Hawai‘i Journal of Health & Social Welfare

A Journal of Pacific Health & Social Welfare

November 2021, Volume 80, No. 11, ISSN 2641-5216

Hawai‘i Journal of Health & Social Welfare

ISSN 2641-5216 (Print), ISSN 2641-5224 (Online)

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Group-based Exercise Therapy Improves Psychosocial Health and Physical Fitness in Breast Cancer Patients in Hawai‘i

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Abstract

Cancer diagnosis and treatment often negatively impact quality of life, worsening prognosis, and long-term survival in cancer patients. Rehabilitation is effective at reversing cancer-related effects, but these services are not standardized. An implementation study was conducted to determine the usability and efficacy of group-based exercise therapy delivered from an outpatient therapy clinic. Thirty breast cancer patients (mean age ± standard deviation [SD],= 55 ± 10 years) completed 36 90-minute group-based exercise sessions in small groups. Team-based exercises were used to foster peer interaction and social support. Usability was evaluated with participant feedback, adherence, and occurrence of adverse events. Effectiveness was measured with the Revised Piper Fatigue, the City of Hope Quality of Life (QOL), and the Beck Depression Inventories. Paired t-tests and 2-way ANOVAs were used to detect significance (P<.05); Cohen's d was used to measure effect size. Twenty-five patients completed the program; they reported that they liked the program design. One anticipated, moderate adverse event occurred. The intervention improved fatigue and QOL, where significant main effects of time were detected [Fatigue: (F(1,76)=29.78, P <.001); QOL: (F(1,80)=24.42, P<.0001)]. Improvements in the fatigue inventory's behavioral/security and sensory dimensions (Cohen's d=-0.43 and -0.68, respectively) and the physical dimension of the QOL inventory were detected (Cohen's d=0.92). There were no significant changes in depression (P=.0735). Seven patients continued to participate in exercise classes for 2.5-years post-intervention, demonstrating achievability of program maintenance. Providing group-based exercise therapy services at an outpatient clinic is an effective and practical approach to improve cancer patients' QOL.

Keywords

pragmatic, group-exercise therapy, depression, fatigue, quality of life

Abbreviations

1-RM = one repetition maximum
6MWT = 6-minute walk test
AE = adverse event
BDI = Beck Depression Inventory
CHQOL = City of Hope Quality of Life (instrument)
GET = group-based exercise therapy
QOL = quality of life
REHAB = Rehabilitation Hospital of the Pacific
RPE = relative perceived exertion
RPFI = Revised Piper Fatigue Inventory
VO^2peak = peak oxygen consumption

Introduction

Exercise rehabilitation effectively improves psychosocial health in breast cancer patients.[1] These programs are important because the reduction in psychosocial health associated with cancer diagnosis and treatment leads to fatigue, depression, and lower ratings of quality of life (QOL), ultimately worsening prognosis and long-term survival. Exercise attenuates cancer-related fatigue and depression and improves QOL,[2-5] and this is associated with enhanced long-term survival[6-8] and prognosis.[1,9]

Supervised training programs have superior effects on fitness and QOL compared to home-based regimens.[10] A recent review of practice-based evidence highlighted the lack of program standardization and sporadic locations in the United States.[11] Most of these programs are community-based.[11-13] Available programs provide ~8–18 weeks of individualized or group exercise training in a gym, hospital, or university setting. Some are free or are paid for out-of-pocket and are led by oncology certified nurses, certified cancer exercise trainers, exercise physiologists, or therapists. To our knowledge, there are no cancer rehabilitative programs that are available to cancer patients in Hawai‘i. Thus, we performed a study where the 3 main purposes were to (1) describe the application of a clinic-supported cancer rehabilitation program, (2) evaluate the program's efficacy in improving psychosocial and fitness health outcomes, and (3) offer strategies to create effective and sustainable exercise programs for cancer patients.

Methods

Recruitment

Thirty female patients diagnosed with stage I, II, or III breast cancer were recruited to participate in a free 12-week program (mean age ± standard deviation [SD], 55 ± 10 years). Patients were recruited through a state-wide referral network of oncology providers. Recruitment advertisements were posted in the offices of physicians who frequently referred patients to the clinic. Participants did not meet each other before the intervention. Inclusion criteria included having been diagnosed with stage I, II, or III breast cancer, having completed clinical cancer treatments, being ambulatory, 18 years or older, received exercise clearance from their oncology provider, literacy in English, and ability to attend exercise sessions 3 times per week for 12 weeks during business hours (7:30 AM to 5:30 PM). All exercise testing and exercise sessions took place in an outpatient physical therapy clinic at the Rehabilitation Hospital of the Pacific (REHAB) in Honolulu, Hawai‘i. The clinic was accessible by public transportation or personal vehicle, and ample free parking was provided.

All participants received exercise clearance from their oncology-related medical provider, and patient medical histories were faxed to the clinic. REHAB received referrals from healthcare networks in Hawai'i and has established referral workflows. Providers included a medical history, and patients provided self-reported medical histories that included non-cancer-related injuries. Medical histories were used by the exercise specialists to identify medications, injuries, and possible cancer treatment-related side effects that would limit exercise. Patients were not excluded if they were diagnosed with controlled hypertension, lymphedema, or metabolic disease. Before participation, patients provided their verbal and written consent. Research activities were approved by the University of Hawai'i Institutional Review Board (#2018-00167).

Group-Based Exercise Therapy Intervention Design

The program was designed to ensure it met the following criteria: (1) utilized available resources within the clinic such as knowledgeable rehabilitation specialists, required equipment, scheduling workflow, (2) incorporated realistic and patient-centered methodology in delivering the exercise intervention (ie, rescheduling exercise sessions to fit the patient's schedule, patients exercised at predetermined, tailored workloads), and (3) fostered peer support through the use of group-based exercise therapy (GET) while adhering to the American College of Sports Medicine exercise recommendations for cancer patients.[14] Table 1 provides a logic model which summarizes the resources, activities, outcomes, and potential impact.

All exercise sessions took place in a shared space in an outpatient clinic consisting of a gym ($80\ m^2$) with aerobic fitness equipment (ie, treadmills, bikes); an adjacent room with resistance training equipment (ie, $210\ m^2$ room with pulley weight systems and free weights). Trainers had access to therapy tools such as foam rollers, yoga balls, and balance training equipment. GET sessions were led by 1 of the 4 exercise specialists dedicated to this project; they worked with various patient groups. The specialists were certified Cancer Exercise Specialists[15] and were employees of the clinic. They had a minimum of 1 year of experience working with patients. Patient safety was ensured by having a minimum of 2 trained personnel administer fitness tests, and before each exercise session, blood pressure and oxygen saturation were assessed to ensure normal levels.

The exercise specialists used the initial physical fitness assessment results and medical history to create tailored exercise programs for each participant, which followed standardized exercise recommendations.[16] Patients were assigned to exercise in groups of 2–4 people, and the grouping was based upon their availability. At least 1 rest day was placed between training sessions to enhance recovery from exercise. If a participant could not attend a session, the patient was scheduled to exercise with another group, or on rare occasions, participants exercised alone with an exercise specialist. In this situation, the trainer exercised with the patient to simulate the group environment.

Table 1. Logic Model of the Group-Based Exercise Therapy Intervention

Resources	Activities	Outputs	Outcomes	Impact
• Outpatient therapy clinic equipped with qualified personnel, an established referral workflow, required equipment and space, protocols which ensure patient safety (ie, emergency protocols, protection of patient health information) • Support from oncology-related providers (ie, surgeons, oncologists) • Breast cancer patients who are interested in improving their QOL • Grant funds to purchase consumable supplies and pay wages	• Provide GET over 36 sessions (90-minute sessions 3 times/week) • Patients exercised in small groups of 2–4 people, where they developed rapport and support • Patients were provided with prescriptive exercise programs based upon baseline physical fitness levels, and ACSM guidelines • Team-based exercises were used to foster peer interaction and teamwork • GET was delivered by rehabilitation technicians who were certified Cancer Exercise Specialists	**Qualitative** • At the of the intervention, a focus group was used to gather patient feedback about the program design and program value • Documentation of adverse events • Determine the reason for withdrawal from GET **Quantitative** • Pre- and post- psychosocial measures were quantified with the Revised Piper Fatigue, Beck Depression and City of Hope QOL Inventories • Pre- and post- physical fitness measures were assessed (ie, body composition, cardiorespiratory fitness, muscular fitness, balance, and flexibility)	**Short–term** • Determine the usability and effectiveness of GET, which maximizes the use of available resources to provide services that are not standardized • Outline modifications that improve program adherence • Patients have reduced fatigue and improved QOL • Patients develop a social support system • Patients benefit from improved physical fitness, which improves the ability to accomplish ADL **Long-term** • Long-term health and prognosis is improved • Provide prevention against future costs associated with professional care related to (1) psychosocial health, (2) comorbid disease, and (3) fall-related or musculoskeletal injuries	**Impact** • Provide a practical and usable approach to cancer rehabilitation • Increase the quality, availability, and accessibility to cancer rehabilitation • Has the potential to improve the health of cancer patients on a global level • Once communities determine the program model that fits their needs, then attention can be focused on bolstering the rehabilitation specialist workforce and securing program funding

Abbreviations: ACSM, American College of Sports Medicine; ADL, activities of daily living; GET, Group-Based Exercise Therapy; QOL, quality of life.

Participants completed 36 personalized GET sessions targeting all components of fitness. The entire session lasted 90 minutes, providing ample time for participants to interact with each other and transition to the next exercise (15 minutes). Patients performed 30 minutes of cardiovascular exercise, 30 minutes of resistance/balance training, and flexibility exercises were incorporated as part of the cool down (15 minutes). The equipment was housed in close proximity to each other, allowing patients to converse during the session. The resistance training workload was set at 40% to 60% of their (predicted) 1-repetition maximum (1-RM). The cardiovascular exercise workload was set at a relative perceived exertion (RPE) of 3–6 out of 10, consistent with guidelines.[17,18] This intensity ensured patients could hold a conversation while exercising at appropriate workloads. Team-based exercises, like circuit-like training or alternating rest-work bouts, were used to deliver personalized therapy in a group format.

Exercising in small groups served as a form of social support, as participants conversed with each other throughout their session. The range of conversational topics was broad and self-directed by the patients. The exercise specialist did not guide the conversation but instead provided exercise supervision and encouragement, corrected exercise form and posture when necessary, and ensured the participants exercised at the target intensity. Exercise leaders recorded all exercises, intensities, and durations in dedicated logbooks, which were used to ensure fidelity to the protocol.

Outcome Measures

Before and after the GET intervention, patients completed 3 surveys evaluating psychosocial health: the Revised Piper Fatigue Inventory (RPFI),[19] the Beck Depression Inventory (BDI),[20] and the City of Hope QOL Inventory (CHQOL).[21-23] The RPFI inventory has demonstrated high reliability and consists of 22 items and measures 4 dimensions of subjective fatigue: behavioral/security (6 items), affect (5 items), sensory (5 items), and cognitive mood (6 items), where 0 represented the best outcome, 10 represented the worst outcome.[19]

The CHQOL instrument has reliability and validity[24] and consists of 41 items, which represent 4 domains: physical (8 items), psychological (18 items), social (8 items), and spiritual (7 items).[21-23] Each item was scored on a scale from 0 to 10, where a higher score indicates better outcomes.

The BDI inventory consists of 21 items and rates the level of depression where a low score corresponds to normal ups and downs, and a high score reflects elevated levels of depression.[20] The BDI demonstrates internal consistency and test-retest reliability.[25] Each question is scored from 0–3, and the scores of all 21 questions are summed. A score of 1–10 corresponds to normal ups and down; 11–16 reflects mild mood disturbance; 17–20 indicates borderline clinical depression; 21–30 indicates moderate depression; 31–40 is associated with severe depression; a score >40 suggests extreme depression.

Physical fitness measures were assessed, and baseline fitness was used to calculate workloads for the exercise programs. Body composition was assessed with waist and hip circumferences, body weight, and skinfold measurements.[26] Cardiorespiratory endurance was measured using a treadmill protocol designed specifically for patients diagnosed with cancer[15]; final speed/grade was used to estimate peak oxygen consumption (VO_2peak).[15,18] A treadmill test was utilized instead of the 6-minute walk test (6MWT) because the 6MWT underestimates VO_2peak in the cancer patient population.[27] Muscular strength was assessed using 1-RM tests targeting the upper and lower body[28]; a prediction equation was used to enhance safety.[29] Muscular endurance was assessed with a timed plank hold up to one minute. The patient was asked to hold a traditional plank with proper form (ie, on toes and forearms); a modified plank was used if necessary (on knees). Flexibility was measured with the modified sit-and-reach test. Balance was assessed using a unipedal single leg stance test without visual feedback.

At the end of the intervention, all participants were invited to attend a focus group. They were invited to provide feedback regarding the intervention design (eg, preference of group exercise, having a variety of exercise trainers, or 1 dedicated trainer). Moderate and severe adverse events (AE) that occurred during the study were documented. A moderate AE was defined as an undesirable physical or emotional event that interferes with daily activities, may require interventional treatment and referral to the patient's physician (eg, arthritis). A severe AE is fatal, life-threatening, requires inpatient hospitalization, or results in persistent or significant disability/incapacity.

Statistical Analyses

Before statistical analyses, Levene's test for the homogeneity of variance was used to determine the presence of homogeneity. For RPFI and CHQOL scores, 2-way ANOVAs (analysis of variance) were used to detect significant main effects or interaction (time x dimension) from pre- to post-intervention. Bonferroni's *posthoc* multiple comparisons tests were used to detect differences between groups (pre- to post-intervention); significance was set at $P<.05$. For the BDI, summed scores and paired t-tests were used to detect differences in patient-reported perceptions of depression from pre- to post-intervention (2-tailed, $P<.05$). Total scores across all dimensions for the RPFI, CHQOL, and BDI inventories and physical fitness measures were compared from pre- to post-exercise intervention with paired t-tests (2-tailed, $P<.05$). Cohen's d (effect size) is presented.

Results

Usability

Twenty-five out of 30 patients who began the program completed it (83% adherence rate). Scheduling was a barrier to program delivery and accounted for the 5 patient withdrawals. All 25 participants had completed their primary cancer treatment, where all underwent surgery except for 1 patient who did not receive any clinical cancer treatment. As documented by the patient medical histories that were collected at the beginning of the study, half of the patients who had surgery also received chemotherapy (n = 5), radiation (n = 3), or chemoradiation (n = 4). Eleven of the 25 participants were taking aromatase inhibitors during the intervention (data not shown).

Of the 25 patients who completed the program, 25% of their exercise sessions were rescheduled for a different day or time. Five percent of the time, participants were rescheduled to a non-group exercise time. Although the program was intended to be delivered over 12 weeks, scheduling conflicts resulted in the program lasting 15 weeks. Exercise sessions were planned around the participant's schedule. Thus, patients with full-time employment opted to exercise before or after work, whereas retired participants had more flexibility in their schedules and could attend midday exercise sessions.

There was 1 moderate and unsurprising AE. During a routine pre-exercise blood pressure measurement, the exercise specialist heard an abnormal rhythm, so an electrocardiogram was ordered, and atrial fibrillation was detected. The participant was immediately referred to her cardiologist. After the patient received medical clearance to return to exercise, she completed the program. Because this event did not require hospitalization or inpatient care, this AE was categorized as moderate. This event was unsurprising as the toxic effects of chemotherapy on the cardiovascular system have been well-documented.[30]

Twenty out of 25 participants attended the focus group. All attending participants liked having different exercise leaders because they each had different training styles. They agreed that exercising with peers motivated them during their exercise sessions. Moreover, subjects kept each other accountable. If a group member were late, another member would immediately contact her to assess the reason for the absence.

The participants agreed that the program was valuable, as demonstrated by their continuation in the program, where 56% of the participants chose to re-enroll for a second and final round of free training (14 out of 25 patients), completing 24 personalized GET sessions (2 sessions/week for 12 weeks). In response to additional requests for exercise maintenance options, fee-based GET sessions were offered ($15/individual class); 7 of the 25 patients (28%) who completed the program continued to exercise 2.5-years post-intervention. Interestingly, one participant chose to utilize the fee-based training session instead of enrolling in a second round of free exercise training.

Cancer exercise specialists consistently used appropriate exercise workloads 95% of the time (verified with the patient logbooks). The remaining 5% of the workloads involved reduced intensities due to patient conditions (eg, fatigue, muscle soreness). Psychosocial self-report results are presented in Table 2, and physical fitness outcomes are presented in Table 3. Levene's test for the homogeneity of variance revealed homogeneity in all data sets (P>.05).

Psychosocial Measures

RPFI. Of the 25 patients who completed the intervention, 20 completed the RPFI at both time points; 20 subjects were analyzed. Incomplete surveys and the inability to retrieve surveys from patients resulted in missing data. Total fatigue scores were significantly improved by 28%, and the effect size was 0.54 (P = .0004; see Table 2). Total pre-intervention scores were 3.8 ± 1.9 (mean ± SD), indicating that fatigue fell below the mid-mark (eg, 5 out of 10). Behavioral/Security and Sensory dimensions were significantly improved by 33% (P<.05) and 29% (P<.01), respectively. No significant changes were detected in the Affect and Cognitive Mood dimensions.

CHQOL. Of the 25 patients who completed the intervention, 21 completed CHQOL surveys at both time points. Total QOL was improved (P<.05). The physical dimension was the only dimension significantly improved (by 27%, Cohen's d = 0.92). No differences were detected in other dimensions.

BDI. Of the 25 patients who completed the intervention, 22 subjects completed the BDI at both time points. No significant changes in depression were detected. Pre-intervention scores corresponded to "normal ups and downs," limiting our ability to detect improvements.

Physical Fitness Measures

Body fat percentage and waist and hip circumferences were significantly reduced after the intervention (P<.05). Bodyweight was unchanged. VO_2peak significantly increased from 27.0 ± 7.0 mL/kg/min to 32.0 ± 7.0 mL/kg/min (P<.05). Chest press and leg press 1-RM's were significantly improved with effect sizes of 0.95 and 1.44, respectively. Muscular endurance, balance, and flexibility were significantly improved (P<.05).

Table 2. Pre- and Post-psychosocial Health Measurements

Type of Inventory	Qualities Evaluated	Pre-exercise Mean ± SD	Post-exercise Mean ± SD	*P* value	Cohen's d[a]
Revised Piper Fatigue Inventory (RPFI)[b]					
Behavioral/security	Distress, ability in work/school, social life, sexual activity, hobbies	3.4 ± 2.2	2.2 ± 2.7[c]	<.05	-0.43
Affect	Pleasant, agreeable, protective, positive, normal	4.0 ± 2.3	3.0 ± 2.8	ns	-0.39
Sensory	Strong, awake, lively, refreshed, energetic	4.9 ± 2.1	3.5 ± 2.2[c]	<.01	-0.68
Cognitive mood	Patient, relaxed, exhilarated; able to concentrate, remember, think clearly	4.0 ± 1.9	3.1 ± 2.1	ns	-0.47
Total		3.8 ± 1.9	2.4 ± 2.3[d]	.0004	-0.54
City of Hope QOL[e]					
Physical	Fatigue, appetite, aches/pain, sleep changes, weight gain, menstrual changes/fertility	5.8 ± 1.5	7.1 ± 1.8c	<.01	0.92
Psychological	Ability to cope, quality of life, happiness, in control, satisfaction of life, ability to concentrate, feeling of usefulness, appearance/self-concept	5.7 ± 1.5	6.2 ± 1.5	ns	0.35
Social	Support, personal relationships, sexuality, employment, isolation, financial burden	5.8 ± 1.8	6.2 ± 2.0	ns	0.27
Spiritual	Religious activities, spiritual life, uncertainty, positive changes, purpose/mission, hopefulness	7.4 ± 1.8	7.8 ± 1.6	ns	0.12
Total		6.1 ± 1.2	6.6 ± 1.3[d]	.0031	0.43
Beck Depression Inventory (BDI)[f]	Sadness, future, failure, satisfaction, guilt, being punished, disappointment in self, thoughts of suicide, interest in others, ability to make decisions, sleep quality, appetite, weight loss, worried about physical health, interest in sex	9.5 ± 7.0	6.6 ± 6.2	.0735	-0.44

Abbreviations: ns, not significant; QOL, quality of life; SD, standard deviation.

[a] Cohen's d (measure of effect size) shows a small (0.2), medium (0.5) or large effect size (0.8). [b] Revised Piper Fatigue Scale Scores, where 0 = best outcome and 10 = worst outcome. [c] 2-way ANOVA with Bonferroni multiple comparison tests. All dimension scores were summed (Total) and compared with a paired t-test (2-tailed). Significance was set at *P*<.05. [d] Significance from pre- to post-exercise, paired t-tests (2-tailed). Significance was set at P<.05. [e] City of Hope QOL, where 0 = worst outcome and 10 = best outcome. [f] BDI, where 0 = best outcome and >40 = worst outcome.

Table 3. Pre- and Post-fitness Measurements

Patient Characteristics	Pre-exercise Mean ± SD	Post-exercise Mean ± SD	Cohen's d[a]
Body Composition			
Weight (kg)	76.1 ± 18.7	75.5 ± 18.4	-0.03
Body fat percentage	40.6 ± 6.3	38.6 ± 6.5[b]	-0.30
Waist circumference (cm)	93.8 ± 17.6	89.8 ± 17.3[b]	-0.23
Hip circumference (cm)	110.1 ± 13.6	107.4 ± 12.9[b]	-0.20
Cardiorespiratory Endurance			
VO_2peak (mL•kg^{-1}•min^{-1})	27.0 ± 7.0	32.0 ± 7.0[b]	0.67
Muscular Strength (1-RM)			
Chest press (kg)	18.8 ± 5.8	25.1 ± 7.2[b]	0.95
Leg press (kg)	89.7 ± 21.4	126.8 ± 29.6[b]	1.44
Muscular Endurance			
Plank hold (sec)	42.0 ±18.9	54.1 ± 14.1[b]	0.73
Flexibility			
Sit & reach (cm)	69.6 ± 28.1	83.4 ± 21.4[b]	0.53
Unipedal Balance Time (sec)			
Right foot (eyes closed)	12.5 ± 12.1	15.8 ± 14.5	0.24
Left foot (eyes closed)	13.0 ± 14.1	18.9 ± 16.9[b]	0.38

Abbreviations: 1-RM, 1-repetition maximum; SD, standard deviation; VO_2peak, peak oxygen consumption.

[a] Cohen's d (measure of effect size) shows a small (0.2), medium (0.5) or large effect size (0.8).

[b] Significance from pre- to post-exercise using paired t-tests set at *P*<.05.

Discussion

The combination of peer support and prescriptive exercise resulted in significant improvements in QOL and fatigue perceptions, even in patients reporting only mild fatigue. This combination is meaningful because studies using psychological intervention alone have not demonstrated elevated mood in breast cancer patients with low levels of baseline distress; benefits were seen only in those with high levels of distress.[31] The GET program improved cardiorespiratory fitness and fatigue similarly to a previous study that used 6-months of individualized training to augment cardiorespiratory fitness and fatigue in breast cancer patients (Cohen's d was 0.53 and 0.78, respectively).[4]

In the current study, participants had the opportunity to practice empathy, the functional dimension of social support, which is known to improve mood,[31] depressive symptoms, and QOL.[32] The largest improvements in fatigue were measured in the Behavioral/Security and Sensory subscales. All physical fitness components were significantly improved, directly related to increased stamina, which could have impacted fatigue. Participants noticed improvements at approximately the third or fourth week of exercise and expressed that they "felt more energetic" (personal communication). The RPFI uses specific terms such as "strong, awake, energetic," descriptors closely related to exercise adaptations. Recognition of these improvements may have served as positive reinforcement and motivated patients to complete the program.

Patients developed group cohesion, and this support facilitated the development of self-efficacy and fitness goal achievement. For example, patients encouraged each other to lift more, complete their exercise set, or try new exercises. Regardless of fitness, each participant discovered their strength (eg, completing a particular exercise with ease); these interactions were observed among patients with different fitness levels. Group cohesion was conditioned by the social dynamics of the group and the exercise itself. The mutual support augmented their self-efficacy beliefs, improved their mastery expectation toward exercise, and strengthened their dedication to their rehabilitation.[33]

Fee-based exercise classes allow the participants to "drop-in," without requiring a prescheduled appointment. In the example provided in the results, one patient decided to pay for classes because it was convenient, suggesting schedule flexibility was a stronger factor in determining adherence compared to cost. In fact, a user-pay model may be an advantageous model to fund and sustain these programs.[32]

Limitations and Strengths

A limitation to this program is that it would not be suitable for patients with certain comorbidities (ie, multiple sclerosis), as they would benefit from individualized attention. Because all participants experienced breast cancer, they may have associated on a deeper level where sympathy was shared, resulting in powerful peer connections. Familiarity and processing fluency support positive feelings where familiar situations or stimuli increase the desirability of a new environment.[34] This may have primed participants in a way that elevated receptivity and likability of the program. In addition, exercise studies naturally attract highly motivated patients who likely have positive, preconceived ideas about the effects of exercise. These early perceptions may have influenced how the participants scored their psychosocial health inventories, which resulted in significant differences in the small cohort of breast cancer patients. Still, these perceptions may be advantageous and could be used to attract patients to these types of programs. Many cancer patients desire to begin an exercise program,[35,] but only about 50% of patients offered an exercise program complete it.[36] Thus, providing GET may augment exercise appeal and adherence. Strengths of this program were attributed to its implementation in a therapy clinic with an established and reliable patient referral system, knowledgeable exercise specialists, clinic space, equipment, and procedures which enhance patient safety.

Conclusion

Providing GET services from an outpatient clinic is an effective and practical approach that enhances comprehensive care for cancer patients as it has the potential to enhance psychological health and QOL.

Conflict of Interest

None of the authors identify a conflict of interest.

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Does Japanese Identity Buffer Stress or Intensify Symptoms of Depression Associated with Discrimination in Hawai‘i?

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Abstract

Racism is a public health crisis—yet our knowledge remains limited about how different racial and ethnic groups cope with the stress of discrimination across the United States. Research suggests that ethnic identity plays a role in the relationship between perceived discrimination and mental health problems. The purpose of this study is to focus on whether a strong Japanese identity in Hawai‘i can buffer the stress of discrimination to protect mental health. Data were from an anonymous survey of 222 students who self-identified as Japanese at a university in Hawai‘i. The average age was 21 years, about half (53%) were women, and 10% were foreign-born. Less than half (42%) of the students self-reported ever experiencing discrimination in a lifetime due to race/ethnicity. However, non-specific unfair treatment based on the Everyday Discrimination Scale was self-reported by most students (90%). It primarily included being treated with less respect or courtesy than other people and people acting as if they were better than them. Levels of ethnic identity were assessed with the Multigroup Ethnic Identity Measure (mean, 2.07; range, 0–3). A statistically significant interaction effect was observed (ß = -0.50; P<.01), indicating a stronger ethnic identity counteracted the psychological distress associated with everyday discrimination. This finding suggested that strong Japanese identity, which involves pride and knowledge, participation in cultural practices, and a sense of belonging to one's ethnic group, can buffer the stress of frequent experiences of unfair treatment.

Keywords

ethnic identity, everyday discrimination, stress buffer, psychological distress, Japanese American, Hawai‘i

Abbreviations and Acronyms

CES-D = Center for Epidemiologic Studies Depression Scale
COVID 19 = Coronavirus disease 2019
EDS = Everyday Discrimination Scale
MEIM = Multigroup Ethnic Identity Measure

Introduction

Despite racism being a “public health crisis,” our knowledge remains limited about how different racial and ethnic groups cope with the stress of discrimination to protect mental health.[1] Since the Coronavirus disease 2019 (COVID-19) pandemic started in the United States, discrimination against Asian Americans has been on the rise because of anti-Asian stigma and political rhetoric surrounding the geographic origin of the virus.[2] National research by social epidemiologists on Asian Americans before the pandemic demonstrated that exposure to racial and ethnic discrimination, measured as self-reported unfair treatment, was associated with a greater risk for depression, anxiety, and other mental disorders, as well as elevated levels of psychological distress.[3,4]

An area of research informed by identity theory has drawn attention to whether a stronger sense of ethnic identity can influence mental health by preventing Asian Americans from being psychologically distressed by perceived discrimination.[4,5] From a social psychological perspective, ethnic identity can be a salient aspect of the individual's self-concept and involve pride, positive feelings, and knowledge about one's ethnic group exemplified by a commitment to cultural practices and social belonging.[6] A strong ethnic identity can be a psychosocial coping resource, which can safeguard mental health by functioning as a stress buffer via the pathway of moderating and diminishing the impact of a stressor.[5] A study on Filipino Americans in Honolulu and San Francisco found that a stronger sense of ethnic identity was linked with lower levels of psychological distress and buffered the stress of racial and ethnic discrimination experienced in a lifetime.[5] Different findings emerged from a study of Korean American college students in Texas: ethnic identity pride buffered the stress of low levels of ethnic discrimination, but when discrimination was more frequent, stronger ethnic pride was associated with more psychological distress.[7] Thus, ethnic pride was referred to as a “protective-reactive factor” depending on the frequency of discrimination. “Rejection sensitivity” occurred when those with more steadfast ethnic pride felt offended by frequent experiences of discrimination, which ultimately harmed their mental health.[7] Furthermore, findings from the first national epidemiological survey of Asian Americans did not provide a clear picture because a stronger ethnic identity buffered the stress of racial and ethnic discrimination only among US-born persons aged 40 to 51 years but exacerbated the distress associated with discrimination among the US-born persons aged 31 to 40 years and 51 to 75 years.[4] There was no evidence of stress-buffering or an exacerbating effect among foreign-born Asian Americans.[4] In essence, racial and ethnic identity has been referred to as a “double-edged sword,” so more research is needed to disambiguate these findings by accounting for nativity status and the frequency of discrimination and studying specific age groups and Asian-American ethnic groups in different places.[8]

Compared to other places in the United States, Asians in Hawai‘i are less likely to identify as “Asian American” but instead identify by their Asian ethnic subgroup.[9,10] Each Asian ethnic group has had a different migration history leading to socioeconomic and ethnic inequality among Asian Americans in Hawai‘i. For example, Filipinos initially moved to Hawai‘i primarily for plantation work, while Japanese Americans were more likely to translate military service and independent businesses into political and socioeconomic advantages.[10] “Many Japanese

Americans believe that their socioeconomic and political success is the cumulative result of their own determined efforts and family and personal sacrifices, with each generation contributing to the progressive mobility and well-being of the next."[10]

Japanese Americans in Hawai'i, however, continue to experience stereotypes and discrimination.[10,11] Moreover, the discriminatory treatment that Japanese residents of Hawai'i experienced during the internment of World War II has not been forgotten. This indelible, race-related historical trauma can be passed down to subsequent generations.[12] It remains unknown whether younger generations of Japanese Americans utilize a central ethnic identity as a protective resource and whether it plays a beneficial or deleterious role in the relationship between discrimination and distress.

The present study aims to address this gap in our knowledge by examining undergraduate students at a university in Hawai'i to focus on Japanese identity, discrimination, and psychological distress during the transition to adulthood. Two competing hypotheses are evaluated in this study; the first is the *Stress-Buffering Hypothesis* characterized as a strong Japanese identity will protect mental health by buffering the stress of discrimination. This buffering could involve insulating one's self-concept from any lasting psychological damage.[5] To clarify, a strong ethnic identity, which consists of a sense of cultural belonging, pride, knowledge, and positive feelings about one's ethnic group, could prevent unfair treatment from changing how one feels or thinks about themself, and block or reduce the harmful psychological effects. For example, a strong Japanese identity could provide resilience and prevent an individual from believing a racist stereotype and thus protect against the internalization of symptoms of depression, such as feelings of sadness, worthlessness, or loneliness. The second hypothesis is the *Intensifying Hypothesis* characterized as a strong Japanese identity will intensify the psychological distress associated with discrimination. It is plausible that intersecting pride in one's Japanese heritage, a sense of belonging to one's ethnic group, and privilege in the racial and ethnic hierarchy in Hawai'i may not be protective but rather increase the sensitivity of Japanese students to unfair treatment. This sensitivity could be due to a greater awareness of discrimination in their daily lives or heightened reactivity. The unexpected stigma could be particularly offensive and distressing. These hypotheses will be tested with interaction effects (ethnic identity x discrimination) between the level of ethnic identity and 2 types of perceived discrimination: racial and ethnic discrimination in a lifetime and the frequency of everyday discrimination in the past year. An interaction effect examines whether the effect of one independent variable (eg, risk factor) is moderated or varies by the effect of another independent variable (eg, protective factor) on a dependent variable (eg, mental health outcome). Evidence of stress-buffering is when a multiplicative interaction between higher levels of ethnic identity and the stressor (eg, discrimination) is significantly related to decreased levels of distress, an inverse association.[13] An exacerbating effect is a statistically significant interaction term in the opposite direction, a positive association.[4]

Methods

This study focused on students who self-identified as full or part Japanese (n=222) from a larger survey of undergraduate students (N=1098) conducted by the author at a university in Hawai'i from 2012 to 2013. Professors agreed to have their students complete the anonymous surveys by writing their responses during class time (10 minutes on average) for courses in the departments of Sociology, Women's Studies, Nursing, Philosophy, Accounting, and Engineering. The survey's procedures were approved by the university's Institutional Review Board (CHS # 20055). The survey's questionnaire informed the students about the goal of the research as well as the benefits and risks and that their participation was voluntary, confidential, and would not be financially compensated.

The statistical programming software STATA Version 16 (College Station, TX) was used to conduct the statistical analyses. Multiple imputation by chained equations replaced missing values (29 observations).[14] Based on pooled estimates derived from 10 imputations, ordinary least squares (OLS) regressions were conducted predicting levels of depressive symptoms. OLS regression results were substantively consistent using list-wise deletion of the missing cases or multiple imputations. As a sensitivity analysis of the multivariate regression models, variance inflation factors confirmed no issues with multicollinearity because the mean VIF was 1.32 and the highest VIF in the fully-adjusted regression model was 2.14, which are below the threshold of 2.50.

Measures

The dependent variable was the 20-item Center for Epidemiologic Studies Depression scale (CES-D) (6 missing cases). The CES-D is a valid and reliable measure to assess the frequency of symptoms of depression or psychological distress during the transition to adulthood.[15] Respondents were asked how they felt in the past week, such as how often they felt depressed, sad, lonely, everything was an effort, and had crying spells.[15] The response categories were: (0) rarely or none of the time or less than 1 day, (1) some or a little of the time or 1–2 days, (2) occasionally or a moderate amount of the time, or 3–4 days, and (3) most or all of the time or 5–7 days. The scale was summed and coded so that higher values signified more symptoms. The Japanese sample's Cronbach's alpha was high (0.90) using all 20 items, which confirmed it was a reliable scale for this population. The mean level of depressive symptoms was 11.68 (standard deviation [SD], 9.77) for this scale that ranges from 0 to 60. The CES-D is a screening scale for levels of psychological distress or symptoms of depression and not intended for diagnosis of clinical depression: 69% of the students were below the CES-D cutoff (> 15) for identifying individuals at possible risk for depression.[16] A sensitivity analysis checked the skewness of the CES-D (1.15), which is common for the scale, and the regression results were consistent using a transformed (natural logged) scale or negative binomial regression and OLS regression. An unadjusted CES-D scale was used for the final OLS regression results shown.

The focal independent variable was ethnic identity (7 missing cases) which used a 12-item scale based on Phinney's Multigroup Ethnic Identity Measure (MEIM).[6] Items from the MEIM have been used in previous research on students in Hawai'i.[17] In the current study's survey of students in Hawai'i, the respondents were informed that "in the United States, people come from different countries and cultures, and there are many words to describe these different backgrounds or ethnic groups. Some examples of ethnic groups are Japanese, Chinese, Filipino, Native Hawaiian, Caucasian, Italian American, and others." Then, they were asked to indicate how strongly they agreed or disagreed with the following 12 statements about their ethnicity or ethnic group: (1) I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs; (2) I am active in organizations or social groups that include mostly members of my own ethnic group; (3) I have a clear sense of my ethnic background and what it means for me; (4) I think a lot about how my life will be affected by my ethnic group membership; (5) I am happy that I am a member of the group I belong to; (6) I have a strong sense of belonging to my own ethnic group; (7) I understand pretty well what my ethnic group membership means to me; (8) In order to learn more about my ethnic background, I have often talked to other people about my ethnic group; (9) I have a lot of pride in my ethnic group; (10) I participate in cultural practices of my own group, such as special food, music, or customs; (11) I feel a strong attachment towards my own ethnic group; and (12) I feel good about my cultural or ethnic background.[6] Responses ranged from strongly disagree (0) disagree (1), agree (2) to strongly agree (3). The scale was based on mean scores (range, 0–3) and had high internal consistency (Cronbach's alpha=0.89).

Two types of perceived discrimination were measured. Lifetime racial and ethnic discrimination (1 missing case) was assessed with the following question: "Have you ever been treated unfairly or badly because of your race or ethnicity in your lifetime?" (1=yes; 0=no). The Everyday Discrimination Scale (EDS) included day-to-day experiences of unfair treatment (5 missing cases).[18] Respondents were asked the following question: "In your day-to-day life how often have any of the following things happened to you?" The specific experiences included being treated with less courtesy or less respect, receiving more subpar service, people acting as if they are better than you and that they think you are not intelligent or honest, and that they are afraid of you, and being called names, insulted, threatened or harassed.[18] Response categories were (0) never, (1) less than once a year, (2) a few times a year, (3) a few times a month, (4) at least once a week, and (5) almost every day. These items were summed (possible range, 0–45) to create a 9-item scale (Cronbach's alpha=0.86). The Everyday Discrimination Scale (EDS) is one of the most widely used scales in epidemiologic and public health research to measure unfair treatment. The EDS was designed to assess discriminatory treatment across different contexts or general mistreatment without reference to race, ethnicity, sex, or other demographic or personal characteristics. In prior research, the scale has been used to measure discriminatory experiences for persons from various racial and ethnic backgrounds (including Asian Americans).[19] Everyday discrimination and ethnic identity were mean-centered (recoded by subtracting the mean from each case, so the new mean is 0) for the interaction effects to test the stress-buffering and intensifying hypotheses.

Control variables included sex (woman=1, man=0), age, nativity status (foreign born=1, US born=0), and parental education. As an indicator of family socioeconomic background, parental education was the highest level of schooling (number of years) the respondent's father or mother had achieved. Missing values were imputed using the following procedure: (1) missing values on father's education were substituted with mother's education and vice versa, and (2) multiple imputation was used to replace the remaining missing values (13 observations).

Results

Descriptive Statistics

Table 1 displays the descriptive statistics, including means or percentages, SD, and ranges of the scales. About half (53%) of the students were women; their average age was 21 years, their parents were generally college-educated (mean, 16 years of education), and 10% were foreign-born. The average level of ethnic identity was 2.07 (SD, 0.47) on a scale ranging from 0 to 3. Less than half of the students (42%) self-reported experiencing discrimination in their lifetime due to race or ethnicity, and 58% reported never experiencing it. The average level of non-specific unfair treatment or "everyday discrimination" was 10.05 (range, 0–45). Supplementary analyses (data not shown) indicated that 200 (90%) students reported any response category other than *never* on at least one of the everyday discrimination questions; only 17 students reported *never* or 0, and there were 5 missing cases. The more subtle forms of discrimination were the most common (data not shown), such as being treated with less courtesy (79% of the students experienced it to varying degrees of frequency), people thinking that they are better than you (79%), being treated with less respect (72%), and the least common was the overt experience of being threatened or harassed (37%).

Table 1. Descriptive Characteristics of the Study Population (N=222)

Variables	n (%)	Mean	SD
Symptoms of depression (range, 0–60)[a]		11.68	9.77
Ethnic identity (range, 0–3)[b]		2.07	0.47
Racial and ethnic discrimination in a lifetime	93 (42)		
Everyday discrimination (range, 0–45)[c]		10.05	7.03
Women	117 (53)		
Age, y		21	3.51
Parental education, y		16	2.44
Foreign born	22 (10)		

Abbreviation: SD, standard deviation.

[a] Score indicates levels of self-reported depressive symptoms or psychological distress based on the Center for Epidemiologic Studies Depression (CES-D) scale.

[b] Score indicates levels of ethnic identity based on the Multigroup Ethnic Identity Measure (MEIM) scale.

[c] Score indicates levels of non-specific unfair treatment based on the Everyday Discrimination Scale (EDS).

Table 2. OLS Regression Models Predicting Levels of Depressive Symptoms and Testing Interaction Effects[a] (N=222)

Variables	Model 1 ß (SE)	Model 2 ß (SE)	Model 3 ß (SE)
Ethnic identity	-0.39 (1.83)	-2.27 (1.35)	-2.08 (1.91)
Racial and ethnic discrimination in a lifetime	0.85 (1.35)	0.84 (1.32)	0.86 (1.33)
Everyday discrimination	0.49 (0.09)***	0.48 (0.09)***	0.48 (0.09)***
Women	2.54 (1.27)*	2.51 (1.25)*	2.52 (1.26)*
Age	-0.19 (0.18)	-0.23 (0.18)	-0.22 (0.18)
Parental education	-0.05 (0.26)	-0.05 (0.26)	-0.05 (0.26)
Foreign born	0.95 (2.03)	1.83 (2.00)	1.83 (2.00)
Interaction Effects			
Ethnic identity x racial and ethnic discrimination	-2.59 (2.74)	---	-0.41 (2.82)
Ethnic identity x everyday discrimination	---	-0.51 (0.18)**	-0.50 (0.19)**
Intercept	15.60**	16.25**	16.15**
R^2	0.17	0.20	0.20

Abbreviations: ß, unstandardized beta; OLS, ordinary least squares; SE, standard error.

[a] For 2-tailed tests: *$P < .05$; **$P < .01$; ***$P < .001$

Ordinary Least Squares Regression Analyses

Table 2 tests the *Stress-Buffering Hypothesis* and *Intensifying Hypothesis* with OLS regression models predicting levels of depressive symptoms and two interaction effects: (1) ethnic identity x racial and ethnic discrimination ever in a lifetime, and (2) ethnic identity x everyday discrimination. Ethnic identity interacted with everyday discrimination, but the interaction between ethnic identity and lifetime racial and ethnic discrimination was not statistically significant. The statistically significant interaction effect (ethnic identity x everyday discrimination) in Model 2 (ß= -0.51; $P < .01$) indicated stress-buffering, in which at higher levels of ethnic identity there were fewer symptoms of depression associated with everyday discrimination. The statistically significant interaction effect remained in Model 3 (ß= -0.50; $P < .01$), which was the fully-adjusted model with all control variables (sex, age, socioeconomic status, nativity status) and both interaction effects. Finally, results indicated that everyday discrimination ($P < .001$) and women ($P < .05$) were associated with higher levels of depressive symptoms in Table 2 and in a supplementary regression model (data not shown) that included the control variables and excluded the interaction effects.

Discussion

This study on Hawai‘i is the first to find that a strong ethnic identity is a protective factor for coping with discrimination among those who identify as Japanese. Interaction effects suggested that ethnic identity served as a stress buffer for everyday discrimination. This finding suggests that having more knowledge and positive feelings about one’s ethnic group, engaging in cultural practices, and fostering a sense of social belonging can counteract the distress associated with routine experiences of unfair treatment. The types of everyday discrimination that were most frequently self-reported were more subtle, such as being treated with less respect or courtesy and people thinking that they were better than them, while the least common was the overt experience of being threatened or harassed. A study using national data similarly found that across Asian American groups, being treated with less respect was reported most often in contrast to being threatened or harassed.[19]

The interaction between racial and ethnic discrimination in a lifetime and Japanese identity was not statistically significant, which is an intriguing null finding. Lifetime racial and ethnic discrimination may have measured more severe experiences that were obviously due to racism and possibly occurred earlier in life, which could involve recall bias. Everyday discrimination referred to experiences in the past year and may capture the intersectionality of several social statuses, so it may be difficult to know if the unfair treatment was due to race/ethnicity, sex, age, or other factors. The statistically significant interaction between everyday discrimination and Japanese identity may be because the frequency of unfair treatment matters. Everyday discrimination can assess regular experiences or chronic stress rather than the oversimplified dichotomy of ever experiencing a stressful event of racial and ethnic discrimination in a lifetime or not. It is an important finding that a strong Japanese identity buffers the stress of day-to-day discrimination that may not necessarily be due to race or ethnicity. Future research should investigate whether a strong ethnic identity can buffer the stress of non-specific unfair treatment and racism, sexism, ageism, classism, and heterosexism as a resilient aspect of the self-concept or a form of ethnic support among different groups.

More generally, this study adds to a growing area of research on the stress-buffering effect of ethnic identity among Asian Americans and should stimulate more research on Asian ethnic groups and different types of discrimination. This study could not determine the sources of discrimination (ie, peers at school, professors, or members of specific racial and ethnic groups), which is a limitation shared by most studies in this literature. The extent to which Japanese identity in Hawai‘i is a positive aspect of the self-concept and a resource for coping with discrimination among younger and older generations (those who were children during World War II after the Pearl Harbor attack), as well as among first-generation and second-generation Japanese Americans warrant investigation. The results from this survey study should be supplemented by qualitative research that explores the extent to which residents of Hawai‘i believe that their ethnic identities help them handle the stress of different types of discrimination and whether it varies by racial and ethnic group, generation, sex, and socioeconomic status. Overall, the current study implies that it is crucial to understand how the ethnic identity of Japanese Americans is a function of that group's social position in a multicultural environment.[20] This study is innovative because it draws attention to a cultural context where Japanese Americans have a uniquely privileged status in a racial and ethnic hierarchy, with Asian Americans as the majority group. Insights might also be gained by more public health, psychological, and sociological research delving into Hawai‘i's unique racial and ethnic hierarchy. Furthermore, studies on identity development and well-being among Japanese youth and young adults are still scarce.[21]

I propose multiple recommendations to advance the limitations of the literature in general and the cross-sectional data used for the present study. Future research should gather representative survey data of racial and ethnic groups in the state of Hawai‘i and assess causal ordering with longitudinal data. This study would help examine whether depression (diagnosed and self-rated symptoms) can lead to perceiving more experiences of discrimination or weaken ethnic identification over time, and include different types of strategies for coping with stress. Future studies should also explore mixed race/ethnicity in Hawai‘i and elsewhere to better understand the role of racial and ethnic identity in the link between racism and mental health problems. Although the current study included lifetime discrimination due to race and ethnicity, the everyday discrimination scale used in the survey did not ask the reasons for discrimination. Despite the limitations mentioned, this study's findings provide new evidence of the psychological efficacy of Japanese identity and how it can be a protective factor against the chronic stress of discrimination.

For public health research moving forward, what needs to be uncovered is whether a strong Japanese identity in the continental United States or places where Asian Americans are not the majority group or in advantaged positions buffers the stress of discrimination similar to Hawai‘i. What deserves closer scrutiny by social psychologists is why a strong ethnic identity across Asian ethnic groups may differentially interact with discrimination, such as protecting the self-concept from denigrating stereotypes by providing a sense of security, backing, and social support, or conversely, whether ethnic pride can trigger or displace aggression.[17] A nullifying hypothesis should also be considered to account for the possibility that stress-buffering and rejection sensitivity could co-occur in a population and cancel each other out. Distinguishing between ethnic identity as an intrapsychic resource or a social anchor that provides emotional support as part of the coping process or a reactive trigger remains imperative for future studies on different ethnic groups to consider.[22]

The implications of this study's findings for clinical practice are that psychiatrists and counseling services at universities should be aware of the roles of ethnic identity and discrimination in their Japanese American students' mental health problems. College counselors need to discuss microaggressions and everyday discrimination with Japanese American students and whether their sense of ethnic identity could prove protective, regardless of the social position of their ethnic group in the racial and ethnic hierarchy of a particular cultural context.[23] To conclude, public health programs, medical schools, clinical practice, and social work programs should incorporate curriculum on how a strong ethnic identity can be a personal form of resilience against racial injustice and discrimination in the United States.

Conflict of Interest

The author reports no conflict of interest.

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Patients' Compliance With Quarantine Requirements for Exposure or Potential Symptoms of COVID-19

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Abstract

Reducing Coronavirus disease 2019 (COVID-19) transmission relies on people quarantining after exposure to COVID-19 or if they experience COVID-19 symptoms, and isolating from others if COVID-19 positive. Quarantine and isolation last 10 to 14 days and can be state-mandated; however, the level of compliance is unknown. The University of Hawai'i Department of Family Medicine clinic called patients instructed by our physicians to quarantine for exposure risk or symptoms of potential COVID-19 infection between March 15, 2020, and April 15, 2020. None of the patients tested positive for COVID-19. Sixty-nine of 90 (77%) patients completed follow-up calls and self-reported whether they had stayed home. Of these 69 patients, 32 (46%) broke quarantine to buy groceries (36%), work (9%), visit others (6%), or for other reasons (12%). For patients living alone, 8 of 11 (73%) left home to buy groceries. For employed patients, 6 of 39 (15%) returned to work during their quarantine period.

Nearly half of our patients did not quarantine for the entire period. Many persons left home to buy food or to work. Strong public health messaging is needed to educate communities about the requirement to quarantine. Clinicians can help by asking patients about social and financial ability to quarantine, schedule follow-up appointments to remind patients to stay home, and link patients to food programs, financial assistance, and other community resources to successfully quarantine and prevent COVID-19 transmission.

Keywords

Quarantine, COVID-19, Coronavirus, SARS-CoV-2

Abbreviations and Acronyms

COVID-19 = Coronavirus disease 2019
CDC = Centers for Disease Control and Prevention
HER = Electronic Health Record
PCR = Polymerase Chain Reaction

Introduction

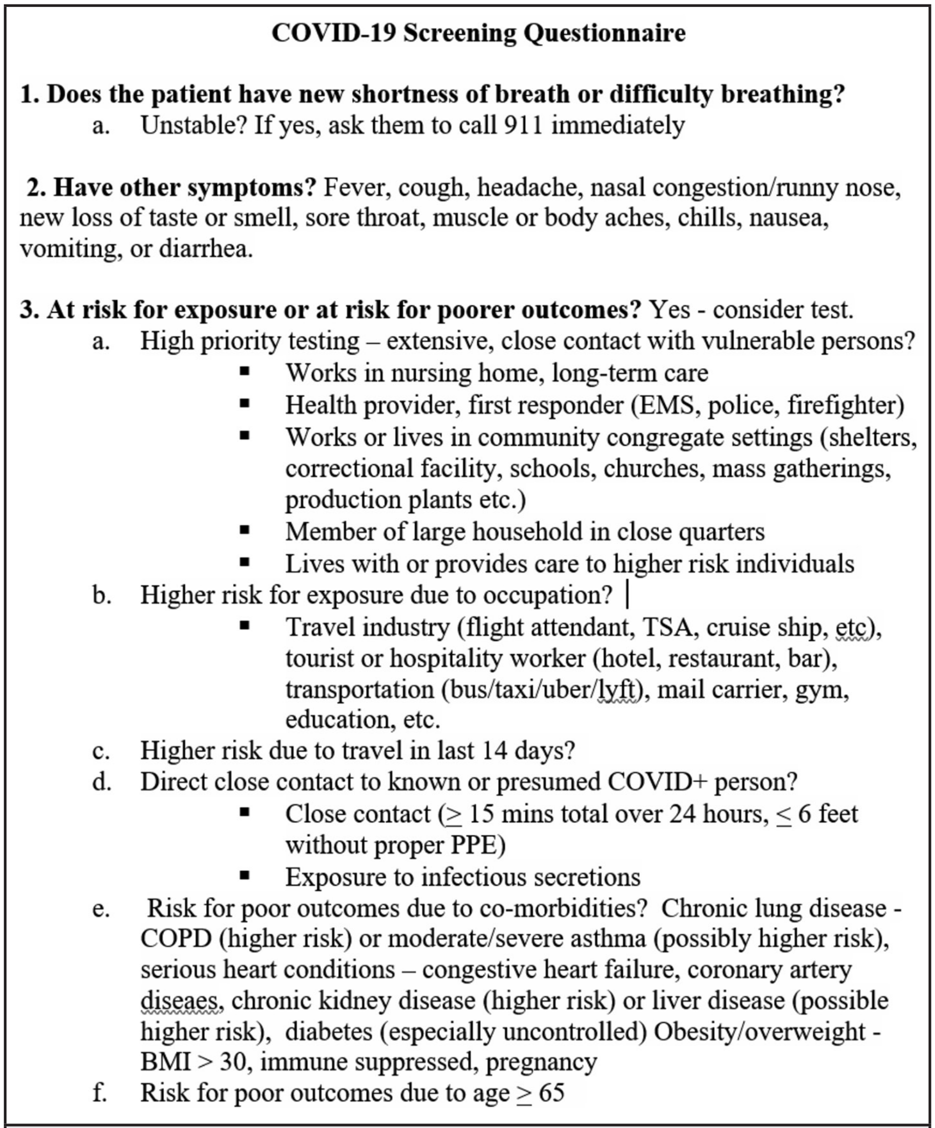
As of May 6, 2021, over 156 million cases of Coronavirus disease 2019 (COVID-19), caused by the virus SARS-CoV-2, and 3.2 million deaths have occurred globally.[1] COVID-19 cases continue to increase in part because people can infect others even when symptoms are mild or absent, and symptoms can take weeks to develop after exposure.[2] A critical aspect of stopping the COVID-19 pandemic depends on whether individuals with exposure to COVID-19 or who have potential symptoms of COVID-19 infection adhere to quarantine and whether individuals who are positive for COVID-19 adhere to self-isolation. The Centers for Disease Control and Prevention (CDC) advises unvaccinated persons with exposure to COVID-19 to quarantine for 14 days and unvaccinated persons with potential symptoms of COVID-19 to quarantine for 10 days regardless of test results because results can be falsely negative.[2-4] Persons with COVID-19 should isolate for 10 days.[3] Despite the importance of these guidelines and government mandates to quarantine or isolate, little is known about patient compliance.[5] What is known is that other CDC guidelines to prevent COVID-19 transmission, such as face mask use in public, have not been observed optimally.[6] Since patients commonly seek medical care from their clinicians for exposure, symptoms, and COVID-19 testing, we examined whether patients told by clinicians to quarantine for exposure or potential symptoms did so for the entire period.

In Hawai'i, the first case of COVID-19 was reported on March 6, 2020. As of May 6, 2021, Hawai'i has documented 33 036 cases and 486 deaths related to COVID-19.[7] At the University of Hawai'i Department of Family Medicine and Community Health Clinic, we followed up with patients who sought care for concerns about potential COVID-19 symptoms or exposure risk and had been asked to quarantine at home for 10–14 days by our clinicians (none tested positive). In our follow-up, we asked patients to self-report if they had successfully quarantined. Our study describes whether our patients followed quarantine instructions, what barriers they faced to do so, and what support is needed by patients in quarantine to decrease COVID-19 transmission.

Methods

The study was conducted at the primary care clinic affiliated with the University of Hawai'i John A. Burns School of Medicine Department of Family Medicine and Community Health. Our clinic patients are diversely insured by Medicaid (50%), commercial plans (30%), Medicare (12%), and other sources (8%). Clinicians consist of 11 attending physicians, 21 family medicine resident physicians, a pharmacist, behavior health counselors, and a social worker.

Starting March 15, 2020, clinicians developed and used a screening COVID-19 questionnaire for patients who sought care for concerns about possible COVID-19 infection to ask about exposure risk and symptoms (Figure 1). Our clinicians created the screening questionnaire and incorporated it into our electronic health record (EHR) visit template early on in the COVID-19 pandemic to ensure that we provided standardized, high-quality care according to CDC guidelines. The questionnaire was pilot tested with 5 patients, revised for clarity, and all clinicians were trained to use the EHR template with the questionnaire. Following CDC guidelines, our clinicians asked patients to quarantine if they had any exposure to someone who tested positive for SARS-CoV-2. Patients were asked to quarantine even if they had not yet been officially notified through contact tracing by the Hawaiʻi State Department of Health since contact tracing was not conducted for all positive cases at that time. Patients with exposure risk or possible symptoms of COVID-19 were counseled on the potential false-negative test results and asked to quarantine between 10 days (symptoms) to 14 days (exposure) even if a test was negative or testing was not done.[8] At the time of the study (March and April 2020), COVID-19 testing was not readily accessible to all. Hence, clinicians used their clinical judgment as to whether to ask patients with concerning symptoms to quarantine.



COVID-19 Screening Questionnaire

1. Does the patient have new shortness of breath or difficulty breathing?

a. Unstable? If yes, ask them to call 911 immediately

2. Have other symptoms? Fever, cough, headache, nasal congestion/runny nose, new loss of taste or smell, sore throat, muscle or body aches, chills, nausea, vomiting, or diarrhea.

3. At risk for exposure or at risk for poorer outcomes? Yes - consider test.

a. High priority testing – extensive, close contact with vulnerable persons?
   - Works in nursing home, long-term care
   - Health provider, first responder (EMS, police, firefighter)
   - Works or lives in community congregate settings (shelters, correctional facility, schools, churches, mass gatherings, production plants etc.)
   - Member of large household in close quarters
   - Lives with or provides care to higher risk individuals

b. Higher risk for exposure due to occupation?
   - Travel industry (flight attendant, TSA, cruise ship, etc), tourist or hospitality worker (hotel, restaurant, bar), transportation (bus/taxi/uber/lyft), mail carrier, gym, education, etc.

c. Higher risk due to travel in last 14 days?

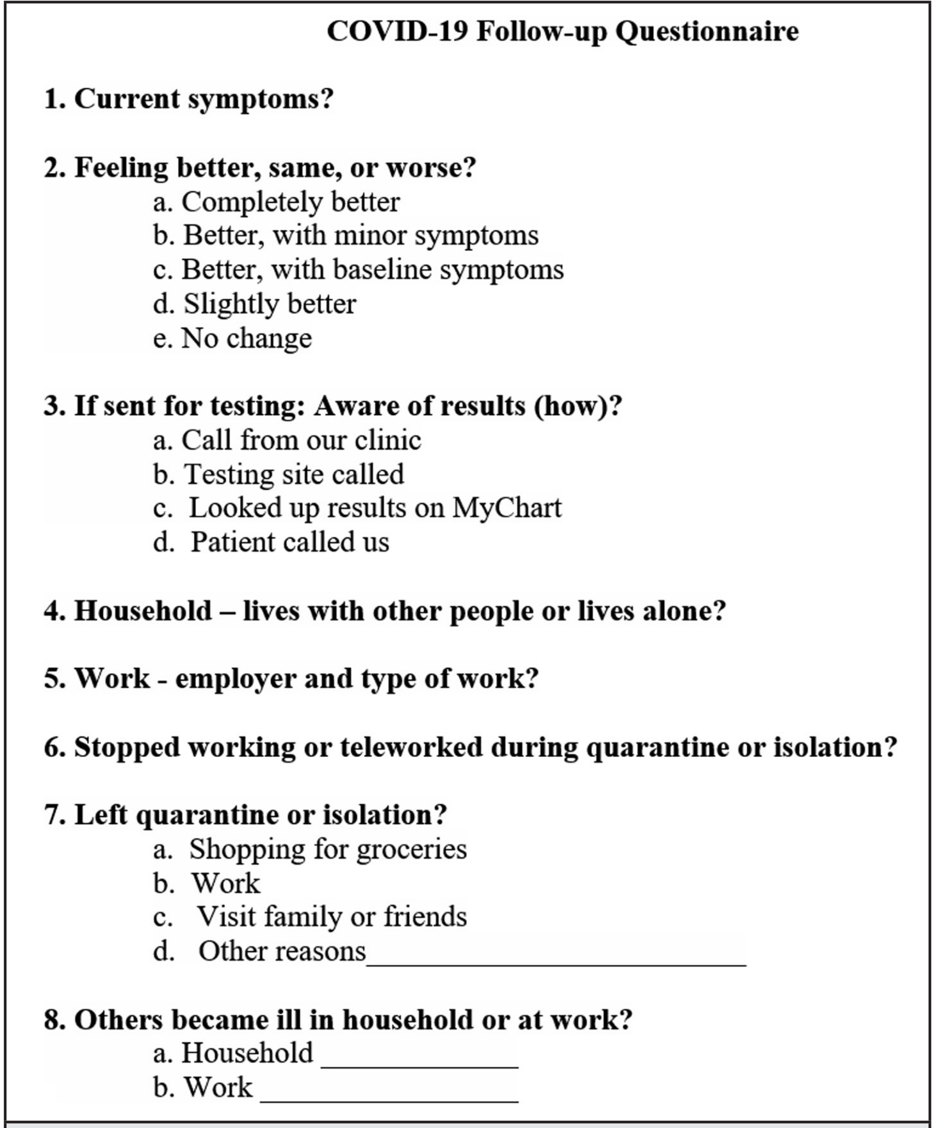
d. Direct close contact to known or presumed COVID+ person?
   - Close contact ($\geq$ 15 mins total over 24 hours, $\leq$ 6 feet without proper PPE)
   - Exposure to infectious secretions

e. Risk for poor outcomes due to co-morbidities? Chronic lung disease - COPD (higher risk) or moderate/severe asthma (possibly higher risk), serious heart conditions – congestive heart failure, coronary artery diseaes, chronic kidney disease (higher risk) or liver disease (possible higher risk), diabetes (especially uncontrolled) Obesity/overweight - BMI > 30, immune suppressed, pregnancy

f. Risk for poor outcomes due to age $\geq$ 65

Figure 1. COVID-19 Screening Questionnaire

On April 15, 2020, investigators began calling patients seen since March 15, 2020, who our clinicians asked to quarantine for exposure or potential symptoms of COVID-19. Our clinicians developed and used a second questionnaire EHR template for these follow-up calls to ask if symptoms had improved, whether patients knew test results, and if patients followed quarantine successfully (Figure 2). For this study, investigators reviewed patients' EHR charts for symptoms associated with COVID-19 (eg, cough, fever, shortness of breath, sore throat, myalgias, chills, loss of smell or taste, nausea, vomiting, diarrhea, headache, runny nose, or congestion),[8] potential exposure to COVID-19 (from work, travel, or friends/family), tests ordered, medications prescribed, age, sex, current smoking status, and 3 health conditions (respiratory disease, heart disease, and diabetes) associated at the time with increased risk for poorer COVID-19 outcomes. A de-identified database was constructed without patient names, medical record numbers, or contact information. Data were presented using simple descriptive analyses. The University of Hawai'i Office of Research Compliance deemed the study not to be human subject research (IRB 2020-00457).



COVID-19 Follow-up Questionnaire

1. Current symptoms?

2. Feeling better, same, or worse?
   a. Completely better
   b. Better, with minor symptoms
   c. Better, with baseline symptoms
   d. Slightly better
   e. No change

3. If sent for testing: Aware of results (how)?
   a. Call from our clinic
   b. Testing site called
   c. Looked up results on MyChart
   d. Patient called us

4. Household – lives with other people or lives alone?

5. Work - employer and type of work?

6. Stopped working or teleworked during quarantine or isolation?

7. Left quarantine or isolation?
   a. Shopping for groceries
   b. Work
   c. Visit family or friends
   d. Other reasons__________________________

8. Others became ill in household or at work?
   a. Household _____________
   b. Work _________________

Figure 2. COVID-19 Follow-up Questionnaire

Results

Ninety patients were advised to quarantine between March 15, 2020, and April 15, 2020, for exposure risk or symptoms (none tested positive). Of these, 69 patients were contacted in follow-up calls (77% follow-up) and included in the analyses. The 69 patients ranged in age from 8 months to 82 years (mean age, 43 years), 68% were female, 57% were employed, and 84% lived in multi-person households (Table 1). Over half had at least 1 risk factor for poor COVID-19 outcomes: 13% were aged 65 years and older, 19% currently smoking, and 55% with chronic respiratory disease, heart disease, or diabetes (Table 1).[9]

Sixty-six of 69 patients (96%) had symptoms, and 31 (45%) also reported exposure risk such as recent travel, friends or family visiting from out-of-state, or working in settings, such as health care and tourism industries (Table 1 and Table 2). The most prevalent symptoms included cough (80%), fever (32%), and shortness of breath (35%) (Table 2).[8] Thirty-five patients (51%) were prescribed treatments, including cough medications (28%), asthma inhalers (25%), decongestants (19%), antibiotics (12%), and oseltamivir, also known as Tamiflu® (1%).

Twenty-nine patients (42%) were sent for nasopharyngeal Polymerase Chain Reaction (PCR) testing (Table 2). All 29 had negative PCR results, although one patient subsequently tested positive later on for the COVID-19 IgM antibody. Most knew their test results primarily because testing sites called (48%), our clinicians called (31%), or patients looked up results through their online personal health portal (14%) (Table 3).

Table 1. Demographics of Patients Advised to Quarantine for Exposure or Isolate for Potential COVID-19 Infection (N=69)

Mean age (range)	**43 years (8 months–82 years)**	
	n	%
Age		
0 to 19 years	5	7
20 to 39 years	28	41
40 to 64 years	27	39
65 years and older	9	13
Sex		
Woman	47	68
Man	22	32
Employed	39	57
Household		
Lives alone	11	16
2 or more persons	58	84
Chronic Conditions		
Respiratory	15	22
Diabetes	19	28
Heart disease	8	12
Any of the 3 conditions	38	55
Smoking Status		
Never	40	58
Current	13	19
Former	16	23
Exposure Risk		
Work	23	33
Family visiting	4	6
Friend visiting	3	4
Travel	6	9
At least 1 exposure risk	31	45

Table 2. Initial Visit Assessment of Symptoms, Treatment, and COVID-19 Testing

	n	%
All Persons (N=69)		
Had exposure risk only (no symptoms)	3	4
Had symptoms	66	96
Received treatment	35	51
Sent for COVID-19 PCR testing	29	42
Type of Symptom (N=69)		
Cough	55	80
Fever	22	32
Shortness of breath	24	35
Sore throat	20	29
Myalgias	7	10
Chills	4	6
Loss of smell or taste	3	4
Nausea, vomiting, or diarrhea	7	10
Headache	0	0
Runny nose or congestion	20	29
Other (eg, wheezing)	7	10
Type of Treatment (N=69)		
Cough medication	19	28
Asthma inhaler	17	25
Decongestants	13	19
Antibiotics	8	12
Oseltamivir (Tamiflu®)	1	1
COVID-19 Testing (N=29)		
Nasopharyngeal PCR (0 of 29 positive)	29	42
IgM antibody (1 of 1 positive)[a]	1	1

Abbreviations: COVID-19, Coronavirus disease 2019; PCR, polymerase chain reaction

[a] One person had an initial negative PCR test but a subsequent positive IgM antibody test.

Follow-up

At follow-up, 52 patients (75%) said they felt significantly better (49% completely better, 26% better with only minor symptoms) (Table 3). The median time between follow-up and the initial visit was 13 days (data not shown).

Compliance

Thirty-two patients (46%) said they left home despite being asked by our clinicians to quarantine (Table 4). Twenty-five patients (36%) went out to shop for groceries, while others went to work (9%), visited family or friends (6%), or for other reasons such as exercising and going to the bank (12%). Of the 11 patients who lived alone, 8 (73%) broke quarantine to buy groceries. Of the 39 employed patients, 6 (15%) went to work during the quarantine period (data not shown). Of the 58 patients who lived in multi-person households, 14 (24%) reported that their family or roommates were also sick or later became ill (Table 4). We did not confirm whether any family or household contacts later tested negative or positive for SARS-CoV-2.

Table 3. Follow-Up Assessment of Improvement In Symptoms and Knowledge of Test Results

	n	%
Follow-up (N=69)		
Had a scheduled follow-up visit	37	54
Knowledge of Test Results (N=29)		
Our clinic called	9	31
Testing site called	14	48
Patient looked up result in MyChart	4	14
Patient called us	2	7
Symptoms at Follow-up (N=69)		
Completely better	34	49
Better, minor symptoms	18	26
Better, baseline symptoms	9	13
Better, slightly	2	3
No change	3	4
No symptoms at initial visit	3	4

Table 4. Compliance With Quarantine Guidelines and Report of Ill Contacts

	Lives Alone (N=11)		**Lives With Others (N=58)**		**All Quarantined (N=69)**	
	n	%	n	%	n	%
Compliance with Quarantine						
Observed quarantine	3	27	34	59	37	54
Left home for any reason	8	73	24	41	32	46
Reasons for Noncompliance[a]						
To buy groceries	8	73	17	29	25	36
To go to work	1	9	5	9	6	9
Visit family/friends	4	36	2	3	4	6
Other reasons	4	36	4	7	8	12
Number of patients who reported ill contacts[b]						
Any ill contacts	1	9	15	26	17	25
Co-worker sick	0	0	1	2	1	1
Household member sick	0	0	14	24	14	20
Other (eg, friends)	1	9	1	2	2	3

[a] Percentages might add to over 100% since patients can report multiple reasons for noncompliance.

[b] Patients reported if their co-workers, household members, or friends were also sick (ie, ill contacts). Percentages might add to over 100% since patients can report ill contacts at more than 1 place.

Discussion

Along with vaccination, a necessary part of preventing the spread of COVID-19 is for people with exposure or potential symptoms to stay at home.[10] However, in our study, only approximately half of patients observed full quarantine when asked to do so by their clinician, and this fell to less than one-third among patients who lived alone. None of our patients with exposure or symptoms sent for PCR testing had a positive result, although this did not guarantee that all persons were COVID-19 free.

Most patients said they broke quarantine to address an essential need to buy food. Among individuals who lived alone, all who left their homes cited shopping for groceries as a reason for doing so. For patients who were employed, 1 in 7 returned to work before being cleared. Anecdotally, patients told us their job could not be done via telework, and they needed to earn income. Patients also reported breaking quarantine for non-essential reasons; however, these results highlight the importance of food and economic support for people who must quarantine for up to 2 weeks. States now fund low or no-cost grocery delivery programs to help increase compliance with quarantine or isolation (Hawai‘i has such programs), and employers can provide paid sick leave or options for people to work from home when possible.[11] In some states, contact tracing personnel asks people who have been exposed to COVID-19 and must quarantine whether they anticipate difficulties doing so and assign case managers to those who need food or financial assistance.[12] Our clinic now routinely asks all patients about their social and financial ability to quarantine or isolate and links them to community services for groceries, supplies, and economic assistance.[12-14] Such support services have become increasingly available and funded by states and the federal government to address the COVID-19 pandemic.[15]

In our study, 75% of patients with symptoms improved significantly over time. As patients feel better, they may drop their guard about infecting others and break quarantine early to return to work or run errands. From our experience, patients were often initially unaware that they needed to quarantine for a full 14 days after exposure because it can take that many days to develop symptoms.[4] Patients also mistakenly believed that a negative test cleared them from quarantine without realizing that COVID-19 tests could be falsely negative.[2] Our clinicians provided extensive education for our patients that transmission can occur without symptoms, and tests can be falsely negative. We now arrange follow-up appointments with all patients asked to quarantine or isolate. This scheduled follow-up visit (by phone or video) allows our clinicians to evaluate whether patients' symptoms are improving and remind patients to quarantine or isolate for the entire period even if they feel better.

Although clinicians can educate individual patients, our findings point out the importance of a clear and strong message to the public about the need to quarantine for exposure or symptoms. In the initial months of the COVID-19 pandemic, the vast majority of our patients sought care appropriately for exposure risk and symptoms. This finding highlights the role of consistent and accurate public health education about COVID-19. The same public message about the importance of quarantine or isolation should be widely disseminated in the community through various outlets and in different languages.[16]

Nearly 1 in 4 of our patients who lived in multi-person households said that someone in their household was sick or later became ill. For quarantine or isolation to truly work in preventing transmission, persons must also separate from household members. Transmission rates between household members of COVID-19 positive persons are high and have exceeded 50% in some studies.[17,18] Large families or multi-generational households can find it particularly difficult to prevent household transmission if there are not enough rooms to allow for adequate separation. Hawai'i and other states have set up free hotels for people who cannot quarantine or isolate within the same household, and clinicians can help reduce transmission by referring patients to these resources.[19-21]

Our study is limited by a small sample size and was conducted for patients seen from March to April 2020. Therefore our findings reflect the knowledge and behavior of patients at the beginning of the COVID-19 pandemic. As we proceed further into the pandemic, patients may be more aware of the need to quarantine and isolate for exposure or symptoms. Our study patients tested negative for COVID-19, and compliance with staying home may be higher among those with a positive COVID-19 test. We relied on patients' self-report regarding whether they broke quarantine. Actual rates may be lower or even higher if people are reluctant to say they left quarantine when advised not to. Given how important quarantine and isolation are to reducing transmission, an ongoing effort to track noncompliance and barriers to quarantine or isolation is needed on a larger scale.

As the pandemic evolves and continues to be a part of our daily lives, we now take the time to switch from reaction to planning. Our study found high rates of noncompliance with quarantine due in part to a need for food and economic support. A robust public health system is needed to educate the public about the importance of quarantine or isolation, provide the necessary resources, and help clinicians connect patients to these resources to prevent COVID-19 transmission.

Conflict of Interest

None of the authors identify any conflict of interest.

Disclosure Statement

Dr. Tseng serves on the US Preventive Services Task Force (USPSTF) and is the Hawai‘i Medical Services Association Chair of Health Services and Quality Research at the University of Hawai‘i.

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The Healthy Hawai‘i Strategic Plan 2030: A Roadmap for Preventing and Managing Chronic Disease and Envisioning a Healthy and Equitable Future

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Insights in Public Health is a monthly solicited column from the public health community and is coordinated by HJH&SW Contributing Editor Tetine L. Sentell PhD from the Office of Public Health Studies at the University of Hawai‘i at Mānoa and Contributing Editor Michele N. Nakata JD from the Hawai‘i Department of Health.

Abstract

In June 2021, over 200 stakeholders, advocates, and visionaries gathered to launch the Healthy Hawai‘i Strategic Plan 2030 (HHSP), a 10-year strategic plan for improving the health of Hawai‘i residents by preventing and reducing chronic disease and advancing health equity. The HHSP is a guide to enable coordination across common risk factors, program areas, interventions, and strategies for chronic disease prevention and control. Developed during the COVID-19 pandemic, which revealed major areas of susceptibility in our health system infrastructure and magnified existing disparities, the HHSP prioritizes health equity and strives to create sustainable change to transform communities, schools, health care and worksites to support the health of the people of Hawai‘i. The HHSP is a living document and partners – present and future – are invited to work together to achieve a healthier future for the people of Hawai‘i.

The HHSP is available in an interactive format and can be downloaded at: www.HHSP.hawaii.gov

Chronic Disease and Obesity in Hawai‘i

In Hawai‘i, chronic diseases are among the most prevalent, costly, and preventable of all health problems. The past two decades have seen unprecedented increases in chronic disease and obesity due to pronounced changes in the environment, behavior, and lifestyle. Almost two- thirds of Hawai‘i residents are living with at least 1 chronic condition such as diabetes or heart disease, which diminishes their overall health and puts them at risk for severe illness from COVID-19.[1]

The annual costs of chronic diseases in Hawai‘i are projected to be $9 billion in direct medical costs and an additional $3.2 billion in indirect costs due to lost employee productivity (average per year 2016-2030).[2] If the current trend continues, by 2030 the projected cost per Hawai‘i resident would be $8300 per year.[3]

The COVID-19 pandemic underscores the need for investing in chronic disease prevention, and innovative policy, systems, and environmental change that will impact health and health equity in Hawai‘i. People of any age with chronic diseases, underlying medical conditions, and those who smoke are at increased risk for severe illness from COVID-19. A 2021 study in the *Journal of the American Heart Association* attributes two-thirds of U.S. COVID-19 hospitalizations to obesity, diabetes, hypertension, and heart failure.[4]

Most chronic diseases can be prevented by eating well, being physically active, avoiding tobacco, and getting regular health screenings.[5] Tobacco use is the single most preventable cause of death and disease, followed by physical inactivity and poor nutrition.[6–7] These 3 risk factors are major contributors to the development of chronic diseases such as asthma, diabetes, many types of cancer, and heart disease and stroke.[8]

A Coordinated Plan to Address Chronic Disease and Obesity

From May 2019 – May 2021, partners across the state came together to develop the HHSP. Prior to the HHSP, individual program area plans outlined objectives and strategies for each risk factor and chronic disease. Recognizing the opportunity to improve collaboration and better leverage resources and efforts, leaders and stakeholders decided that a single, coordinated plan to prevent and reduce chronic disease would be developed and encompass the following program areas: Asthma, Cancer, Diabetes, Heart Disease and Stroke, Physical Activity and Nutrition, and Tobacco. The HHSP belongs to all the existing partners that developed the coordinated plan and those who join in achieving the objectives.

Community engagement and ownership begins at the formative stage. The HHSP Advisory Group with representation from across program areas and societal sectors provided recommendations on the vision, structure, and process for developing and introducing the plan. Stakeholder working groups were convened by program areas and labored over the course of 2 years to develop objectives and strategies.

Moving to a harmonized planning approach and consistently embedding the social determinants of health in the plan enables coordination of multiple programs across common risk factors, interventions, and strategies. It also facilitates the expansion of evidence-based policies, programs, and services, and keeps Hawaiʻi in step with national funding requirements, recommended strategies, and best practices that combine multiple health areas and address the spectrum of chronic disease.

The HHSP also supports and reinforces the following comprehensive, chronic disease prevention and management strategic plans for the state:

- Hawaiʻi Asthma Plan 2030
- Hawaiʻi Cancer Plan 2030
- Hawaiʻi Diabetes Plan 2030
- Hawaiʻi Heart Disease and Stroke Plan 2030
- Hawaiʻi Physical Activity and Nutrition Plan 2030
- Hawaiʻi Tobacco Prevention and Control Plan 2030

Overview of the Healthy Hawaiʻi Strategic Plan

The HHSP contains 58 objectives that strive to create sustainable change across our communities, schools, health care systems, and worksites to support the health of the people of Hawaiʻi. The HHSP Advisory Committee, along with a wide range of stakeholders from across the state developed the HHSP objectives utilizing a common framework. All objectives incorporate principles of the Social Ecological Model and are organized into four sector areas representing the social determinants of health: Community Design and Access, Education, Health Care, and Worksite. The plan prioritizes goals, objectives, and strategies that lead to policy, systems, and environmental change. Objectives were developed using current data, best practices, and evidence-based science, and reflect one or more cross-cutting themes. The HHSP is meant to be a living document that is reviewed and updated throughout the plan's timeframe.

HHSP Vision, Mission, and Goals

Vision: Healthy People, Healthy Communities, Healthy Hawaiʻi

Mission: Shape environments, policies, and systems to support wellness and improve the quality and years of life for Hawaiʻi's people.

Goals:

- Improve health and wellness.
- Decrease premature death and disability from chronic disease.
- Increase quality of life years among Hawaiʻi residents.
- Reduce health disparities.

Figure 1. HHSP Vision, Mission, and Goals

Sector-based objectives of the HHSP include:

- Communities with wider sidewalks and bike lanes that make walking and rolling to work easier and safer;
- Parks and beaches that are smoke-free and well-maintained;
- Chronic disease self-management classes conveniently located at worksites, schools, pharmacies or through telehealth;
- Safeguards that keep vaping products out of the hands of youth; and
- Sun protection guidelines in schools to lower the risk of skin cancers as keiki grow up.

The HHSP objectives and strategies can be found at: www.HHSP.hawaii.gov

Focus on Priority Populations and Achieving Health Equity

Hawaiʻi is one of the most diverse states in the nation. The state's main population groups are Native Hawaiians, Japanese, Chinese, Filipinos, Other Pacific Islanders, and Caucasians. Hawaiʻi has a larger percentage of Native Hawaiians, Other Pacific Islanders, and multiracial subgroups than the rest of the country. Non-Caucasian minorities, including large immigrant populations from Asian and Pacific Islander nations, comprise 74% of the population.[9] Although Hawaiʻi has consistently placed a high value on providing accessible, top quality health care for all, health disparities between population groups exist.

Numerous social, economic, and environmental factors influence the health of individuals and populations. For example, people with a quality education, stable employment, safe homes and neighborhoods, and access to high-quality, preventive health services tend to be healthier throughout their lives and live longer. Conversely, people with behavioral health disorders, those identifying as a sexual and gender minority including lesbian, gay, bisexual, transgender, queer and/or questioning (LGBTQ), or persons of low socioeconomic status, often face inequitable health outcomes. Where you live directly affects your health in a number of ways, from the accessibility of healthy food, to the availability of green space to be physically active, to access to primary health care. In Hawai‘i, life expectancy ranges by zip code from 73 years to 87 years, a 14 year difference.[10] Inequity is also found across ethnic and non-English speaking communities. Native Hawaiians, Pacific Islanders, and Filipino population groups concomitantly face the greatest disparities in health outcomes from chronic disease. The COVID-19 pandemic and climate change are bearing out the disparate vulnerabilities across communities in Hawai‘i.

The HHSP recognizes and prioritizes the importance of addressing health equity and priority population groups that are more likely to experience poor health outcomes. Research suggests social determinants of health may be the most important factors in health outcomes and health equity. To ensure that individuals and communities across the state achieve their full health potential, the HHSP addresses social determinants of health domains such as education; health care and quality; and neighborhood and built environments. The plan also provides insights on population characteristics, disease data and trends, and existing health inequities. Communities that are most vulnerable or more likely to experience disparities have been identified and prioritized. Work will continue with organizations representing priority populations to identify objectives and develop action plans specific to priority communities.

Implementation and Next Steps

The HHSP Advisory Group and program area stakeholder groups are meeting regularly to ensure implementation of the plan’s objectives and strategies, and to monitor and evaluate progress. Data trackers are currently being developed to monitor performance and progress of the HHSP and program areas. The HHSP was launched online and designed to be a dynamic public-facing document that is assessed and updated throughout the plan’s timeframe. HHSP partners will be invited to meet every other year to assess and monitor progress and make any needed adjustments to objectives and the plan. Stakeholder group membership is expected to expand to assure an inclusive, community-based participatory approach to realize the plan’s goals.

Partners

The work of the HHSP is led by the Hawai‘i State Department of Health, Chronic Disease Prevention and Health Promotion Division (CDPHPD). CDPHPD promotes health and reduces the burden of chronic disease by empowering communities, influencing social norms, and supporting and encouraging individuals to make healthy lifestyle choices. CDPHPD utilizes an integrative and coordinated approach to assemble and unite partner agencies statewide to build a shared vision, implement strategies, and secure resources that will improve the health of the people of Hawai‘i. Contributions of time, energy, resources, and expertise are provided by the following:

Advisory Group Members

The HHSP Advisory Group members are partners from across the state who provide input on the vision, purpose, and development process of the plan. Thank you to these respected leaders who offer valuable advice and expertise. A list of the Advisory Group member can be found on the HHSP website.

Program Area Partners

Thank you to the numerous individuals and organizations who contributed to the development of this plan. These diverse and esteemed partners are listed in the program area chronic disease prevention and management plans for the state.

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Hawaiʻi Journal of Health & Social Welfare (HJH&SW)

Style Guide for the Use of Native Hawaiian Words and Diacritical Markings

The HJH&SW encourages authors to use the appropriate diacritical markings (the ʻokina and the kahakō) for all Hawaiian words. We recommend verifying words with the Hawaiian Language Dictionary (http://www.wehewehe.org/) or with the University of Hawaiʻi Hawaiian Language Online (http://www.hawaii.edu/site/info/diacritics.php).

Authors should also note that Hawaiian refers to people of Native Hawaiian descent. People who live in Hawaiʻi are referred to as Hawaiʻi residents.

Hawaiian words that are not proper nouns (such as *keiki* and *kūpuna*) should be written in italics throughout the manuscript, and a definition should be provided in parentheses the first time the word is used in the manuscript.

Examples of Hawaiian words that may appear in the HJH&SW:

ʻāina
aliʻi
Hawaiʻi
kūpuna
Kauaʻi
Lānaʻi
Mānoa
Māori
Molokaʻi
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