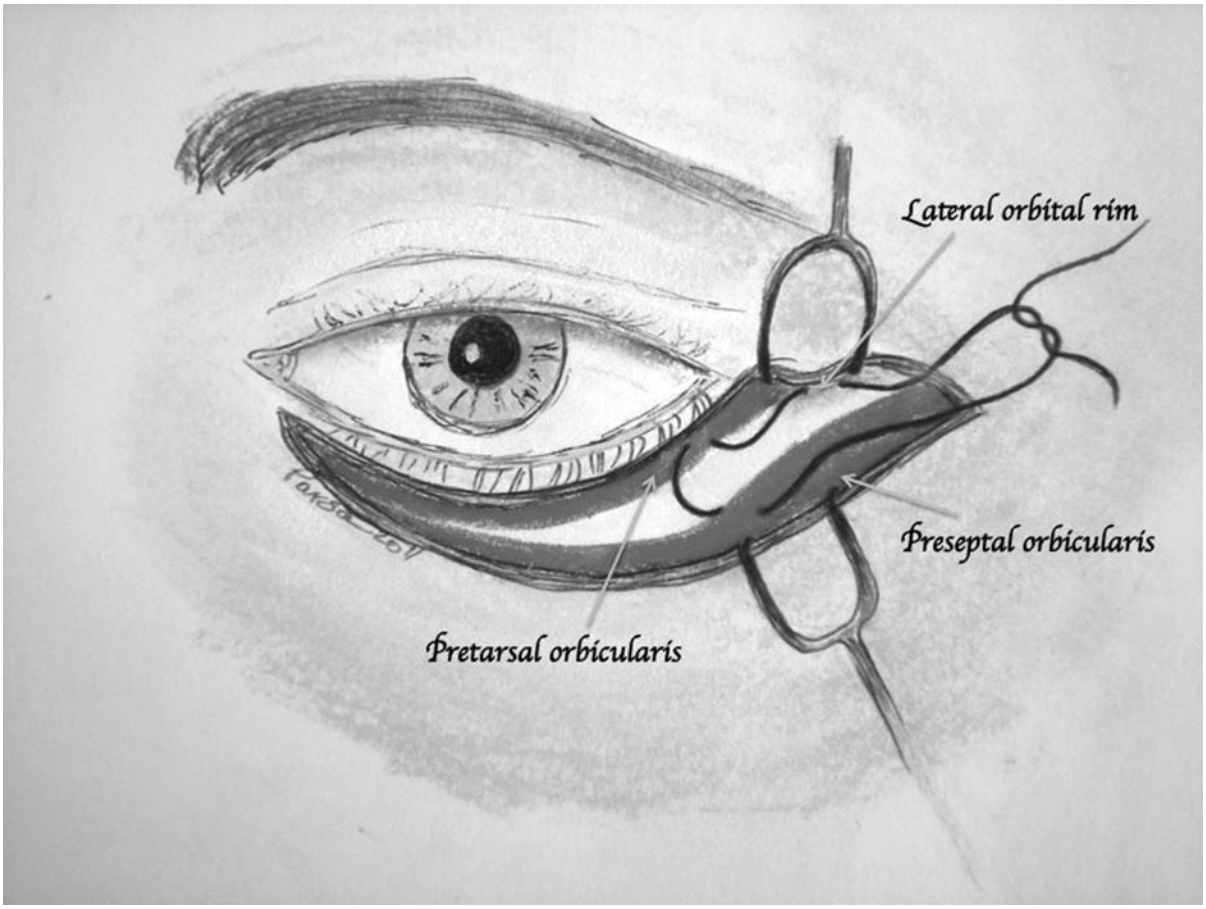

Figure 2. Schematic drawing shows the placement of the lateral anchor suture for correction of persistent orbicularis oculi paresis.

for longer than one year. Thus far no "severe" change has been observed by us.

In instances when the manifestations of dry-eye state (Figure 1 and Table 1) remain troublesome to the patient and do not reverse within one year of observation and conservative management, performing lateral musculoplasty of the lower eyelid similar to the techniques described by Fogli has been successful.[24] Typically, an anchor stitch of 5-0 absorbable monofilament is placed into the dense and supportive fibrous tissue of the lateral orbital rim at the level of the lateral canthal ligament and through the lateral aspect of the pretarsal orbicularis oculi muscle as well as the muscular portion of the lower eyelid's musculocutaneous flap (Figure 2). In cases of a prominent globe and negative vector, placement of the lateral canthal suture may be modified or the tension on the muscles diminished. If there is concomitant fat herniation of the lower lid possibly due to BTX-A injections[26] or from another cause, a fat-preserving hernia repair[27,28] or another technique may be utilized.

Conclusion

Dry eye syndrome of varying severity may develop when BTX-A is repeatedly injected into the lateral canthal region for aesthetic correction of crow's feet. Early suspicion of this condition is suggested by subtle eye irritation, foreign body sensation, and epiphora. If BTX-A injections are continued, worsening of the manifestations may take place (Figure 1). These manifestations seem to be due to orbicularis oculi muscle weakness and may become worse and possibly persistent if BTX-A injection is not delayed or discontinued. Our clinical experience indicates that inquiry for the presence of any dry eye symptoms as well as routine snap-back and distraction tests prior to BTX-A injections help early detection of this condition and therefore we recommend their use. When conservative management of dry eye syndrome due to BTX-A injection over a period of 6 to 12 months fails, we have had success in resolving it by performing musculoplasty as shown in Figure 2.

Disclosure Statement

None of the authors identify any conflict of interest.

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Dietary Intakes, Obesity and Health Behaviors in Native Hawaiians Residing in Southern California

Archana Jaiswal McEligot PhD; Juliet McMullin PhD; Ka'ala Pang RN; Momi Bone BS; Shauna Winston BS; Rebekah Ngewa MPH; and Sora Park Tanjasiri DrPh

Abstract

Objectives: *Accessing dietary intakes, body mass index (BMI) and health behaviors in Native Hawaiians residing in Southern California.*
Design: *Cross-sectional, community based participatory research.*
Participants: *Native Hawaiian (N = 55); Mean age 59 (± 15).*
Main Outcome Measures: *Diet, body mass index (BMI), and diet/exercise health behaviors. Collected diet via 24-hr dietary recalls, health behaviors through questionnaires and BMI via measurement/self-report.*
Analysis: *Frequencies/means and multiple linear regression were used to assess diet, BMI, and health behaviors.*
Results: *Nearly 90% of the participants were either overweight or obese. Less than 20% met the vegetable, fruit, fiber, and whole grain recommendations. Most were a little or somewhat sure (relative to almost always sure) about their ability "to stick with an exercise program when attending a cultural gathering", and "when visiting Hawai'i".*
Conclusions and Implications: *These results suggest that developing a culturally-based education program to reduce obesity and improve diet is critical for Native Hawaiians residing in Southern California.*

Introduction

Native Hawaiians have the second highest overall incidence of cancer in Hawai'i and second highest all-site cancer mortality rate in the United States.[1-3] Several lifestyle factors, including diet and obesity have been linked to cancer risk.[4-8] Studies on diet and obesity in Native Hawaiians show either higher energy intakes and/or increased body mass index (BMI).[9-13] The Multiethnic Cohort Study (MECS) reports that Native Hawaiians consume the lowest amount of legumes, but nutrient intakes from supplements are similar to the other ethnic groups.[18-19] These studies underscore the need for further investigation into strategies for improving nutrition and weight management for Native Hawaiians.

California has the largest Native Hawaiian and other Pacific Islander population (approximately 262,000), outside the state of Hawai'i.[14] However, culturally sensitive educational programs addressing cancer risk, obesity, and dietary intakes for Native Hawaiians have traditionally been conducted in Hawai'i and not directed towards Native Hawaiians residing in Southern California.[15-18,20] While some cultural and behavioral issues, such as respect and caring for the family and one's health, are similar between the Hawaiians in Hawai'i and in Southern California, Hawaiians in California have different structural needs in terms of access to food (eg, taro is more readily available in Hawai'i), and knowledge related to diet.[19] Our previous study of Native Hawaiians in California showed differences in psychosocial support by cardiometabolic status, however information on whether the community is meeting macro and micronutrient guidelines, and factors influencing culturally-specific health behaviors, which may impact future health programs for Native Hawaiians, have yet to be reported.[21]

Therefore, we conducted an exploratory community based participatory research (CBPR) study assessing diet, obesity, and health behaviors related to food and exercise for Southern California Native Hawaiians. Further, we wanted to assess whether culturally specific behaviors influence diet and exercise. To help reduce obesity and improve nutrition for Native Hawaiians, and subsequently develop culturally-appropriate health messages, information on dietary intakes and behaviors related to diet and exercise in Native Hawaiians should be made available and investigated.

Methods

Study Overview and Sample

Study population, recruitment, and study design have been described previously.[21] Briefly, the present CBPR study was a cross-sectional study with a non-probability sample of Native Hawaiian adults ≥18 years of age residing in Southern California. Our key partners from 'Āinahau O Kaleponi Civic Club and the Pacific Islander Health Partnership comprised the community advisory board (CAB) and were involved with all phases of the study from design, to recruitment, to results dissemination. Eligibility included ≥18 years of age, having some Native Hawaiian ancestry, and currently residing in Southern California. For the present study, community leaders and study staff, after obtaining written consent, collected two self-reported questionnaires (demographic and socio-cultural), and in-person height and weight measurement at an initial assessment meeting. Following the collection of these first sets of data, three 24-hr dietary recalls via telephone were scheduled and collected. At subsequent assessment meetings self-reported health behavior data related to food and exercise were collected. Sixty-two recruited and consented individuals completed the demographic and socio-cultural questionnaires; 55 (88.7%) completed the 24-hr dietary recall and health behavior questionnaire, and constitute (N=55) the present analysis. A full study protocol review was conducted and was approved by the Internal Review Board of California State University, Fullerton (HSR#: 09-0159).

Dietary Assessments

We assessed dietary and supplement intakes via 24-hr dietary recalls. Trained dietary assessors conducted three 24-hour dietary recalls stratified over weekdays and weekends during a 3-week period. Twenty-four hour dietary recall methodology uses multiple-pass, computer-assisted technology to collect all types of foods consumed and supplements used, over the previous 24-hour period for the participant.

The Nutrition Data System (NDS, University of Minnesota, Minneapolis, MN) used to conduct the 24-hour recalls is an interactive interface between the interviewer and participant, allowing for collection of detailed dietary/supplement intakes, including amounts, dosage, and brands. The nutrient database used by NDS to obtain the nutrients from food and supplements is derived from the USDA Nutrient Data Laboratory. NDS includes values for 144 nutrients, nutrient ratios, and food components and encompasses over 18,000 foods, including ethnic foods, and over 8,000 brand products. This is in direct contrast to other dietary assessment methodologies such as food frequency questionnaires or food checklists which are limited by a set-number and types of foods. Because NDS includes ingredient choices and preparation methods, more than 160,000 food variants are provided as options. Therefore, for different ethnic foods and recipes, as well as for collecting the most accurate and up-to-date dietary data, NDS is an appropriate tool for dietary assessments for Native Hawaiians and potentially for other Pacific Islander populations.

Health Behavior/Psychosocial Questionnaire

The health behavior instrument and psychometric evaluations of the scales used to assess behaviors related to diet and exercise have been validated and measured in diverse populations.[22-24] The health behavior questionnaire measures 15 scales: social support for diet, social support for exercise, self-monitoring diet, self-monitoring exercise, self-efficacy related to diet, self-efficacy related to exercise, outcome expectations for diet and for exercise, diet planning, preparing/buying foods, portion control, social interaction related to diet, social interaction related to exercise, and cognitive-behavioral strategies related to diet and exercise. The responses for all but one scale were on a 4 point Likert scale (1–4) ranging from "almost never to almost always" and "not at all sure to very sure"; the outcome expectations scale was on a 5 point Likert scale. Participants reported on their experiences over the past month.

Our CAB suggested revisions to the questionnaire that included culturally-specific questions such as: "how sure are you that you could stick to an exercise program in the following situation: when attending a cultural gathering (*'Ohana*, *Luau*, New Year, Christmas)" and "when visiting Hawai'i." Additional questions are shown in Table 2.

Other Measures

We obtained sociodemographic data via a self-reported questionnaire. Height was measured in-person using a Seca 214 portable stadiometer (Hanover, MD), and weight was measured by an electronic step-up Ohaus ES200L bench scale (Pine Brook, NJ). Measurements were conducted using standardized guidelines previously reported.[25]

Statistical Analysis

Descriptive analysis was conducted on gender, age (continuous), and education. Frequencies were also conducted on whether the participant was born, lived, or had family in Hawai'i, and on supplement use. Height and weight data were used to calculate frequencies of normal (< 25 kg/m^2), overweight (25-29.99 kg/m^2), and obese (> 30 kg/m^2) BMI. Mean intakes for food groups, macronutrients, and micronutrients from food and supplements were conducted. We calculated sample frequencies of participants who either met or exceeded dietary guidelines, for food groups and nutrients (based on Dietary Reference Intakes), established by the American Institute for Cancer Research (AICR) or the United States Department of Agricultural (USDA).[26-27] We conducted a *t* test and examined dietary intake differences between men and women. Cronbach's alpha coefficient was calculated for each of the 15 scales stratified by gender, including the culturally-specific questions. Means stratified by gender were calculated for each health behavior scale and individual culturally-specific questions.

Separate multivariate linear regression analysis were conducted to measure the association between each of the following independent dietary variables (independent), vegetable, fruit, fiber, and % energy from fat, and BMI with each health behavior scale (continuous dependent variable). Only those that completed all questions on all scales and questionnaires were included in the multivariate model (n = 37). Models were adjusted for age (continuous), gender, and education (no college education vs some college education). Significance for each test was set at $P \leq 0.05$. Analyses were conducted using SAS Version 9.1.

Results

Participation rates for completing all study components including questionnaires (health behavior and sociodemographic) and three 24-hr dietary recalls was 89%. Sociodemographic characteristics are presented in Table 1. The mean age for the current population was 59 (±15) and a majority of the participants were females (61.8%), 41.8% had some college education, and slightly over half (54.6%) used dietary supplements.

Table 2 presents the daily food groups, macro and micronutrient intakes from food and supplements, and dietary recommendation intakes stratified by gender. Data on frequency consumption related to the AICR/USDA dietary recommendations, for men, showed that <20% of the sample consumed above the recommendations for vegetable, fruit, fiber, whole grains, natural folate, vitamin E, and calcium. Similarly for women, <20% consumed above the recommendations for vegetable, fruit, fiber, whole grains, natural folate, synthetic folate, vitamin E, and calcium. However, between 30%–50% of both men and women were meeting guidelines for total folate, vitamin C, iron, and refined grains.

Individual questions specific to Native Hawaiian health behaviors related to food and exercise, presented in Table 3, show that most participants were either a little sure or somewhat sure about "sticking with an exercise program when attending a cultural gathering (*'Ohana*, *Luau*, New Years)" and "when visiting Hawai'i." Mean scores for "how often did you choose leaner meat options and substitutes for lau lau and *Kalua* pig" were significantly higher for women (2.5 ± 1.1) compared with men (1.8 ± 0.9; $P \leq 0.05$). Mean scores for "how satisfied are

Table 1. Anthropometrics and sociodemographic characteristic data for Native Hawaiians enrolled in the present study (N = 55)

Variable	Strata	
Age (Mean ± SD)		59 ± 15 yrs
Body Mass Index, n (%)	Normal (19-24.9 kg/m2)	7 (12.7%)
	Overweight (25-29.9 kg/m2)	18 (32.7%)
	Obese (> 30 kg/m2)	30 (54.6%)
Education, n (%)	High School graduate	11 (20.0%)
	Some college	23 (41.8%)
	College Graduate	8 (14.6%)
	Advanced Degree	13 (23.6%)
Sex, n (%)	Female	34 (61.8%)
	Male	21(38.2%)
Supplement User, n (%)	Yes	30 (54.6%)
Born in Hawai'i, n (%)	Yes	42 (76.4%)
	No	13 (23.6%)
Lived in Hawai'i, n (%)	Yes	44 (80.0%)
	No	9 (16.4%)
	Unspecified	2 (3.6%)
Any family in Hawai'i, n (%)	Yes	53 (96.4%)
	No	1 (1.8%)
	Unspecified	1(1.8%)

you with your current weight" was significantly lower for women (1.8 ± 1.0) compared with men (2.4 ± 1.0; $P \leq 0.05$). No significant gender differences were found between mean scores for the thirteen scales on health behaviors related to diet and exercise (data not shown in tables). Briefly, for both men and women, the responses for most scales were at the intermediate level with mean scores for social support for exercise being the lowest (1.9 ± 0.7, 1.9 ± 0.6, respectively). The Cronhbach alpha coefficients ranged, for all 15 scales, from 0.71 to 0.96 for males, and from 0.79 – 0.95 for 13 out of 15 scales, for females, indicating good to excellent internal consistency. For females, two scales, portion control and social interaction related to diet, had a lower alpha of 0.64 and 0.69, respectively.

Multivariate analysis showed significant associations between dietary intakes and BMI with the diet/exercise health behavior scales (data not shown in tables). We found that fruit intake had a significant, positive association with healthful preparation and buying of foods ($P \leq 0.05$; ß = 0.872). Also, % energy from fat had a significant, positive association with higher social support for diet and higher outcome expectations related to diet ($P \leq 0.05$; ß = 0.11 and 0.38, respectively), but % energy from fat had a significant negative association with healthful preparation and buying of food ($P \leq 0.05$; ß = -0.2). BMI had a significant negative association with self-efficacy related to exercise, and outcome expectations related to diet and exercise ($P \leq 0.05$; ß = -0.16, -0.25 & -0.29, respectively).

Discussion

According to our findings, Native Hawaiians in Southern California are connected with Hawai'i either through family or living and/or being born in Hawai'i. Nearly 88% of the sample was either overweight or obese, and < 20% of the group met the vegetable, fruit, fiber, and whole grain recommendations. Finally, participants with lower self-efficacy related to diet and lower outcome expectations for diet and exercise had a higher BMI.

Studies have been conducted on dietary intakes and obesity in Native Hawaiians, primarily in Hawai'i.[9-13,21,29] The MECS showed that Native Hawaiians in general had a high average fiber consumption (25.9 g), but they also consumed the most amount of energy (2,727 kcal) compared with Latinos (2,679 kcal), African Americans (2,278), Japanese-Americans (2,242) and Whites (2,340).[28] A recent study of 434 Native Hawaiians in North Kohala Hawai'i also found that Native Hawaiians consumed the most amount of calories (2672.5 ± 1239.7).[10] In contrast, energy intake was lower in our population which could be due to differences in dietary assessment methodology between studies. Further, our study shows that > 80% of the sample is not meeting AICR/USDA guidelines for vegetable, fruit, and fiber consumption, and similar to other reports, 87.3% were either overweight and/or obese.[10,13,29] These results suggest that Native Hawaiians in Southern California could benefit from further nutrition and weight management education/interventions related to cancer prevention.

Several health behaviors related to diet and exercise can be improved upon for Native Hawaiians. Social support for exercise should be encouraged. Because concepts such as *'ohana* (family) and working together are prevalent Native Hawaiian values,[17] programs focusing on social support in a group setting may be well-received. Previous nutrition and health education programs in Hawai'i using Native Hawaiian cultural values and integrating community and family social support have been effective.[17-18] Our findings suggest that increasing availability and accessibility of healthful Hawaiian foods, and particularly for men, providing alternatives for leaner substitutes for lau lau and *Kalua* pig, could initiate dietary behavior change. In addition, higher fruit and lower % energy from fat intake was associated with healthful preparation of foods. To improve Native Hawaiian dietary intakes, educational programs should focus on healthful preparation of foods, such as choosing leaner meats and cutting off visible fat. Moreover, we showed that lower BMI was associated with higher self-efficacy related to exercise and greater outcome expectations associated with diet and exercise. Thus, weight management programs for Native Hawaiians should focus on increasing self-efficacy related to adjusting meals by making them lower in fat, identifying low fat and low calorie foods, and developing programs on individual benefits of outcomes related to healthful eating and exercise such as feeling less depressed and losing weight. Attending to these issues could help motivate and encourage Southern California Native Hawaiians to make healthful dietary and weight management behavior modifications.

Table 2. Mean daily intakes of food groups, macro- and micronutrients and supplements for males and females (n = 55)						
	Males (N=21)			Females (N=34)		
	Mean (SD)	Range	% above guidelines[a,b]	Mean(SD)	Range	% above guidelines[a,b]
Food Intake						
Energy kcal	1882 (710)	992-3220		1601 (615)	579-3010	
% Energy from fat	33.7 (5.9)	22.3-44.2	24	34.8 (8.4)	18.2-48.3	22
Fiber, g	19.5 (6.3)	7.9-30.1	19	15.2 (7.3)	2.8-31.4	12
Vegetable, servings	2.9 (1.7)	0.7-6.6	14	2.3 (1.4)	0-5.8	3
Fruit, servings	1.9 (2.1)	0-8.3	14	1.5 (1.2)	0-5.6	3
Whole grain, servings	2.0 (2.0)	0-8.6	5	1.4 (1.3)	0-5.4	0
Refined grain, servings	4.0 (1.5)	0-7.3	66	3.5 (2.1)	0-9.0.	56
Total Folate, mg	452 (204)	240-995	52	393 (285)	104-1781	35
Natural Folate, mg	265 (125)	123-609	19	204 (89)	123-607	3
Synthetic Folate, mg	187 (166)	46-853	5	190 (236)	23-1373	9
Vitamin C, mg	110 (92)	28-322	48	83 (53)	23-205	44
Vitamin E, IU	10.3 (6.2)	3.4-28.0	19	13.4 (17.4)	1.8-100.9	18
Total carotenoids, mg[c]	10913 (6676)	1672-25118		8857 (6568)	487-25161	
Calcium, mg	754 (459)	234-2433	10	714 (332)	129-1568	9
Iron, mg	15.5 (5.5)	8.9-32.2	100	13.6 (9.6)	4.4-61.2	79
Supplement Intake						
Folate, mg	175 (246)	0-900	33	251 (309)	0-1000	44
Vitamin C, mg	168 (404)	0-1500	38	163 (330)	0-1060	26
Vitamin E, IU	94 (214)	0-833	43	65 (151)	0-667	47
Carotenoids, mg[c]	217 (598)	0-2550		1247 (6500)	0-38002	
Calcium, mg	139 (272)	0-1120	0	367 (661)	0-2970	9
Iron, mg	2.4 (8.2)	0-36.3	10	3.8 (8.3)	0-36	18

[a]Guidelines are based on AICR and USDA dietary recommendation: < 30% energy from fat (USDA), 25 – 30 g fiber (USDA), 5 servings of vegetable (AICR), 5 servings of fruit (AICR).[6,32]
[b]DRI guidelines for micronutrients have been previously reported.[33]
[c]Precise dietary recommendations for carotenoids are unavailable.

Table 3. Means and standard deviations for individual culturally-specific health behavior questions related to diet and exercise for Native Hawaiians				
Variable	**Males**		**Females**	
	n	Mean(SD)	n	Mean(SD)
How sure are you that you can stick to an exercise program when attending a cultural gathering, (‘Ohana, *Luau*, New Year, Christmas)?[a,d]	19	2.8(1.0)	33	2.5(0.9)
How sure are you that you can stick to an exercise program when visiting Hawai‘i?[a,d]	19	2.8(1.0)	33	2.5(1.2)
How often did you find healthy Hawaiian foods readily available and accessible?[b,e]	19	2.0(0.9)	34	2.0(0.9)
How often did you choose leaner meats over those higher in fat, such as Spam, Portugese sausage, Vienna sausage?[b,e]	19	2.2(1.1)	34	2.4(1.0)
How often did you choose leaner meat options of substitutes for *lau lau* and *Kalua* pig?[b,c,e]	19	1.8(0.9)[c]	31	2.5(1.1)
How often did you prepare healthy foods with your family and friends?[b,f]	19	2.5(1.1)	33	2.5(0.9)
How satisfied are you with your current weight?[b,c]	19	2.4(1.0)[c]	33	1.8(1.0)

[a]Response options “not at all sure, a little sure, somewhat sure, very sure”; scale range 1 – 4
[b]Response options “almost never, sometimes, often, and almost always”; scale range 1 – 4
[c]$p < 0.05$ between males and females
[d]Questions included in the self-efficacy related to diet scale
[e]Questions included in the planning related to diet scale
[f]Question included in the preparation/buying scale

This study is one of the first studies to assess diet and health behaviors related to exercise/diet in Native Hawaiians residing in Southern California. However, limitations should be discussed. The small sample size may have limited detecting all potential associations in the multivariate model, observing differences between genders and generalizing the results. Despite the small sample size, we were able to detect significant associations between diet/BMI and health behaviors related to diet and exercise and gender differences. In addition, the study sample recruited from two primary community organizations in Southern California had a higher median age and education level, suggesting limitations related to representativeness of the results to the general Native Hawaiian population. Therefore, future studies should include a larger sample size and use population-based recruitment to ensure generalizability and representativeness. Nonetheless, the present study contributes to the sparse data on dietary intakes and health behaviors in Native Hawaiians residing in Southern California, and also demonstrates that joint partnership with the Native Hawaiian community, and incorporation of cultural values, can result in high participation rates and involvement of the community in research studies assessing diet and health behaviors related to nutrition and exercise.[30]

Considering that Native Hawaiians are at high risk for cancer morbidity and mortality, developing a culturally-specific diet and weight management education program may reduce health disparities in this population. Importantly, the present study was initiated and mobilized by the Native Hawaiian community in Southern California which has significant implications for the effectiveness of future nutrition and physical activity programs for this community.

Conflict of Interest

The authors report no conflict of interest.

Acknowledgements

Funded by NIH (grant number, 3 U01 CA114591-03S4). We would like to thank Shirley Flatt for her statistical expertise, Patricia Lenard for assisting with initial assessments, and Melinda Verissimo for her assistance with manuscript preparation and submission.

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Changes in Fasting Plasma Glucose Levels with Ribavirin and Pegylated Interferon Treatment in Normal and Impaired Glucose Tolerant Patients with Chronic Hepatitis C

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Abstract

Background: *Patients with Hepatitis C Virus (HCV) infection have increased rates of glucose intolerance, and studies have shown the improvement of fasting plasma glucose (FPG) levels after clearance of HCV infection with standard ribavirin plus pegylated interferon treatment. The purpose of this study was to examine glycemic changes with standard HCV treatment in patients with impaired fasting glucose (IFG) and normal fasting glucose (NFG).*

Methods: *A retrospective study of FPG changes in HCV patients with IFG and NFG treated with standard HCV therapy was conducted. Baseline characteristics and viral responses were assessed; FPG levels before treatment, at the end of treatment, and more than one-month post treatment were compared.*

Results: *The mean FPG levels increased by 8.68 mg/dl at the end of treatment in the NFG group but decreased by 9.0 mg/dl in the IFG group, a statistically significant difference (P=0.019). The change in FPG levels remained significantly different after adjusting for weight change (P=0.009) and weight changes and initial weight (P=0.039). FPG change from baseline at more than one month after treatment were similar in both groups (P=0.145). The change in FPG levels was not associated with sustained viral response.*

Conclusions: *In HCV-infected patients, standard ribavirin plus pegylated interferon treatment reduced FPG levels in patients with IFG and increased FPG levels in NFG individuals; independent of initial weight, weight change, or viral response. Standard HCV treatment modulates fasting plasma glucose levels which supports the need for a prospective study to determine the clinical significance of this finding.*

Introduction

Hepatitis C Virus (HCV) infection appears to confer increased risk of diabetes mellitus beyond established risk factors and is associated with severity of liver disease.[1] In HCV-infected patients with cirrhosis, diabetes mellitus was identified in approximately 25% of patients.[2] Abnormal glucose tolerance is manifested by alterations in hepatic glucose production, peripheral tissue insulin sensitivity, and β-cell function.[3] Non-diabetic HCV-infected patients have been found to be insulin resistant based on increased fasting insulin levels, homeostasis model assessment-estimated insulin resistance (HOMA-IR), and increased insulin secretory response to glucagon stimulation.[4] Additional characterization of glucose homeostasis among HCV-infected patients revealed reduced β-cell function by insulinogenic index among both impaired and non-normal glucose tolerant patients.[5] The treatment and clearance of HCV infection also impacts blood glucose concentrations. Standard interferon alpha treatments of HCV infection with sustained viral response (SVR) as compared to non-SVR HCV infection have shown lower rates of glucose abnormalities during an 8-year follow up period after treatment.[6] Fewer individuals with SVR than non-SVR HCV infection developed impaired fasting glucose (IFG) one-year post-treatment completion.[7] The effect of prolonged HCV treatment on fasting plasma glucose (FPG) level in the HCV-infected patients with IFG or normal fasting glucose (NFG), and the association with virologic response, has not been directly examined. The purpose of this study was to determine glycemic responses to standard ribavirin and pegylated interferon therapy in patients with IFG and NFG. The effect of interferon therapy to cause weight loss which decreases insulin resistance and improves glycemia was also assessed as well as the possible impact of various HCV genotypes which require different treatment protocols.

Methods

This retrospective study evaluated 43 adults (age ≥ 18 years) diagnosed with HCV infection by International Statistical Classification of Diseases and Related Health Problems (ICD-9) code of 070.44 and 070.54 and treated with once-weekly injections of pegylated interferon α-2a or α-2b (180 μg) plus ribavirin (1000 or 1200 mg/day in divided doses) for 48 weeks (genotype 1) or 24 weeks (genotype 2,3) through an ambulatory infectious disease practice from January 2004 to June 2008. This study was approved by the University of Hawai'i Committee on Human Studies (CHS #1541). Eight individuals with diabetes mellitus were excluded from analysis. Before treatment, 25 individuals had NFG with FPG level <100 mg/dl and 10 subjects had IFG based on FPG ≥100 mg/dl but <126 mg/dl. Three individuals had liver biopsy confirmed cirrhosis. Anthropometric measurements and FPG levels were obtained before treatment, at the end of treatment, and more than one-month post treatment. FPG levels in the IFG and NFG groups at these three time points were compared using unpaired t-test analyses. The change in FPG levels in the two groups was adjusted for the participants' overall weight change during the study period and the participants' weight change plus pre-treatment (initial) weight using linear regression analysis. Separate analysis was conducted to compare the FPG levels in SVR and non-SVR patients. SVR was defined as an undetectable viral load at 24 weeks after the end of therapy. All tests were two-tailed with P value <0.05 considered significant at the 95% confidence interval (CI). All statistical analyses were conducted using SPSS for Window software, version 16.0 (SPSS Inc, Chicago, IL).

Results

The baseline characteristics and response to treatment are presented in Table 1. The mean age of HCV-infected patients was 50 years in both IFG and NFG groups. The IFG group was exclusively men and there was an equal number of men and women in the NFG group, a difference between groups which was statistically significant (P=0.007). Mean baseline weight

Table 1. Baseline characteristics and changes in weight and FPG between IFG and NFG groups.			
Characteristics and Changes	**IFG (n = 10)**	**NFG (n = 25)**	***P*-value**
Age, years, mean + SD	50.0±6.2	50.0±6.6	1.000
Male gender, n (%)	10 (100)	13(52)	0.007
Initial BMI, kg/m^2, mean + SD	25.8±2.6	27.6±4.6	0.478
Initial weight, kg, mean + SD	85.3±16.5	82.1±18.4	0.633
Weight change after treatment, kg, mean + SD	-7.9±5.4	-8.5±10.0	0.883
Patients with SVR at end of treatment, n (%)	7 (70)	18 (72)	1.000
Initial FPG, mg/dl, mean + SD	108.7±7.3	85.9±7.6	<0.001
FPG at the end of treatment, mg/dl, mean + SD	99.7±14.7	94.6±21.2	0.496
Difference in End FPG from baseline, mg/dl, mean + SD	-9.0±13.7	+8.7±21.0	0.019
FPG >1 month post treatment, mg/dl, mean + SD	112.4±28.9	90.8±19.9	0.031
Difference in >1 mo FPG from baseline, mg/dl, mean + SD	+4.6±28.1	+4.7±18.7	0.145

Table 2. Baseline characteristics and changes in weight and FPG between SVR and Non-SVR groups.			
Characteristics and Changes	**SVR (n = 25)**	**Non-SVR (n = 10)**	***P*-value**
Age, years, mean + SD	50.4±6.8	49.2±5.6	0.636
Male gender, n (%)	17(68)	6(60)	0.706
Initial BMI, kg/m^2, mean + SD	26.9±4.1	27.3±4.4	0.845
Initial weight, kg, mean + SD	82.4±19.6	85.32±12.6	0.664
Weight change after treatment, kg, mean + SD	-8.9±10.5	-7.36±5.5	0.667
Patients with IFG before starting treatment, n (%)	7(28)	3(30)	1.000
Initial FPG (mg/dl), mg/dl, mean + SD	93.0±12.8	91.1±13.3	0.697
FPG at the end of treatment, mg/dl, mean + SD	93.6±17.2	102.3±24.2	0.238
Difference in End FPG from baseline, mg/dl, mean + SD	+0.6±15.9	+11.2±29.1	0.174
FPG >1 month post treatment, mg/dl, mean + SD	96.8±26.5	97.2±20.6	0.970
Difference in >1 mo FPG from baseline, mg/dl, mean + SD	+3.3±23.1	+7.7±17.4	0.521

and body mass index (BMI) were similar between the two groups. The percentage of patients with SVR was approximately 70% in both IFG and NFG groups. As expected, the mean FPG level at baseline was significantly higher (108.7 mg/dl) in the IFG group than the NFG group (85.9 mg/dl). At the end of treatment, the mean FPG level increased by 8.7 mg/dl in the NFG group and decreased by 9.0 mg/dl in the IFG group, a statistically significant difference between the two groups ($P=0.019$). This difference remained significant after adjusting for weight change ($P=0.009$) and weight change plus initial weight ($P=0.039$). The change from baseline in FPG levels of both groups was not significantly different at more than one-month post treatment ($P=0.145$; adjusted for weight change $P=0.159$ and weight change and initial weight $P=0.198$). There was no statistically significant difference in FPG levels from baseline to end of treatment within each group.

Baseline characteristics and changes in FPG level and weight in HCV-infected patients were also evaluated based on viral response to treatment (Table 2). Comparing SVR (n=25) and non-SVR (n=10) groups, there were no significant difference in FPG levels at baseline or the percentage of individuals with IFG and NFG in both groups. Although, the mean FPG level increased in non-SVR group with ribavirin and pegylated interferon treatment, the increase from baseline compared to the SVR group was not statistically significant ($P=0.174$). This difference was also not significant after adjusting for weight change ($P=0.223$) and weight change plus initial weight ($P=0.344$). The FPG differences at least one-month post treatment were also not statistically significant ($P=0.521$; adjusted for weight change $P=0.513$ and weight change and initial weight $P=0.531$).

During the course of the 24-week and 48-week treatment periods, significant weight reduction was observed with pegylated interferon plus ribavirin treatment in nearly all patients. However, weight change was similar for IFG and NFG groups (Table 1) as well as in SVR and non-SVR groups (Table 2).

Discussion

In this retrospective study, a statistically significant difference in FPG levels was observed between the IFG group and the NFG group ($P = 0.019$), and this significance remained after adjusting for weight change or weight change plus initial weight. The tendency for standard ribavirin and pegylated interferon treatment to cause anorexia and weight loss, and to improve viral load, did not appear to be significantly related to FPG changes. The FPG level decreased in the IFG group, and, interestingly, increased in the NFG group despite weight loss. Moreover, the FPG changes in both groups returned to near baseline levels at one month post-treatment and were not significantly different between treatment groups. Based upon the results of our study, ribavirin and pegylated interferon treatment affects FPG regulation, but the mechanism remains unclear. Treatment may very well impact insulin resistance and β-cell function differently in glucose tolerant and intolerant patients with HCV infection. Several reports have noted different effects of interferon treatment on insulin resistance and β-cell function. For example, a short-term study of a two-week exposure to interferon demonstrated reduced insulin sensitivity in liver and peripheral tissue assessed by euglycemic hyperinsulinemic clamp.[8] Another study found that two weeks of pegylated interferon treatments caused worsening glucose levels and resulted in a high incidence of type 1 diabetes.[9] However, prolonged interferon treatment of three months in HCV-infected patients has been reported to minimally impact insulin sensitivity, but causes an increase in insulin response to glucose.[10]

For the observed changes in FPG levels in our study of HCV-treated patients, we presumed that insulin resistance was reduced in both groups, primarily attributed to weight loss. The treatment period for our observational study was 24 weeks for HCV genotype 2,3 patients and 48 weeks for HCV genotype 1 patients, which was longer than previously reported studies by others. Thus, we suggest that prolonged pegylated interferon treatment increased insulin response and with decreased insulin resistance from weight loss, FPG levels reduced in the IFG group. A similar mechanism would have been expected in the NFG group, but surprisingly FPG levels increased at the end of treatment in this group. Another study that utilized a similar treatment protocol as ours, found no abnormalities (IFG or Diabetes Mellitus development) during HCV-treatment and at 6-months after treatment among 202 HCV-treated patients with NFG.[6] However, the actual FPG levels within the NFG group were not reported and it is possible that similar increases in FPG levels in the NFG group were observed.

The limitation of this study is the retrospective analysis of an observational, standard of care treatment cohort. The small sample size limits more meaningful evaluation of FPG levels. A larger study is needed to ascertain overall glycemia (A1c level) and other biomarkers such as insulin, C-peptide, and adiponectin. Still, despite the small sample size, our study still showed significant differences in FPG levels and remains one of few studies that examine glucose changes after prolonged treatment of 24 and 48 weeks with pegylated interferon among HCV-infected patients.

In summary, standard HCV infection treatment impacts FPG levels differently in HCV-infected patients with IFG and NFG. These changes are independent of initial weight, weight change, or viral response. A prospective and larger study examining the various parameters of glucose metabolism during prolonged HCV-treatment may be meaningful and provide clinical relevance of changes in FPG levels. If confirmed, frequent blood glucose monitoring may be necessary to minimize potential risk for hyperglycemia in NFG patients during HCV treatment.

Acknowledgement and Disclosures

The authors greatly appreciate Jim Davis PhD and Patsharaporn Techasintana MD for assistance with statistical analysis.

Richard Arakaki MD disclosed that he is a consultant for Novo Nordisk Company and a speaker for Eli Lilly and Company and Amylin Pharmaceuticals. Alan Tice MD disclosed that he is a consultant or speaker or investigator for Astellas, Cubist, Gilead, Merck, Novartis, Pfizer, and Roche.

Administrative support was provided by the Hepatitis Support Network of Hawai'i, a non-profit organization.

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PUBLIC HEALTH HOTLINE
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A Proposal for Achieving Health Equity for Fetal Alcohol Spectrum Disorders

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At an intuitive level Health Equity (HE) is a straightforward concept — everyone should have good health and have access to quality healthcare services. Yet, when looking at groups within the United States — and within Hawai'i — clearly there are differences in health status, access to care, and the quality of care available. And when the differences are significant and fall along dimensions that have usually reflected discrimination, these differences can become disparities, and a sense of injustice arises.

The Centers for Disease Control & Prevention (CDC) is one of the principal governmental institutions charged with promoting HE. They see the inequalities in health status in the United States as "large, persistent and growing." The main risk factors cited in a recent monograph are: poverty, income and wealth inequalities, poor quality of life, racism, sex discrimination, and low socioeconomic conditions. Their goal, then, is to ensure that everyone has the opportunity to attain his or her full health potential, as measured by length of life, quality of life, rates of disease, disability and death, severity of disease, and access to treatment.[1]

An aspect of healthcare that can also create access barriers is the stigma carried by certain diagnoses, such as Hansen's at one time and more recently, HIV/AIDS. The CDC accepts that negative attitudes can pose barriers for persons needing treatment for a mental illness, as well. To understand, quantify, and trend attitudes towards mental illness, two questions were recently added to their Behavioral Risk Factor Surveillance System (BRFSS). The results showed that most adults (89%) agreed that treatment is effective. But fewer (57%) agreed that "other people are caring and sympathetic toward those with mental illness." The most revealing statistic concerns the responses of people with mental health symptoms: fewer than one in four (24.6%) agreed that "other people are caring and sympathetic toward those with mental illness."[2]

The health equity issues regarding behavioral health have been known (and tacitly accepted) forever. They deservedly will be explored in much greater detail later this year. The remedy, though, involves the "integration" of behavioral health and primary care, which will take a substantial modification of the cultures of these specialties and professions. Because of the size and complexity of the task, a useful approach might be to target one specific behavioral health diagnosis, improve the way the condition is managed, then scale up. This paper will discuss the Fetal Alcohol Spectrum Disorders (FASD) and outline the steps needed to move toward this "integrated" model.

Note that FASD is not a mental illness like schizophrenia or Attention Deficit Hyperactivity Disorder (ADHD), but 96% of the individuals with Fetal Alcohol Syndrome (FAS) in one study had a comorbid mental health diagnosis.[3] And many of the manifestations of FAS are behavioral in nature, so that patients become subjected to the same negative attitudes. Thus, changing the system of care for FASD is an appropriate starting point.

Proposal for a New System of Care for a Very Old Disease

"Of all the substances of abuse, including cocaine, heroin, and marijuana, alcohol produces by far the most serious neurobehavioral effects in the fetus," the Institute of Medicine noted in their report to Congress in 1996.[4] The consequences of prenatal exposure to alcohol on the developing brain were described by the Greek philosopher, Aristotle, who wrote, "Foolish, drunken and harebrained women, most often bring forth children like unto themselves, morose and languid."[5] The first description of the teratogenic effects of alcohol in the medical literature appeared more than four decades ago, but for many reasons getting affected children into an appropriate treatment program has remained stubbornly elusive. Considering that the prevalence of Fetal Alcohol Spectrum Disorders (FASD) is at least as frequent as the autism spectrum disorders and the estimated lifetime cost to society of each case exceeds $2 million,[6] this disorder has received surprisingly little attention.

What is FASD?

"FASD" is an umbrella term that encompasses the wide array of abnormalities caused by in utero exposure to alcohol. These developmental disorders are physical as well as neurobehavioral and can affect each person in different ways, such that there is no typical "FASD profile." The Fetal Alcohol Syndrome (FAS) is the best known variant of FASD (the only one that is an ICD-9, 10 diagnosis) and often manifests more severe signs and symptoms. FAS children tend to present with distinct facial characteristics, cognitive impairment (low IQ), growth deficiency, poor memory, coordination difficulties, learning disabilities, attention deficits, hyperactivity, and problems with impulse control, language, memory, and social skills. The heart, kidneys, eyes, ears, and limbs may be involved.[7]

Prevalence

The prevalence of FASD has been thought to be about 1% of

live births. But in May, 2009 the US Department of Health and Human Services' Substance Abuse and Mental Health Services Administration (SAMHSA) estimated that the real rate could be five times that. To illustrate this point, in a year-long study of youths remanded for a forensic psychiatric assessment in Canada 23.3% were diagnosed with FASD, whereas only 1% carried the diagnosis pre-study.[8] Each year in Hawai'i there are around 18,500 live births. Applying the national statistics, conservatively, there are 185 new cases of FASD each year, but the number could be much higher.

Diagnosis of FAS and Related Considerations

Part of the reason for the wide range in the prevalence estimate is the difficulty in making a firm diagnosis. Unfortunately, there is no specific test for FAS. And other disorders, such as attention-deficit/hyperactivity disorder and Williams Syndrome, share some of the same features. The anomalies seen on neuroimaging studies, such as MRI, are not specific to FAS because the developing brain may be susceptible to alcohol throughout gestation; thus the structural part of the brain that is being formed at the time of exposure sustains the injury.[9] Three highly regarded organizations have developed diagnostic criteria for FAS; each requires the presence of specific facial abnormalities, lower than average height/weight, neuro-behavioral deficits, and prenatal alcohol exposure (confirmation is not an absolute requirement). The neuro-behavioral criteria can be difficult to appraise, prompting a Canadian group to recommend the use of a multidisciplinary team (psychologist, occupational & physical therapists, speech pathologist, social worker, and physician) to assess each child — at substantial cost.[10]

FAS falls on the severe end of the Fetal Alcohol spectrum. Many cases will fall short of the FAS criteria, but nevertheless should be considered alcohol-related neurodevelopmental disorders or birth defects. The prevalence of these less-severe cases may be 3 to 10 times higher than FAS. Presently no consensus has been reached on FASD criteria.[11]

Beyond these clinical issues, primary care providers (PCP) may be reluctant to make the diagnosis for non-technical reasons. The stigmatization issue is a factor for the child and the mother, which may affect the provider/patient relationship. Concerns about a "safe environment" may arise because of substance abuse, and these concerns can be an indication to involve social services. Hence, side-stepping these issues with an alternative diagnosis might have advantages, but there also can be consequences. Table 1 points out how the treatment of different conditions with similar manifestations can diverge markedly.

Treatment

The damage to the central nervous system caused by alcohol is irreversible and has lifelong implications. The natural history of FAS has shown that these patients are at great risk for "adverse life outcomes," such as encounters with the criminal justice system, substance abuse, and inappropriate sexual behavior. These risks can be significantly reduced by families, communities, and healthcare providers working together to create a stable environment with enduring relationships and an appropriate treatment regimen. Early diagnosis and intervention (before 6 years of age) appears to be the key.[13]

Table 1. (Source: Dan Dubovsky, SAMHSA FASD Center for Excellence)[12]

Behavior: Takes risks	**Core Cause of Behavior**	**Intervention**
Fetal Alcohol Spectrum Disorders	• Does not perceive danger	Provide mentor; utilize a lot of repeated role playing
Attention Deficit Hyperactivity Disorder	• Acts impulsively	Utilize behavioral approaches (eg, stop and count to 10)
Oppositional Defiant Disorder	• Pushes the envelope; feels omnipotent	Psychotherapy to address issues; protect from harm
Behavior: Does not complete tasks	**Core Cause of Behavior**	**Intervention**
Fetal Alcohol Spectrum Disorders	• May or may not take in information • Cannot recall information when needed • Cannot remember what to do	Provide one direction at a time
Attention Deficit with Hyperactivity Disorder	• Takes in information • Can recall information when needed • Gets distracted	Limit stimuli and provide cues
Oppositional Defiant Disorder	• Takes in information • Can recall information when needed • Choose not to do what they are told	Provide positive sense of control; limits and consequences
Behavior: Hits others	**Core Cause of Behavior**	**Intervention**
Fetal Alcohol Spectrum Disorders	• Someone told them to • Misinterprets intentions of others • May sense bump as attack • May respond from history of abuse	Deal with misinterpretations at the time; one-to-one support
Attention Deficit Hyperactivity Disorder	• Frequently an impulsive act	Behavioral approaches to address impulsivity
Oppositional Defiant Disorder	• Plans to hurt others • Misinterprets intentions of others as attack or impending attack	Consequences; cognitive behavioral approaches

While there is no specific cure for FASD, medication may be used to mitigate some of the symptoms. Additionally, a number of treatment approaches have shown positive results. These include education therapy directed at specific skill-building, parent training, and behavior therapy.[14]

Total FASD Patient Care Requirements

A complete FASD program must take a multi-factorial approach that includes the primary prevention of this 100% preventable diagnosis, the screening of infants and children, and the provision of diagnostic and therapeutic services. Although each of these areas needs expansion, the lack of an available FASD "track" is, with some possible exceptions, the glaringly omitted piece.

1. Prevention: identify women at risk for binge drinking; provide an effective intervention to stop alcohol use; public education on the effects of alcohol during pregnancy
2. Screening of infants, toddlers and children
3. Referral to appropriate healthcare providers
4. Entry into an FASD "track" with a preplanned set of diagnostic and therapeutic steps

Government's Role: the Hawai'i Department of Health has had a multi-pronged public health strategy for its FASD program that includes, alcohol prevention programs, social service interventions, screening clinics, the development of screening tools, data-gathering through the CDC's Pregnancy Risk Assessment Monitoring System, the development of family education material, support for provider education, and efforts to improve communication and collaboration among the different disciplines. The state will strive to maintain and expand its programs over the coming years.

A full treatment of FASD is beyond the scope of this paper. Because Health Equity is a central theme in the care of FASD patients, the remainder of this paper will be devoted to the development of a model of care that improves outcomes and increases HE. To accomplish this, a system of care has to be created that leverages existing resources to make a definitive diagnosis, to provide appropriate therapy, and to modify the treatment plan depending on reassessment results. Ultimately, at least in this context, primary care and behavioral health have to move into a more coordinated relationship, which will help reduce mental health stigma and discrimination.

Clinical experts in Hawai'i relate that currently, behavioral health and primary care providers generally continue to operate in separate silos with minimal sharing of information. From the standpoint of many (if not most) of the PCPs in Hawai'i, behavioral health services are obtained from a specialist through a formal consultation.

General Constraints Within the Hawai'i Delivery System

- A majority of PCPs practice in solo or small group practices (< 5 providers)
- Many of the PCPs and Behavioral Health Providers are early in the implementation of electronic health records and are generally not able to share information electronically
- PCPs are often not comfortable in making the diagnosis of FAS
- PCPs often will not provide an extensive range of behavioral health treatment services
- Hawai'i does not yet have the type of multi-disciplinary team described in the Canadian literature set up to assess and diagnose FAS cases
- Hawai'i has a small number of FASD specialists

System of Care After Screening of a Pediatric Patient

This proposal is for a co-management system where the PCP, the Behavioral Health Provider (BHP), and FASD specialist (Genetics, Pediatric Neurology, Developmental-Behavioral, other) each plays a specific role. There will be a single treatment plan and appropriate sharing of information.

1. The PCP will refer a patient who screens positive to an FASD specialist;
2. One or more FASD specialists will make the diagnosis, establish a treatment plan, and refer the patient back to the PCP (with the assessment and written treatment plan);
3. The PCP will refer the patient to BHPs in accord with the treatment plan; appropriate information, including the FASD specialist(s) assessment and treatment plan, will be sent;
4. The PCP and/or BHP will involve the patient's family and school as recommended in the treatment plan;
5. The BHPs will provide the treatment (medication and other modalities); the BHP will provide periodic reports to the PCP;
6. The PCP will monitor the patient's progress from patient contact and communication from the family, school, and BHPs, as indicated;
7. If the patient's progress is not satisfactory, the PCP will refer the patient back to the FASD specialist;
8. The FASD specialist will reassess the patient, modify the treatment plan as necessary with input from the PCP and BHP, and refer the patient back to the PCP.

There are two caveats. This proposed "system of care" is just a set of guidelines. To get the desired outcomes, the providers will have to consciously agree to assume specific duties that they perhaps have not performed in the past. Some of the new responsibilities, such as more frequent and detailed communication or participation in case conferences, may have no additional reimbursement.

Although this proposal represents a significant change from current practice, it only creates a "collaborative model." The providers work together, but from the patient's point of view the behavioral health treatment is still a separate service that comes from a specialist so that some of the stigma may yet remain. This undertaking, however, is a necessary first step toward an "integrated model," where behavioral health is part of primary care, and patients perceive it as a routine part of their health care.[15]

Change in the system of care doesn't happen overnight, as least not in healthcare. But providers should begin to think about the issues presented in this paper, FASD, health disparities surrounding behavioral health, and the possibility of a more integrated delivery system. And that is the purpose of this paper.

Providers will have to be given more information, such that they have a clear understanding of their roles, what to expect from their clinical colleagues, and the risks and benefits to all parties, particularly the child and his or her family. Free and open dialogue will be a critical part of the change process; for this reason co-located providers (same practice setting) should have an easier time moving forward. Perhaps early adoption of this change should be done in a more controlled environment with external support and data-gathering capability. Regardless, it's time to make the CDC's measures of health equity in this area trend upward. A new system of care for a very old disease seems like a good place to start.

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Teaching Clinical Skills at John A. Burns School of Medicine: Philosophy and Practice — A Continuing Journey

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The professional discipline of medicine is learned. It requires constant updating and practice. As physicians we attempt to prevent, diagnose, treat, and cure or ameliorate illness. We are committed to growing in skill and knowledge and apply that knowledge to the myriad of individuals who come to us for evaluation, treatment, and counsel. In addition, there is also the commitment to pass on our tradition and experience to the next generation of physicians. It is an important part of the Hippocratic Oath that the physician takes periodically in their professional lives. Medicine is still in many ways an apprenticeship. It is passed to the next generation by teachers and the written word, by observing role models, and by practice under expert observation and feedback. There are many roles for doctors—as clinical or basic scientists, as diagnosticians, as therapists, and as counselors. We must have skills in all of those areas to be effective physicians.

Since 1971, Clinical Skills training in Hawai'i has involved patients, medical students and residents, and community physicians.[1] Clinical Skills is the set of behaviors, professional attitudes, thought processes, and procedural capabilities that continuously develop, improve, and allow physicians to interact with patients to solve medical problems. These are central to physician identity and practice. These skills are now so crucial to effective practice that they have become a part of medical student national testing before graduation. Because of John A. Burns School of Medicine's (JABSOM's) attention to teaching Clinical Skills, the students are well prepared and uniformly pass this challenge. This foundation begins early in the first year of medical school. It is an integral part of the student Problem Based Learning Curriculum[2,3] and life-long learning. Early training in Clinical Skills is an essential part of Problem Based Learning[1] and is congruent with the active learning process.

Those who are teachers of clinical skills were motivated even in medical school to transmit these essential skills often as junior or senior medical students teaching second year students prior to their clerkships. Carrying on that tradition, at JABSOM 3rd and 4th year students and medical residents are invited to help teach these basic physical examination skills under faculty supervision. Teaching truly solidifies these skills for young physicians-to-be.

In 1971, the Clinical Skills teaching at the new medical school was, as now, taught by volunteer clinical faculty. At that time, it was a two-year school and so students were prepared to take their clerkship and clinical years at Mainland medical institutions.

Teaching Clinical Skills in Hawai'i has offered an unusual opportunity to learn about and teach cultural sensitivity. In addition to the indigenous Hawaiian population, the physician's care extended to all peoples who migrated to Hawai'i: Caucasians, Japanese, Chinese, Portuguese, Filipinos, Pacific Islanders, Vietnamese, Koreans, as well as active duty military personnel, veterans living in Hawai'i, and adult military dependent family members. Communicating with patients from so many different backgrounds teaches us the importance of respecting wide-ranging opinions, traditions, and economic and educational circumstances, as well as being empathetic and gaining their understanding for immediate and long term diagnostic and treatment goals. Today, this is called "Cultural Sensitivity" taught by lesson and example at JABSOM.

Dr. Lawrence Weed developed and promulgated the Problem Oriented Medical System.[3-6] Dr. Weed was an inspirational speaker and promotor in the early 1970's of a new approach to medical data gathering, recording, grouping, and formatting patient health information that furthered the objectives of comprehensive, scientific, and patient centered medical care. His was a magnificent effort to reconstruct the medical record into a more scientific document meant for patient care, medical audit, and education. Medical data useful in solving medical problems were addressed at the level of its understanding. It included a summary Problem List, followed by an Assessment of each problem. Each problem was followed by a Plan that was justified by the data pertinent to that problem. Each included further plan-specific laboratory information, treatments, and patient education. In addition, this method organized follow-up Progress Notes into separate sections: Subjective (symptomatic patient information), Objective data (physical and laboratory findings), and further Assessment and Plans under individual problem headings. The beauty of this system was that you could not go beyond your collected data in making diagnoses or designing treatment plans. It recognized that the diagnosis and treatment were an evolutionary and iterative process. His system recorded, interpreted, and proceeded upon data in a rational, systematic, and scientific retrievable way. It provided an ongoing audit trail for the treatment of the patient. It was a learning tool. Weed's precepts formed the basis for developing the JABSOM Problem Oriented Medical Record. Weed's format is now the standard method to record student and resident medical data across the country. We began using this format shortly after Weed invented it.

Over the ensuing years, educators at JABSOM increasingly recognized the limitations of the lecture based educational system. The faculty supported the then Dean Gulbrandsen's decision to begin JABSOM's dramatic conversion to Problem Based Learning. This occurred in 1989.

Educators recognize the importance of the setting for teaching. This was certainly true for Clinical Skills. A Clinical Skills teaching space was first created at Queens Medical Center at University Tower and subsequently at the medical school's Manoa campus. The director solicited excellent "used" examination tables from local physicians, the local medical association, and from hospitals to provide a realistic milieu for teaching physical examination. For 15 years those facilities provided a teaching laboratory for clinical skills until the move to a well-stocked, beautifully appointed clinical skills laboratory at the JABSOM Medical Education Building at Kaka'ako, Honolulu, Hawai'i.

When Problem Based Learning (PBL) became the Curricular Foundation, clinical skills were integrated over the next two years into Systems Based Units. This curriculum begins with Introduction to Problem Based Learning, followed by Cardiology and Pulmonology, Nephrology and Hematology, Endocrinology and Gastroenterology, Rheumatology and Neurology, and Behavioral Science. In addition, the final unit, the Life Cycle, acquainted the students with the data bases and skills needed for Pediatrics, Adolescent Medicine, Geriatrics, and Reproductive Health. In the first Unit, a basic physical exam was taught along with the other components of a medical history. With each subsequent organ system oriented subunit, the relevant portions of the history and physical examination were expanded

Teaching the motor and cognitive skills related to gathering historical and physical information from patients provides first and second year students with their initial trajectory into medical care and "Lifelong Learning" (the latter being constantly emphasized). These skills are necessarily taught in small units over long periods of time beginning in a laboratory setting. Each laboratory prepares students for their subsequent patient experiences. The laboratory is divided into the usual activities of examination: Inspection, Palpation, Percussion, and Auscultation. Each skill is taught in a standardized fashion first by classroom demonstration and followed by students examining each other under careful supervision. In addition to teaching motor skills and techniques, these labs require that students ask permission of each other to perform the exam and learn the appropriate draping necessary to preserve privacy. This skill set prepares first and second year students for their patient interactions in each subsequent PBL unit, in the third and fourth year hospital and outpatient clerkships, and subsequent residencies, fellowships, and practice careers.

Students learn most from patients. After acquiring basic skills in the laboratory, tutorial groups are paired with clinician preceptors who provide volunteer patients for the students to interview and examine. Students see how data collection and inductive reasoning lead to possible explanatory hypotheses and then diagnoses. These patient experiences are similar to classroom learning with "paper problems", except the student-physician must gather the data. These student-patient interactions mirror the doctor-patient relationship and teach professionalism as well as data collection skills in a realistic clinical setting. Pertinent patient experiences in each pre-clinical unit reinforce and complement the tutorial learning.

Directing and teaching clinical skills have meant interacting with many faculty members to assure constantly their integration into the greater educational whole. This includes coordinating direct clinical skills teaching with the Office of Clinical Skills chaired by Michael Nagoshi MD, and the clinical simulations laboratory (Sim-Tiki) headed by Joseph Turban MD. In the former, standardized patients (actors) are used for evaluating clinical skills and for teaching difficult portions of the clinical examination (female breast and pelvic examination; male genital and rectal exam).[7,8] The latter teaches and assesses procedural skills and simulates physiological responses to pharmacologic, diagnostic, and other treatment modalities.[9]

Directing and teaching this subject includes year-round recruiting and developing a clinical faculty capable of teaching clinical skills. Together, the faculty facilitates student-patient interactions that reinforce the classroom learning. This means professional development and professional education for this faculty to better prepare them for the clinical skills teaching program. This program recruits and orients about 130 volunteer clinical faculty members each year to assist in teaching clinical skills. Furthermore, interaction and coordination are necessary with those physicians involved with Clinical Skills in the various Clerkships in the third and fourth years. This maintains the integrity of clinical skills teaching and practice throughout the JABSOM experience. Each clinical skills instructor serves as a role model by supervising and guiding student interactions with volunteer patients.

Yearly, the Director reviews and updates the organized objectives and written materials that summarize what students in the first and second years will learn. Annually, the Clinical Skills Resource Manual,[10] the written repository of what is taught in clinical skills, is reviewed and edited. A suggested textbook[11] is provided for the students as well as visual and auditory clips for the classrooms. Useful Internet sites for collections of breath sounds and heart tones supplement the laboratory experiences.

The impact of Clinical Skills in medical education at JABSOM has been significant as over one half of practicing physicians in Hawai'i have come from our school. The Chair of this program has taught every student graduating from JABSOM since 1979 and actually was a preceptor teaching clinical skills while at Tripler from 1971-1974. Furthermore, the Chair teaches students, residents, and community physicians in his own discipline of Endocrinology, in general medicine, and in direct patient care. This enterprise has been made possible due to the combined supporting efforts of students, physician colleagues, the medical school, and the physician-patient community at large.

Future educational challenges include the following. (1) How will future physicians provide patient-centered care? (2) How

will medical schools provide a medical education emphasizing primary care that takes care of the whole patient? (3) How will primary care physicians be taught to provide preventive care, as well as acute and chronic care for patients? (4) How can physicians provide comprehensive care to all patients associated with the practices? (5) How can information be shared to avoid duplication of services? (6) How will services be more efficiently and humanely provided? (7) How will adequate and appropriate care be provided to everyone; not just to those with medical insurance? (8) How do we make health care a right instead of a privilege?

The concept of the Medical Home[12] will provide a framework to respond to the above questions. It will allow better patient access to care, improve communication between providers, emphasize preventive medicine, and more efficiently care for the currently healthy as well as for the acutely and chronically ill. JABSOM will need to emphasize these goals in the future. In part, this can be done by returning to the first principles: Rather than increasing dependence on increasingly expensive technology for diagnosis and treatment, emphasize the inexpensive, effective and time-honored history and physical examination for planning and efficiently using more expensive laboratory and imaging tools for diagnosing and treating medical problems. Electronic medical records (EMR) need to be designed to communicate with each other and incorporate the principles of the Problem Based Medical Record. The EMR must include the diagnostic and decision support tools that are increasingly available. Doctor-patient interaction must be maintained. Technology that permits the physician to really listen to patients, to maintain eye contact, and to perform appropriate physical examination must be used to elicit and sift through pertinent medical information. The Medical Home will ideally incorporate the skills of professionals and para-professionals into Team Approaches to health care delivery. The challenge will be to introduce medical students to the new paradigm of the Patient-Centered Medical Home. There still remains a lot of learning and teaching that must be achieved.

** Recipient of the 2012 Excellence in Teaching Award, University of Hawai'i.*

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THE WEATHERVANE

RUSSELL T. STODD MD; CONTRIBUTING EDITOR

EFFECTIVE SELLING IS CONVINCING PEOPLE TO BUY WHAT THEY DON'T NEED.

When a doctor sold his wonder tonic out of a horse-drawn wagon, we called him a quack. When a major drug company foists a useless product on millions of patients, we call it enterprise. Although only one patient out of a hundred without heart disease might benefit from Lipitor, solid marketing has pushed it to number one in the pharmaceutical world. With sales of $11 billion annually, Pfizer stands to lose big time as it goes generic and their monopoly disappears. Fearful of lost revenue, the company is striking deals with drug benefit plans and providing discounts to patients to encourage continued branded use of the drug. For the long term, Pfizer is seeking to sell an over-the-counter version of Lipitor. "We're doing our best to enable the maximum number of individuals to stay on the brand they've come to trust," said Ian Read, Pfizer CEO. Yes, it is easy to trust something you never needed in the first place.

THIS MORNING I DID PUSH-UPS IN THE NUDE. I DIDN'T SEE THE MOUSE TRAP.

Pumping up is easier for people who have been buff in young adult years. A Norwegian team found that muscles retain memory of their former fitness even as they wither from lack of use. The hard-working enlarged muscle cells require more than one nucleus to supply the DNA templates for making large amounts of protein that give the tissue its strength. Even when the cells are later deflated to 40% of their bulked up size, the number of nuclei in the cells does not change. The extra nuclei form a type of muscle memory that allows the muscle to bounce back quickly when retrained. According to team leader physiologist, Kristian Gunderson, reporting in the Proceedings of the National Academy of Sciences, the findings suggest that exercise early in life can fend off frailness in the elderly.

AGAINST STUPIDITY, THE GODS THEMSELVES FIGHT IN VAIN.

Embedded in the Obama medical reform law is a toxic rule called the Physician Payments Sunshine Act. The Act requires all companies that manufacture medical products purchased by the government to disclose on a public website anything they give physicians valued above $10, not $100, not $1,000, but $10. That's about the cost of a bagel and a latte. The Centers for Medicare and Medicaid Services (CMS) justifies this legislation by citing "conflicts of interests that may influence research, education, and clinical decision-making in ways that compromise clinical integrity and patient care, and may lead to increased health care costs." This is a piece of bureaucratic claptrap that must be described as just plain dumb! A voluminous 2009 Institute of Medicine report on "Conflict of Interest in Medical, Education and Practice" found no evidence that relationships adversely affect what really counts – patient outcomes. Can there be any doubt that CMS has been turned over to accountants and lawyers?

DRUNK? OH NO, OFFICER. I JUST HAD ONE GLASS OF WINE WITH DINNER.

Binge drinking is defined as consuming four or more drinks per occasion for women and five or more drinks for men. Centers for Disease Control and Prevention (CDC) data tell us that 38 million U.S. adults (one in six) binge drink. The frequency of episodes is approximately four times a month. On average, the largest number of drinks consumed is eight drinks per occasion. Binge drinking accounted for more than half of the 80,000 alcohol-related deaths in the United States each year. It is a risk factor for health and social problems including motor-vehicle crashes, violence, suicide, hypertension, acute myocardial infarction, unintended pregnancy and sexually transmitted diseases. Binge drinking accounts for more than half of the alcohol consumed by adults and 90% consumed by youths. Interesting to note that most binge drinkers are not alcohol dependent.

STAND BACK! IT LOOKS LIKE THAT VICIOUS WHIPPED CREAM!

Rebecca Hains was flying from Las Vegas to Boston when a Transportation Safety Administration (TSA) agent confiscated the cupcake she had in her carry-on. He deemed it a security risk. She explained that her other cupcake-in-a-jar was able to pass through security at Boston's Logan International Airport without a problem, but the Las Vegas agent insisted the frosting on the cupcake was too "gel-like." She offered to scoop the dangerous cupcake out of its jar and place it in a zip-lock bag, but the agent still refused. A TSA spokesperson stated that the incident was unusual and was being reviewed. Absurd events like this have caused some airports to opt for private security companies and get rid of the TSA. Security lines are getting steadily longer now that body-screening devices have become de rigueur. As an Israeli security consultant stated, TSA only provides a system for annoying people.

THE HANDS ON HIS BIOLOGICAL CLOCK GAVE HIM THE FINGER.

In Stuttgart, Germany, a former beauty queen wife and her husband wanted badly to have a child. When it was found that the husband was sterile, he entered into a contract with his neighbor to impregnate his wife for a fee of $2500. For six months the neighbor visited the wife three times a week, but she failed to become pregnant. The husband demanded a sperm count of his neighbor which revealed that he too was sterile. The neighbor's wife was not surprised and admitted that her husband was not the father of their two children. The husband of the former beauty queen has filed a breach of contract suit and wants a return of his $2500. The neighbor has refused stating that he did not guarantee conception. Perhaps they should call the unmentioned boyfriend. He might even repeat his performance without charge.

ADDENDA

– Approximately 5,000 people per year go to hospital emergency departments for falls associated with holiday decorations.
– According to annual statistics, Russians typically drown at a rate 5 times greater than Americans. Reports indicate the majority were drunk at the time.
– Forty percent of married Americans who were planning divorce before the recession decided to stick it out because of the economy (National Marriage Project).
– The first modern leap year was 1752.
– My wife really needs me only once a month when it's time to flip the mattress.

ALOHA AND KEEP THE FAITH rts

(Editorial comment is strictly that of the writer.)

UPCOMING CME EVENTS

Interested in having your upcoming CME Conference listed? Please contact Brenda Wong at (808) 536-7702 x103 for information.

Date	Specialty	Sponsor	Location	Meeting Topic	Contact
May 2012					
5/25	ADM, ADP	University of Hawai'i, JABSOM, Department of Psychiatry	Queen's Conference Center, O'ahu	Hawai'i Addictions Conference: Trends & Developments	Email: nmatsuda@dop.hawaii.edu
June 2012					
6/13-6/16	OPH	UC Davis Health System	Hilton Waikoloa Village, Kohala, Hawai'i	35th Annual Ophthalmology Symposium, Big Topics on the Big Island: An Update of Comperehensive Opthalmology	www.ucdmc.ucdavis.edu/cme
July 2012					
7/1-7/6	OBG, REN	University of California San Francisco School of Medicine	Hapuna Beach Prince Hotel, Big Island, Hawai'i	Essentials of Women's Health: An Integrated Approach to Primary Care and Office Gynecology	www.cme.ucsf.edu/cme
7/7-7/13	PD	Childrens Hospital Los Angeles Medical Group	Hyatt Regency Maui Resort & Spa	Pediatrics in the Islands… Clinical Pearls	www.childrenshospitallamedicalgroup.org
7/9-7/12	R	Postgraduate Institute for Medicine	Hyatt Regency Maui	Summer Imaging in Hawai'i	www.imaginginhawaii.com
7/17-7/20	EM	UC Davis Health System	Fairmont Kea Lani, Maui	Emergency Medicine Update: Hot Topics 2012	www.ucdmc.ucdavis.edu/cme/conferences
7/29-8/2	ORS, OSM, OTR	Kaiser Permanente	Grand Hyatt Kauai, Kaua'i	20th Annual Update in Orthopaedic Surgery Conference	Email: kpos@sbcglobal.net
August 2012					
8/9-8/11	IM, FM	MCE Conferences	Disney Hawai'i Aulani Resort, O'ahu	Internal Medicine Update for Primary Care	www.mceconferences.com
September 2012					
9/10-9/13	R	Postgraduate Institute for Medicine	Ritz-Carlton Kapalua, Maui	Imaging in Hawaii: Practical & Clinical Education	www.imaginginhawaii.com
October 2012					
10/22-10/26	GM, IM, FP	Continuing Education Company	Sheraton Maui Resort & Spa	2nd Annual Primary Care Fall CME Conference: Maui	www.cmemeeting.org
10/27-11/2	PD	Childrens Hospital Los Angeles Medical Group	Grand Hyatt Kaua'i Resort & Spa	Aloha Update: Pediatrics 2012	www.childrenshospitalmedicalgroup.org
10/3-10/6	CD	UC Davis Health System	Hilton Waikoloa Village, Kohola, Big Island, Hawai'i	32nd Annual Current Concepts in Primary Care Cardiology	www.ucdmc.ucdavis.edu/cme/conferences
January 2013					
1/13-1/16	ORS, OSM, OTR	Orthopedicstoday	Fairmont Orchid, Big Island, Hawai'i	Orthopedicstoday Hawai'i 2013	www.othawaii.com
1/20-1/24	VIR, VM, VS	UC Davis Health System	Sheraton Maui	D. Eugene Strandness Jr. Symposium: Diagnostic & Therapeutic Approaches to Vascular Disease	www.strandness-symposium.com
February 2013					
2/8-2/9	US	University of Hawai'i, JABSOM Dept of Surgery	Ala Moana Hotel, O'ahu	pdf	cchc-conference.com
2/9-2/15	PD	Childrens Hospital Los Angeles Medical Group	Hyatt Regency Maui Resort & Spa	Pediatric Potpourri: State of the Art 2013	www.childrenshospitalmedical-group.org
2/10-2/15	D	Global Academy for Medical Education	Grand Wailea Hotel, Maui	37th Hawai'i Dermatology Seminar	www.globalacademycme.com

Date	Specialty	Sponsor	Location	Meeting Topic	Contact
2/13-2/17	EM	University of California San Francisco School of Medicine	JW Marriott Ihilani Resort, O'ahu	High Risk Emergency Medicine Hawai'i 2013	www.cme.ucsf.edu/cme
2/16-2/19	OTO	University of California San Francisco School of Medicine	Moana Surfrider Hotel, O'ahu	Pacific Rim Otolaryngology Head and Neck Surgery Update Conference	www.cme.ucsf.edu/cme
2/17-2/22	MDM	University of California San Francisco School of Medicine	Sheraton Maui	Infectious Diseases in Clinical Practice: Update on Inpatient & Outpatient Infectious Diseases	www.cme.ucsf.edu/cme
March 2013					
3/18-3/21	R	Postgraduate Institute for Medicine	Grand Hyatt Kaua'i Poipu Beach	Imaging in Hawai'i	www.imaginginhawaii.com
April 2013					
4/7-4/12	GP, FM, GPM	University of California San Francisco School of Medicine	Wailea Beach Marriott, Maui	Primary Care Medicine: Update 2013	www.cme.ucsf.edu/cme
September 2013					
9/24-9/27	R	Postgraduate Institute for Medicine	Ritz-Carlton Kapalua Maui	Imaging in Hawaii	www.imaginginhawaii.com

Waikiki Surfers