CARDIOVASCULAR DISEASE TRAINING FOR COMMUNITY HEALTH WORKERS SERVING NATIVE HAWAI'ANS AND PACIFIC PEOPLE

A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAI'I AT MĀNOA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN

DEVELOPMENTAL AND REPRODUCTIVE BIOLOGY

August 2013

By
Chace Donovyne Ikaika Moleta

Thesis Committee:

W. Steven Ward, Chairperson
Vanessa S. Wong
Angela Sy

Keywords: Chace Moleta, community health workers, health training
Acknowledgements

I would first and foremost like to express mahalo piha to a very special advisor and mentor, Mele Look. Without her vision, guidance, and aloha from start to finish on this project none of it would have been possible. I also owe a great deal of gratitude to my colleague and friend Mililani Trask-Batti, as well as all others, including instructors and community health workers, who have contributed to the development, facilitation, and evaluation of Heart 101. Mahalo loa is extended to Dr. Keawe Kaholokula, Tricia Usagawa, my entire thesis committee, and all who have provided me with assistance and support in completing this thesis. Mahalo!
# TABLE OF CONTENTS

**ACKNOWLEDGEMENTS** .................................................................................................................................................................................. II

**LIST OF TABLES** .................................................................................................................................................................................... VI

**LIST OF FIGURES** .................................................................................................................................................................................. VII

**ABSTRACT** ............................................................................................................................................................................................. VIII

## CHAPTER 1. INTRODUCTION ........................................................................................................................................................................ 1

1.1. HEALTH DISPARITIES AMONG NHPP ................................................................................................................................. 1

   1.1.1. Historical Background ............................................................................................................................................... 1

   1.1.2. Current Trends ......................................................................................................................................................... 1

1.2. CARDIOVASCULAR DISEASE IN NHPP ................................................................................................................................. 2

1.3. COMMUNITY HEALTH WORKERS ............................................................................................................................................... 7

   1.3.1. Roles and Importance Nationally ............................................................................................................................. 7

   1.3.2. Roles and Importance in Hawai‘i .................................................................................................................................. 8

1.4. TRAINING OF CHW IN CARDIOVASCULAR & OTHER CHRONIC DISEASES .............................................................................. 9

1.5. CULTURE-BASED EDUCATION .................................................................................................................................................. 10

1.6. CHW TRAININGS AT THE DNHH OF THE JABSOM .................................................................................................................... 13

   1.6.1. Use of CBPR as a Framework ............................................................................................................................................... 13

   1.6.2. Ulu Network Formation and Assessment of Needs .......................................................................................................... 13

   1.6.3. Diabetes 101 and Kidney 101 ........................................................................................................................................... 15

   1.6.4. Heart 101 ......................................................................................................................................................................... 16

## CHAPTER 2. MATERIALS AND METHODS ........................................................................................................................................ 17

2.1. STUDY PARTICIPANTS ................................................................................................................................................................. 17

2.2. PARTICIPANT RECRUITMENT & ENROLLMENT .......................................................................................................................... 17
2.3. HEART 101 TRAINING SEMINAR CURRICULUM DEVELOPMENT ............................................. 20

2.4. TRAINING MODULES ........................................................................................................ 23

2.4.1. Module 1: “Introduction to the Cardiovascular System and Cardiovascular Disease” ....................................................................................................................... 23

2.4.2. Module 2: “Types of Cardiovascular Disease and Their Treatments” ......................... 24

2.4.3. Module 3: “Successful Strategies for Caring for a Client with Cardiovascular Disease” ......................................................................................................................... 24

2.5. TEACHING STRATEGIES .................................................................................................. 25

2.5.1. Selection of Instructors .................................................................................................. 25

2.5.2. Interactive Learning ...................................................................................................... 27

2.6. EVALUATION TOOLS ...................................................................................................... 28

2.6.1. Knowledge Test ........................................................................................................... 28

2.6.2. Satisfaction Survey ...................................................................................................... 29

2.7. DATA COLLECTION .......................................................................................................... 29

2.8. DATA ANALYSIS .............................................................................................................. 30

CHAPTER 3. RESULTS ............................................................................................................... 31

3.1. CARDIOVASCULAR HEALTH KNOWLEDGE GAINED FROM PRE- TO POST-SEMINAR ......................................................................................................................... 17

3.2. CARDIOVASCULAR HEALTH KNOWLEDGE RETAINED 6-MONTHS POST-SEMINAR 31

3.3. PARTICIPANT SATISFACTION EVALUATIONS .................................................................. 31

3.4. QUESTION-BY-QUESTION ANALYSIS OF KNOWLEDGE TESTS .............................................. 35

CHAPTER 4. DISCUSSION ......................................................................................................... 39

4.1. EFFICACY OF HEART 101 FOR TRAINING CHW IN CVD KNOWLEDGE ....................... 39
4.2. IMPLICATIONS OF KNOWLEDGE TEST RESULTS FOR HEART 101 CURRICULUM.... 41

4.3. STUDY LIMITATIONS........................................................................................................... 44

4.4. SUMMARY............................................................................................................................... 45

BIBLIOGRAPHY .......................................................................................................................... 47
List of Tables

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>18</td>
</tr>
<tr>
<td>2.2</td>
<td>22</td>
</tr>
<tr>
<td>3.1</td>
<td>32</td>
</tr>
<tr>
<td>3.2</td>
<td>33</td>
</tr>
<tr>
<td>3.4</td>
<td>36</td>
</tr>
</tbody>
</table>
# List of Figures

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>2</td>
</tr>
<tr>
<td>1.2</td>
<td>4</td>
</tr>
<tr>
<td>1.3</td>
<td>5</td>
</tr>
<tr>
<td>1.4</td>
<td>6</td>
</tr>
<tr>
<td>1.5</td>
<td>12</td>
</tr>
<tr>
<td>1.6</td>
<td>14</td>
</tr>
<tr>
<td>2.1</td>
<td>19</td>
</tr>
<tr>
<td>3.1</td>
<td>34</td>
</tr>
</tbody>
</table>
Abstract

It has been well documented that Native Hawaiians and other Pacific Peoples (NHPP) are disproportionately affected by cardiovascular disease (CVD) in the United States, and particularly in Hawai‘i. Nationally, community health workers (CHW) have been shown to be effective in delivering CVD self-management education. They are utilized by clinics and health agencies for individual and group education, as well as in case management and outreach; however, they are often hired with no formal health education and with limited clinical experience. In Hawai‘i, CHW are used extensively in community health centers (CHC) and throughout the Native Hawaiian Healthcare System (NHHS). A 2008 needs assessment of 19 CHC and the NHHS identified the training of CHW in CVD as a top priority. The focus of this thesis was to further develop and evaluate a CVD training program tailored specifically for CHW serving NHPP. A community-based participatory research (CBPR) framework was utilized to both identify this priority and guide the development of a training program. Our efforts were motivated by the hypothesis that CHW knowledge in CVD could be increased, and subsequently retained, through training that is both culturally competent and interactive. Specific aspects of culture-based education (CBE) were systematically incorporated throughout the development of the training. The resulting product, “Heart 101,” is a 5-hour long training seminar that is taught by a multidisciplinary team and balances a PowerPoint guided lecture with interactive class games, group discussions, and role-play scenarios. To date, Heart 101 has been delivered nine times, reaching 162 individuals, primarily CHW. For our evaluations we examined participants from three training seminars held during 2010. Identical pre-,
post-, and 6-month post-training CVD knowledge tests were administered to seminar participants to assess gain and retention of CVD knowledge. Additionally, participants were also asked to complete a satisfaction survey. The results of our analyses of changes in mean test scores revealed both significant gains in CVD knowledge from pre- to post-seminar, as well as retention of that knowledge measured at 6-months post-training. Participant feedback about their experience in Heart 101 was overwhelmingly positive. A subsequent analysis to investigate knowledge change by CVD subtopics compared the frequency of correct answers by question from pre- to post-seminar. Although there were clear increases in knowledge for all subtopics reviewed, we also found baseline understanding among participants to be stronger in clinical knowledge as opposed to that of the basic sciences. This finding provides us with a basis to strengthen the Heart 101 curriculum and may serve as a guide for the development of future CHW training programs. The demonstrated success of Heart 101 has positive implications for the standardization of CHW education and their professional development. Our findings show that a CHW training program like Heart 101 can be effective in providing the necessary tools for the further development of this important and growing segment of the healthcare workforce. As the utilization of CHW in efforts to ameliorate health disparities increases, so will the importance of their ability to assist in the delivery of chronic disease management directives.
Chapter 1. Introduction

1.1. Health Disparities Among NHPP

1.1.1. Historical Background

The Hawaiian Archipelago is believed to have first been settled by Polynesians who arrived from the Marquesas Islands as early as 100 B.C.E. Isolated by hundreds of miles of open ocean, Native Hawaiians lived largely free of dangerous pathogens until the arrival of European explorers beginning with Captain James Cook in 1778.¹ The onslaught of deadly foreign diseases that followed decimated the Native population (Fig. 1.1).² Other historical injustices, including colonization and the eventual overthrow of the Hawaiian government, resulted in the loss of land and political power, as well as traditional customs and practices, for Native Hawaiians. These experiences of disenfranchisement and loss of self-determination within their ancestral homeland is increasingly recognized by health scholars as a source of many of the detrimental social determinants of modern Native Hawaiian health.³ Today, Native Hawaiians continue to be overrepresented in lower socioeconomic groups and prison incarcerations, underrepresented in higher education, and report greater difficulties in accessing healthcare.⁴ ⁵

1.1.2. Current Trends

Morbidity and mortality resulting from chronic conditions, principally cardiovascular disease (CVD) and diabetes mellitus, have reached epidemic levels worldwide and are projected to increase.⁶ In the United States, the prevalence of these chronic conditions in racial/ethnic minorities exceeds those seen within the general population.⁷ Among the most disproportionately affected of groups nationally, but
Figure 1.1. Depopulation of Native Hawaiians in Hawai‘i over 100 years following Cook’s 1778 arrival.


Although there are varying estimates of the initial population of the Hawaiian Islands at the point of first contact, all projections nonetheless suggest a staggering decline over the subsequent 100 years to Cook’s arrival.
particularly in Hawai‘i, are Native Hawaiians and other Pacific Peoples (NHPP). The U.S. Federal Government uses the designation “Native Hawaiian and other Pacific Islanders” (NHOPI) to refer to persons of heritage in any of the original peoples of the islands of Polynesia, Micronesia, and Melanesia. Here we use the term NHPP to broaden our scope so as to include Filipinos, who represent the third largest ethnic group in Hawai‘i and experience cardiometabolic health challenges more similar to NHOPI than that of other Asian subgroups with which they are typically aggregated by federal standards.

While mortality rates resulting from chronic conditions in Hawai‘i have generally declined since the 1960’s, gaps in wellbeing between NHPP and the general population have not shown signs of narrowing (Fig. 1.2). In fact, Native Hawaiians significantly exceed all other ethnicities in mortality rates for all leading causes of death in Hawai‘i (Fig. 1.3).

1.2. Cardiovascular Disease in NHPP

CVD, including coronary heart disease and stroke, is the leading cause of death worldwide—responsible for 30% of lives lost each year. This trend is also true for the state of Hawai‘i where CVD is recognized as the top killer in all ethnicities; however, NHPP suffer rates of death from CVD that far exceed that of the state average (Fig. 1.4). Moreover, Native Hawaiians die at a younger age from CVD when compared against other ethnic groups. The root causes of disparities in CVD seen among NHPP are complex and multifaceted. One recent study suggests that Native Hawaiians who strongly identified with American mainstream culture and lifestyle, as well as those who perceived greater racism, were more likely to report having hypertension. Another study that measured hypertension against different variables in Native Hawaiians found that hypertension,

Figure 1.3. Mortality Rates for Leading Causes of Death Among Native Hawaiian Compared to Other Ethnicities, Hawai‘i, 2000.

Figure 1.4. Mortality Rates for CVD by Ethnicity and County, Hawaii 2005.

particularly diastolic pressure, was also significantly related to degree of Hawaiian ancestry when all other variables were controlled.\textsuperscript{15}

1.3. Community Health Workers

1.3.1. Roles and Importance Nationally

Community Health Workers (CHW) have been utilized in the U.S. healthcare system since at least the 1960's. Their titles, job descriptions, and work settings vary tremendously, and are dictated by regional needs and demographics. In general, CHW help to address barriers to healthcare in populations that face health disparities.\textsuperscript{16} Seven core CHW competencies were defined in the 1998 National Community Health Advisor Study and included:

1. Bridging and providing cultural mediation between communities and established health and social service systems
2. Providing culturally sensitive health education and services
3. Ensuring continuity of care
4. Providing informal psychosocial support
5. Advocating for community needs
6. Delivering direct health services including first aid and health screening
7. Building individual and community capacity\textsuperscript{17}

In 2010, CHW was officially recognized as a unique occupational classification by the federal Office of Management and Budget, and included on that year's census. The definition of CHW accepted by the government is based on the American Public Health Association description of CHW as “a frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served.”\textsuperscript{18}
The heterogeneity within this segment of the healthcare workforce has traditionally made defining CHW roles and skills difficult for researchers; however, recent national studies have been able to demonstrate some important trends in their utilization and demographics. In both urban and rural settings, CHW are most often employed within community health centers, and primarily work to address health issues related to HIV/AIDS, cancer, obesity, and other chronic disease conditions. The ethnic/racial composition of the CHW workforce is unique among other sectors in healthcare in that it is dominated by minority groups. This is not surprising in that it is reflective of the fact that the vast majority of CHW share the ethnicity of their clients. While the implementation of CHW labor has fluctuated over past decades, they are being increasingly used within medically underserved populations—where their skills for serving as culturally competent care supporters are particularly well suited.

1.3.2. Roles and Importance in Hawai‘i

Federally designated community health centers (CHC) are strategically located within the most health disparate areas. In Hawai‘i, these communities tend to have large populations of NHPP and exist in rural and isolated regions. As such, many CHC rely heavily on community members to staff their organizations. While CHW are desired by CHC and agencies of the federally established Native Hawaiian Health Care System (NHHCS) for their strong interpersonal skills—essential for the roles they play as outreach workers, patient self-care educators, case managers, and interpreters—most are hired with no formal health education or clinical experience and receive little opportunity for disease-specific trainings.
1.4. Training of CHW in Cardiovascular and Other Chronic Diseases

As legitimate and important members of the healthcare team, CHW stand alone as the only group who is not required to complete formal health education or medical training. All other members involved in the hands-on care of patients suffering from chronic diseases require standardized training and certification to demonstrate a level of proficiency in order to lawfully practice their trade. In Hawai‘i, CHW have very limited training options. The Wai‘anae Health Academy (a partnership between the Wai‘anae Coast Comprehensive Health Center, Kapi‘olani Community College, and Leeward Community College) has offered vocational training certificates in a number of health career programs, including CHW, since 1992. Other University of Hawai‘i system schools have also periodically provided CHW training courses, but the viability of attempts to institutionalize certificate programs have so far been poor. Furthermore, while all of these opportunities provide general health and social support education to their students, none have been known to offer disease specific trainings. This area of need has been vocalized by numerous health agencies, most of which report having limited capacity to independently implement CHW training.

The role of the CHW as a member of the healthcare team continues to grow, largely for their ability to help alleviate the already over-burdened primary care physician who is expected to diagnose, maintain and educate patients all in a regularly allotted 15-minute visit. More significant is the increasing value placed on CHW for the unique roles they play as community bridges, providing important services like cultural mediation, linguistic support, and informal counseling. The effectiveness of CHW in helping to provide chronic disease self-management education, screening, and care has been established in numerous
Recent health outcome investigations involving interventions for CVD and its risk factors delivered by CHW demonstrate positive results measured by clinical markers. No other known studies, however, in cardiovascular health education for CHW have provided data beyond participant-reported perceptions in the evaluation of training efforts.

As the physician shortage across the country continues to deepen and social awareness of the need to reduce health disparities increases, so too will the demand for the services that CHW are especially skilled to provide. This increasing importance of the CHW creates increased responsibility placed on this class of workers, yet there has been minimal effort to create a standardized training protocol, nationally or in Hawai‘i, to prepare CHW for the growing burden they face. Furthermore, there are no other known attempts to investigate how to effectively approach the education of CHW in CVD—a task which may be complicated in that many CHW are considered non-traditional students due to having either delayed enrollment in a post-secondary education, maintain a part-time course load, have a full-time job, have dependents other than a spouse, or do not possess a high school diploma.

1.5. Culture-Based Education

The disparities in educational achievements among Native Hawaiians are closely representative of those seen for Indigenous peoples worldwide. Disparities in academic outcomes for Native Hawaiians are present at nearly every measurable level including lower standardized test scores, lower levels of graduation and retention rates, higher rates of absenteeism, and over-representation in special education and guidance programs for at risk youth. Since the 1970’s, Indigenous rights groups and progressive leaders in
education have successfully collaborated in developing, assessing, and advocating the use of the culturally responsive schooling model as a way to ameliorate the gaps in academic achievement seen among Indigenous learners. Known also as culture-based education (CBE), this framework identifies the incongruity between the dominant and minority culture of the Indigenous student as a major determinant of low educational attainment.\(^{36}\) The goal of CBE is to create an educational environment built on the foundation of the learners’ home and community experiences. This establishes a harmony between the student’s classroom learning and their familial environment.

The Indigenous worldview emphasizes a holistic and comprehensive approach to life that prioritizes an individual’s relationship to their collective community. This sentiment permeates all aspect of Indigenous understanding and inevitably extends into education where it manifests as a key motivator and facilitator for learning. Indigenous education scholar Kana’iaupuni, describes CBE as “the grounding of instruction and student learning in values, norms, knowledge, beliefs, practices, experiences and language that are the foundation of a (n indigenous) culture.”\(^{37}\) CBE pedagogy, curriculum, policies, and standards strive to connect the learner's perspectives with institutional values, knowledge and practices (Fig. 1.5).\(^{38}\) The successful integration of culturally responsive schooling has also been examined in the Dakota Sioux, other American Indian and Alaska Native tribes, and bands of Canadian First Nations.\(^{39}\)
Figure 1.5. Hawaiian Cultural Influences in Education Theoretical Model.

1.6. CHW Training at the DNHH of the JABSOM

1.6.1. Use of CBPR as a Framework

The CHW training programs developed and facilitated by the Department of Native Hawaiian Health (DNHH) at the University of Hawai‘i’s John A. Burns School of Medicine (JABSOM) were originally designed as community capacity-building initiatives with the aim to reduce health disparities. A community-based participatory research (CBPR) framework was implemented by the DNHH to both identify this priority and guide the development of the training. CBPR is defined as a collaborative approach to research in which decision-making power for study design, implementation, and evaluation is equally shared by all of those involved, specifically researchers and community members. In contrast to traditional investigator-driven research, CBPR always begins with a topic of importance determined by the community. The underlying goal of CBPR is to increase community wellbeing and eliminate health disparities.40

1.6.2. Ulu Network Formation and Assessment of Needs

The Ulu Network was formed in 2003 as a coalition of 19 community-based health organizations across the state of Hawai‘i who serve NHPP (Fig 1.6). To delineate a set of directives for the newly formed alliance, an inaugural needs assessment was conducted over eight months during 2003 and 2004. The process began with an environmental review of chronic diseases in NHPP, and lead to a subsequent information gathering effort. The planning initiative included informant and small group interviews with representatives from each Ulu Network organization and involved some 64 individuals. Participants primarily included executive directors or organization-designated contact persons, which included physicians, nurses, clinical managers, and nutritionists. A
Today the Ulu Network consists of 30 community organizations. The membership includes 14 federally qualified community health centers in Hawai‘i; five federally established Native Hawaiian Health Care System organizations; two partners in California; and several rural community hospitals, non-profit organizations, educational institutions and Hawaiian Civic Clubs that serve Native Hawaiians and other Pacific Peoples.
summative prioritization session of key activities involving representatives from each Ulu Network organization was also held in April 2004.

One of the most frequently defined areas of concern for Ulu Network organizations was the need to increase disease-specific knowledge among their community health and outreach staff. At the statewide prioritization meeting nearly half (49%) of participants identified this as a top priority—a sentiment shared by representatives from both ‘Oahu and the neighbor islands.\textsuperscript{24}

1.6.3. Diabetes 101 and Kidney 101

The first of the CHW chronic disease training programs to be developed at the DNHH was “Diabetes 101.” Diabetes 101 is a 5-hour long seminar taught by a multidisciplinary team. It is delivered in three modules and typically taught over two days. Module 1, “Introduction to Diabetes,” is taught by a health educator; Module 2, “Improving the Health and Wellness of Someone with Diabetes,” is taught by a clinician; and Module 3, “Successful Strategies for Caring for a Client with Diabetes,” is taught by a senior community health worker. The curriculum combines a PowerPoint guided lecture with interactive class games, group discussions, and role-play scenarios.\textsuperscript{41} Since its inception in 2004, Diabetes 101 has been taught 28 times, 20 times across the State of Hawai‘i and 8 times within the Continental U.S. A total of 385 individuals have attended the training to date. Evaluations of Diabetes 101 have demonstrated positive outcomes in gains and retention of knowledge of diabetes mellitus, as well as strong satisfaction, among training participants.\textsuperscript{42,43}

Being that chronic renal disease is a common complication of diabetes mellitus, a second CHW training entitled “Kidney 101” was developed in close coordination with the
National Kidney Foundation of Hawai‘i (NKFH). Kidney 101 serves as a refresher course and follow-up for participants who have previously completed Diabetes 101. The 2-hour long training is taught in one session and presented by a representative of the NKFH. A total of 61 attendees have attended one of five Kidney 101 trainings held throughout Hawai‘i.

1.6.4. *Heart 101*

“Heart 101” is the newest CHW training program developed by the DNHH. Initial curriculum development began in 2008 by a former CHW with a Masters Degree in Public Health. In 2009 I was hired as a research assistant with the DNHH to revise and refine the curriculum to be more culturally competent and interactive. A final product was presented for the first time in June 2009 as a pilot-test of the CVD training seminar. There have since been nine Heart 101 trainings—seven across the State of Hawai‘i and two within the Continental U.S. A total of 162 individuals have so far attended the Heart 101 training.

This thesis presents the development, implementation, and evaluation of Heart 101. Our efforts were guided by the hypothesis that an interactive and culturally competent curriculum on CVD for training CHW who serve NHPP would result in an increase and retention of cardiovascular health knowledge for training participants.
Chapter 2. Materials and Methods

2.1. Study Participants

Study participants in our evaluation were asked to complete a demographic survey prior to the start of the training seminar. Sixty-three percent of them self-identified CHW or outreach worker as their current work position. Medical assistants, peer counselors, and health educators were among the most frequently specified job positions of those remaining. Of all participants, 67% were women and 43% were of age 50 or older (Table 2.1). When asked to specify the ethnicity they most identify as, 61% selected Native Hawaiian, while Filipinos and other Pacific Islanders comprised 9% and 6% of training participants, respectively (Figure 2.1).

2.2. Participant Recruitment & Enrollment

Participants for this study were recruited directly and through the Ulu Network coalition of health clinics, state health offices, and other organizations serving health needs of NHPP via flyers, emails, and other marketing efforts. The training seminar was popularized with the colloquial title “Heart 101.” Physical and electronic mailings containing visually attractive flyers that described the training and included Pacific-oriented graphics were disseminated among organizational leadership within the Ulu Network beginning 6-8 weeks prior to the scheduled training date. Registration forms were sent out 4 weeks prior to the seminar to the same group of key contacts as well as to all individual flier respondents. Anyone interested was encouraged to register for the training, which was advertised as free of cost to those affiliated with any Ulu Network organization.
Table 2.1. Demographic Characteristics of Heart 101 Participants, 2010.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Count (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>15 (32.61)</td>
</tr>
<tr>
<td>Female</td>
<td>31 (67.39)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Count (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-30 years</td>
<td>8 (17.39)</td>
</tr>
<tr>
<td>30-50 years</td>
<td>18 (39.13)</td>
</tr>
<tr>
<td>Over 50 years</td>
<td>20 (43.48)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of Experience</th>
<th>Count (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 years</td>
<td>5 (10.87)</td>
</tr>
<tr>
<td>1-2 years</td>
<td>2 (4.35)</td>
</tr>
<tr>
<td>2-5 years</td>
<td>7 (15.22)</td>
</tr>
<tr>
<td>5 or more years</td>
<td>32 (69.56)</td>
</tr>
</tbody>
</table>

n= 46, all participants
Figure 2.1. Self-Identified Ethnic Composition of Heart 101 Participants, 2010.
Enrollment criteria required participants to be 18 years of age or older and current staff of health or community agencies. The first 20 registrants for each presentation of Heart 101 were guaranteed enrollment. All registrants beyond capacity were placed on waitlists for future trainings. Exclusion criteria included prior attendance to the training and lack of English comprehension. Participants who completed all testing data were included in our statistical analyses without discrimination. Subjects were in full-disclosure of the research component to the training (which was determined exempt from review by the University of Hawai’i IRB) and gave written consent to participate.

2.3. **Heart 101 Training Seminar Curriculum Development**

Consistent with community-based participatory research (CBPR) principles, the curriculum and teaching strategies were developed in collaboration with CHW and other staff from several community-based health organizations who serve NHPP. Developers of the initial curriculum prioritized materials and approaches that were (1) interactive, (2) facilitated the delivery and retention of information, and (3) culturally relevant to NHPP. Two external collaborators with clinical CVD expertise reviewed the curriculum for accuracy and clarity. PowerPoint was chosen as the presentation media because of its potential to allow for strong visuals and its ability to be readily formatted for easy distribution. The training curriculum was delivered in modules, which facilitated the participation of multiple instructors and also served as a means for retaining participant interest.

The resulting product, “Heart 101,” is a 5-hour long training seminar taught by a multidisciplinary team. It is delivered in three modules and typically taught over two days, in two to three hour sessions. Module 1, “Introduction to the Cardiovascular System and
Cardiovascular Disease,” is taught by a health educator; Module 2, “Types of Cardiovascular Disease and Their Treatments,” is taught by a clinician (typically a NHPP physician, nurse, or nutritionist); and Module 3, “Successful Strategies for Caring for a Client with Cardiovascular Disease,” is taught by a senior CHW. The curriculum balances a PowerPoint guided lecture with interactive class games, group discussions, and role-play scenarios. A student workbook was also supplied to each participant. The workbook contained the PowerPoint slides from each teaching module, a glossary of CVD terms, nutritional and dietary information, scientific and popular press articles, a variety of locally developed brochures on CVD, and a reference guide on additional sources for CVD knowledge.

Specific aspects of CBE that were incorporated into Heart 101 included: (1) *language*—recognizing and using native or heritage language, (2) *context*—structuring the class in culturally appropriate ways, and (3) *content*—making learning meaningful and relevant through culturally grounded content and assessment. To accomplish this we began by prominently including language, images, and concepts familiar and endearing to NHPP throughout the curriculum and training material. For example, PowerPoint slides discussing the importance of physical exercise in maintaining cardiovascular health featured images of NHPP engaged in traditional and cultural activities like canoe paddling and hula dancing. The same approach was extended to the topic of keeping a heart healthy diet; however, in addition to PowerPoint images depicting popular Hawai‘i cuisine, we also incorporated the use of locally produced nutritional fact sheets for foods unique to Hawai‘i and portion appropriate food models of items important in NHPP diets as teaching tools. A list of strategies and examples is summarized in Table 2.2.
Table 2.2. Examples of CBE Strategies Incorporated into "Heart 101."

<table>
<thead>
<tr>
<th>CBE Principles</th>
<th>Strategies and Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Language</strong></td>
<td>• Use of commonly spoken Hawaiian and Hawai‘i Creole English words and phrases both in colloquial conversations with participants and also in articulating otherwise complicated scientific concepts.</td>
</tr>
</tbody>
</table>
| **Context**    | • Warmly greeting and embracing each participant individually in the traditional Hawai‘i manner.  
• Establishing group cohesiveness by sharing personal and emotional connections to CVD.  
• Acknowledging the importance of group wellbeing with the incorporation of team challenges and small-group discussions.  
• Addressing and referring to well-known and highly respected senior authority figures from the community with culturally appropriate titles (e.g. Aunty, Uncle, Papa, Kumu, Kahu, Kauka, etc.)  
• Presenting lei to invited speakers and other special guests. |
| **Content**    | • Incorporation of Pacific-oriented graphics that emphasize NHPP engaged in traditional NHPP activities in an island setting.  
• Discussions that illustrate health disparities experienced by NHPP and the significance of it in comparison to other ethnic groups.  
• Providing historical perspectives that dispel negative modern stereotypes about NHPP such as NHPP being overweight by nature.  
• Referencing and emphasizing traditional and cultural NHPP diets and forms of physical activities in discussing the importance of maintaining a heart healthy lifestyles.  
• Illustrating CVD risk factors with special attention to those most significant within NHPP communities.  
• Incorporation of specific strategies for working with NHPP clients that promote lifestyle modifications, such as familial, communal, and cultural motivations. |
2.4. Heart 101 Modules

2.4.1. Module 1: Introduction to the Cardiovascular System and Cardiovascular Disease

The first module of Heart 101 begins with an overview of normal cardiovascular anatomy and physiology. This is followed by a brief introduction into the pathologic basis of metabolism-associated disease states of the cardiovascular system. Next, disparities in cardiovascular health faced by various groups, particularly NHPP, are reviewed. Epidemiological evidence gathered from studies and government statistics are used to illustrate community, state, and national disparities of NHPP. The important role of CHW in combating health inequities is emphasized here and throughout the training to build participant self-worth, motivation, and community pride. Some time is also spent to dispel negative, modern stereotypes of NHPP (e.g., traditionally desiring large, round figures for beauty or being averse to work). Historical descriptions of pre-contact NHPP from the journal of Captain James Cook provide evidence of a lean, fit, and healthy people. The virtues of traditional NHPP diets, which are low-in-fat and high in lean protein, complex carbohydrates, and dark greens are highlighted to further illustrate the change in diet and lifestyle that resulted from Western contact and colonization.

Module 1 continues with a discussion on the risk factors that contribute to the development of CVD. Particular attention is paid to those in which NHPP are most at-risk (e.g., obesity, smoking, family history). Here participants are encouraged to be active in a group challenge to list and classify risk factors into the categories of “controllable” versus “non-controllable.” The training then segues into a discussion on strategies for preventing CVD, specifically through lifestyle modifications. Participants are educated on the
American Heart Association guidelines for physical activity and diet; then share ideas for making said guidelines more culturally sensitive to NHPP.

2.4.2. Module 2: Types of Cardiovascular Disease and Their Treatments

The second portion of the training continues to build on the pathophysiologic foundations established during Module 1, but also includes information on the various clinical manifestations of CVD, methods for diagnosis, and treatments. In this unit participants learn the proper medical terminology for conditions of CVD, such as hypertension, atherosclerosis, and dyslipidemia, etc. Lessons on understanding the numbers behind blood pressure readings and plasma lipid profiles are emphasized, as well as warning signs for the complications of CVD (e.g., stroke, myocardial infarction, and congestive heart failure). Participants are also instructed in the pharmacology of agents commonly prescribed in the treatment of CVD. Module 2 stresses the importance of diligence in maintaining care under a physician due to the asymptomatic nature of CVD, which can go undetected and continue to progress in the absence of clinical assessment.

2.4.3. Module 3: Successful Strategies for Caring for a Client with Cardiovascular Disease

The final teaching module examines the roles and importance of CHW in more detail than earlier discussions. Particular focus is placed on the special relationship that CHW share with their clients, and how this contributes to their ability to help manage chronic disease conditions. Prochaska’s “stages of change” is taught to provide a foundation for understanding the general psychological hurdles patients with chronic diseases face in making meaningful lifestyle modifications. Additional psychosocial determinants that make treatment compliance challenging are also examined. Strategies for goal setting and overcoming barriers to better health are then discussed with the aid of personal
experiences shared by the presenting senior CHW. Emphasis is placed on specific educational strategies that promote behavioral changes among NHPP clients, such as familial, communal, and cultural motivations.

At the end of the lecture presentation, training participants are divided into groups of three participants and provided with a set of three case-studies. In role-playing through the case scenarios, participants have an opportunity to practice the skills and concepts they learned over the duration of the seminar. Group members assume the roles of CHW and client, while the third serves to observe the interaction. After allowing the individual groups time to work through a case, the seminar reconvenes as a whole to allow the observers to share their thoughts on the interaction that transpired. Once each observer has shared and discussions have subsided, group members rotate in their roles and proceed to the subsequent case-study as the process begins again.

2.5. Teaching Strategies

2.5.1. Selection of Instructors

Each module is lead by a different instructor. Effort is given to find instructors from the community where each seminar would be held. In addition, each seminar sought to include instructors of NHPP ethnicities. The curriculum developers believed that the training would be most effective with a multi-disciplinary team of instructors. They concluded that CHW participants would gain from: (1) multiple perspectives, (2) an increased awareness of instructors as community-based resources, and (3) exposure to a variety of role models for CHW.

I personally served as both the training organizer/facilitator and Module 1 health educator for each of the three Heart 101 seminars examined in this evaluation. My Native
Hawaiian and Filipino heritage, as well as my rural upbringing, equipped me with an intimate understanding of the CBE strategies employed in our curriculum, while my family history of CVD gave credibility to my emotional ties to the disease. Being present throughout each of the trainings also allowed me to maintain a consistent standard of education for all of the seminars.

Clinicians with a strong understanding of community medicine were sought as instructors of Module 2. Typically a NHPP physician, RN, or nutritionist from the community hosting the training would deliver the curriculum. It was important to have health professionals featured prominently in the training to help build participant self-worth by emphasizing that CHW serve as their partners in delivering health management. Demonstrating their support for the hard work that CHW contribute also helped to make the clinician more accessible to serve as role models for Heart 101 participants.

For Module 3 the curriculum was always administered by a senior CHW. These are usually individuals who have garnered significant respect and influence within their CHC and community through years of ardent service. Many times these senior CHW are so revered within their respective organizations that they have traditional titles of respect, like “Aunty” or “Uncle,” bestowed upon them by their colleagues. In NHPP culture oral traditions continue to be very important in the transference of knowledge; therefore, everyone pays special attention when respected individuals take the time to share their insights. This is what makes the senior CHW role in presenting Module 3 especially powerful.

Once selected, instructors were encouraged to incorporate any community or NHPP cultural practices appropriate to the setting to establish personal, familial, and geographic
connections to students. This was part of a specific strategy to create a culturally sensitive learning environment. Relaxed and informal interactions were established by individually greeting each participant in the traditional Hawai‘i manner as they entered the training classroom. Rapport among the participants and with the training facilitator was further built through the sharing of personal and emotional connections to CVD in a self-introduction icebreaker. Personal testimonials about working with patients and loved ones afflicted with CVD were encouraged during group discussions around related case-studies.

The objective was for participants to think about cardiovascular health and disease within the context of their community and culture. It was believed that this approach would make learning about challenging scientific concepts more relatable to the large segment of non-traditional students who attended our Heart 101 trainings.

2.5.2. Interactive Learning

The curriculum developers recognized it was critical to engage the CHW participants, understanding that many may be resistant to the classroom rigor for new and complex material. The importance of repetition for ensuring that the information presented would “stick” was another area of focus. As such, review activities were designed to help break-up the monotony of the lecture-based presentation and lighten the mood after emotional discussions of the impacts that CVD can have on peoples’ lives. Among the most popular of these activities was a “Jeopardy” inspired review game. Just as in the game show, participant teams were challenged to two rounds of questions (i.e., “Jeopardy” and “Double Jeopardy”). Teams were determined at random by having each participant draw a puzzle piece out of a hat. Groups of four were formed as participants mingled in search of others with the correct pieces to complete their puzzles. Once completed the puzzles
revealed artwork (by the historic Native Hawaiian painter Herb Kane) depicting pre-contact Native Hawaiians engaged in activities that traditionally helped to maintain physical fitness, such as farming, sailing, hula dancing, and canoe building. Group names were chosen to keep track of points earned for correct answers or lost for incorrect answers. “Jeopardy” contained nine questions from the information presented in Module 1, while “Double Jeopardy” contained another set of nine questions, but from the information in Module 2. The winning group received small novelty prizes.

A primary strategy in making Heart 101 interactive was the incorporation of many group-oriented activities. In NHPP culture, collective wellbeing is emphasized over individual achievements; therefore, the importance of motivating participants through group challenges for increasing the level of cognitive engagement in the training became a prime focus.

2.6. Evaluation Tools

2.6.1. Knowledge Tests

Pre-, post-, and 6-month post-training evaluations were administered to seminar participants to assess gain and retention of CVD knowledge. All three evaluations were identical in content and consisted of 16 multiple-choice questions, 15 of which were selected from the “Coronary Heart Disease Knowledge Test” developed and validated by the University of New Mexico Wellness Center and Southwest Cardiology Associates. These questions tested on cardiovascular health concepts related to signs, symptoms, medications, and risk factors, including exercise and stress. A final question was added from the “Dutch Heart Failure Knowledge Scale,” developed and validated with the support of the Netherlands Heart Foundation, in order to assess knowledge of normal cardiovascular
The evaluation tested exclusively on content covered over the course of the seminar (Table 3.3).

2.6.2. Satisfaction Survey

In addition to the knowledge test, participants were also asked to complete a satisfaction survey at the closing of the seminar. The survey consisted of four open-ended questions inviting participants to comment on the most and least liked aspects to the seminar, how the seminar should be improved, and what information (if any) should be added. Answers were coded and tallies of the most frequent answers were assessed. In addition, a performance rating section asked participants whether they agreed, were not sure, or disagreed with nine questions assessing: 1) communication abilities of the educators; 2) length of training; and 3) content, scope, and complexity of the seminar.

2.7. Data Collection

We examined seminar participants from three training seminars held during January, April, and May of 2010, on Maui, O'ahu, and Hawai‘i Island, respectively. Data collected from all 46 participants of these trainings were reviewed; however, only the thirty participants who attended all 5 hours of the seminar and fulfilled all of the training requirements (i.e., consent form, demographic survey, pre-test, and post-test) were included in the initial analysis of changes in knowledge.

To measure knowledge gained from pre- to post-seminar, our CVD knowledge test was given before any education was delivered and again at the very end of the seminar. No strict time limits were enforced for completing the evaluations, but participants were generally encouraged to finish within about 15 minutes of starting. Participants were instructed not to discuss questions or share answers during the testing period.
For our six-month post-training analysis of knowledge retention, the same CVD knowledge tests given pre- and immediately post-seminar were sent out electronically via email to all participants included in the initial evaluation of knowledge gain. Up to three reminder emails were sent to participants who were not responsive, with a final hard copy mailed 26-weeks post-training. Participants received a small incentive upon completion of the 6-month post-training follow-up evaluations.

2.8. Data Analysis

Each participant was assigned a unique ID# and pre-, post-, and 6-month post-test scores were analyzed using JMP software, a SAS-FSP based statistical analysis software program. Paired t-tests compared differences in the mean values for baseline (pre-seminar) and post-seminar to measure knowledge gained from the training. Subsequent paired t-tests compared the mean values for baseline and 6-month follow-up to measure retention and gain of knowledge following training.

An additional question-by-question analysis was performed to measure increases in participant knowledge of various cardiovascular health subtopics taught over the course of the seminar. Here paired t-tests compared the proportion of correct answers from pre- to post-seminar for each individual question of the knowledge test.
Chapter 3. Results

3.1. Cardiovascular Health Knowledge Gained from Pre- to Post-Seminar

Of the 46 individuals who attended the three classes examined, 30 had complete sets of usable data (i.e., demographic survey, satisfaction survey, pre-test, and post-test). In total, these participants demonstrated a statistically significant (P < 0.0001) improvement in mean test scores from 11 points at pre-seminar to 14.77 points at post-seminar (Table 3.1). This reflects a 34.3% increase in the mean test score.

3.2. Cardiovascular Health Knowledge Retained 6-Months Post-Seminar

The group of individuals who submitted 6-month post-seminar tests, in addition to complete sets of usable data collected at the time of training (n=20), also demonstrated improved mean test scores from pre-seminar (12.1 pts.) to post-seminar (14.75 pts.). Moreover, there remains an increase in mean test scores at 6-months post-seminar (14.15 pts.) compared to baseline (Table 3.2).

3.3. Participant Satisfaction Evaluations

The satisfaction survey showed that the majority of participants enjoyed the seminar, and found them to be informative, understandable and engaging. In responding to what they liked best about Heart 101, participants most frequently answered (1) good information, (2) that information was presented well, and (3) that they really enjoyed the trivia games and group activities. One participant sums this up nicely by stating that the material was presented by “local presenters in a local style; sharing interesting info that can easily be understood.”
Table 3.1. CHW test scores for participants who submitted Pre- & Post-Seminar Test.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>n=30</td>
<td>30</td>
</tr>
<tr>
<td>Mean Pre-Seminar Test Score</td>
<td>11</td>
</tr>
<tr>
<td>Mean Post-Seminar Test Score</td>
<td>14.77</td>
</tr>
<tr>
<td>Mean Difference (SD)</td>
<td>3.77</td>
</tr>
<tr>
<td>P value</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
Table 3.2. CHW test scores for participants who submitted Pre-, Post-, & 6-Month Post-Seminar Test.

<table>
<thead>
<tr>
<th>n=20</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Pre-Seminar Test Score</td>
<td>12.1</td>
</tr>
<tr>
<td>Mean 6-Month Post-Seminar Test Score</td>
<td>14.15</td>
</tr>
<tr>
<td>Mean Difference from (SD)</td>
<td>2.05</td>
</tr>
<tr>
<td>P value</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
Figure 3.1. CHW test scores for all participants who completed pre-, post, and 6- month post-seminar tests, 2010. (n=20; P<0.0001 for change in test score from pre-seminar to post-seminar, and from pre-seminar to 6-month post-seminar.)
The results of the performance rating section was also overwhelmingly positive, with more than 95% of respondents selecting the highest degree of satisfaction for eight of the nine participant perceptions assessed. The lone outlier reflected a main complaint about Heart 101 that the time allotted for the training was too short. A number of participants also noted that they would appreciate more information on alternative/traditional treatments and ways to better help patients without insurance.

3.4. Question-by-Question Analysis of Knowledge Tests

For this evaluation we reviewed knowledge tests from the same 30 participants included in our initial analysis of CVD knowledge gain from pre- to post-seminar. Here we found that the frequency of participants selecting correct answers increased from pre-seminar to post-seminar for each of the 16 cardiovascular health questions used in our evaluation—12 of which showed statistical significance (P =0.0434 to P <0.0001). At post-seminar the proportion of correct answers was 83.33% or higher for all test questions (Table 3.3).
Table 3.3. Frequency and Proportion of Correct Answers on CVD Knowledge Tests
(N=30).

<table>
<thead>
<tr>
<th>CVD Subtopic</th>
<th>Question</th>
<th>Pre-Test n (%)</th>
<th>Post-Test n (%)</th>
<th>Percent Change</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| CHD Signs, Symptoms, & Medications | 2. The most common disease of the circulatory system among people in the United States is:  
 a. Heart attack  
 b. Stroke  
 c. High blood pressure  
 d. A blood clot in blood vessels of the heart | 22 (73.33%)    | 29 (96.67%)    | +23.34%        | 0.0059   |
|                       |                                                                          |                |                 |                |          |
|                       | 6. The condition in which the pumping power of the heart is reduced to the point where fluids begin to collect in the lungs and extremities is known as:  
 a. Arrhythmias  
 b. Congestive heart failure  
 c. Coronary spasms  
 d. Tachycardia | 26 (86.67%)    | 28 (93.33%)    | +6.66%         | 0.3256   |
|                       |                                                                          |                |                 |                |          |
|                       | 8. Beta-blockers are drugs that:  
 a. Reduce heart rate & blood pressure  
 b. Improve heart-muscle contractibility  
 c. Interfere with blood-clotting ability  
 d. Are used to reduce blood lipids | 21 (70%)      | 27 (90%)       | +20%           | 0.0314   |
|                       |                                                                          |                |                 |                |          |
|                       | 12. An occlusive blood clot that results in a small area of dead heart muscle is called:  
 a. A myocardial infarction  
 b. A stroke  
 c. Endocarditis  
 d. A pulmonary infarction | 20 (66.67%)    | 28 (93.33%)    | +26.66%        | 0.0089   |
| Risk Factors          | 4. A risk factor of coronary artery disease that you CANNOT change is:  
 a. Lack of exercise  
 b. Heredity  
 c. Obesity  
 d. Stress | 29 (96.67%)    | 30 (100%)      | +3.33%         | 0.3256   |
|                       | 7. The single most preventable cause of death and disease in the United States is:  
 a. Drug abuse  
 b. Environmental pollution  
 c. Poor nutrition  
 d. Smoking | 17 (56.67%)    | 30 (100%)      | +43.33%        | <0.0001 |
|                       | 15. Which of the following blood fats is thought to lower your risk of coronary artery disease:  
 a. High density lipoprotein  
 b. Low density lipoprotein  
 c. Cholesterol  
 d. Triglycerides | 18 (60%)      | 27 (90%)       | +30%           | 0.0014   |
| Exercise | 11. Which of the following is a direct benefit of exercise:  
| a. Reduced work of heart for a given workload  
| b. Reduction of fat cells  
| c. Enlarged lungs  
| d. Increasing resting heart rate | 14 (46.67%) | 26 (86.67%) | +40% | 0.0001 |

| 14. The best type of physical activity to maintain cardiovascular fitness is __________ exercise:  
| a. Anaerobic  
| b. Aerobic  
| c. Non-aerobic  
| d. Dynamic | 26 (86.67%) | 30 (100%) | +13.33% | 0.0434 |

| 16. The symptoms of angina pectoris after physical exertion include:  
| a. Numbness of the legs  
| b. Prolonged, severe chest pain  
| c. Pain in the right arm  
| d. Temporary chest pain | 16 (53.33%) | 25 (83.33%) | +30% | 0.0014 |

| Diet | 5. Most Americans could benefit from diets:  
| a. Lower in complex carbohydrates and higher in protein  
| b. Lower in complex carbohydrates and lower in fat  
| c. Higher in complex carbohydrates and higher in fat  
| d. Higher in complex carbohydrates and lower in fat | 17 (56.67%) | 26 (86.67%) | +30% | 0.0014 |

| 10. The type of fat that is solid at room temperature is called:  
| a. Saturated  
| b. Monosaturated  
| c. Polyunsaturated  
| d. Unsaturated | 21 (70%) | 29 (96.67%) | +26.67% | 0.0029 |

| 13. A reasonable weight loss goal is:  
| a. 1 pound a day  
| b. 2 pounds a day  
| c. 2 pounds a week  
| d. 5 pounds a week | 25 (83.33%) | 27 (90%) | +6.67% | 0.4888 |

| Stress | 3. Which of the following is a physiologic response to stress:  
| a. Feeling hungry  
| b. Slower heart rate  
| c. Decreased metabolism  
| d. Increased blood pressure | 29 (96.67%) | 29 (96.67%) | 0% | 1 |

| 9. What is the relationship between stress and atherosclerosis:  
| a. Atherosclerosis is a major cause of stress  
| b. Elasticity of the arterial walls will increase with atherosclerosis  
| c. A single stress, by itself, is both necessary and sufficient to cause atherosclerosis  
| d. The stress response causes cholesterol to be circulated in the bloodstream to aid in muscle activity | 9 (30%) | 25 (83.33%) | +53.33% | <0.0001 |
The questions here are numbered as they appear on the actual knowledge tests provided to training participants included in our analyses. Correct answers are denoted by the underlined corresponding letter choice. An asterisk identifies the sole question taken from the “Dutch Heart Failure Knowledge Scale,” while all others were compiled from the “Coronary Heart Disease Knowledge Test” as described in our methods.

<table>
<thead>
<tr>
<th>Normal Cardiovascular Physiology</th>
<th>*1. What is the main function of the heart:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a. To absorb nutrients from the blood</td>
</tr>
<tr>
<td></td>
<td>b. To pump blood around the body</td>
</tr>
<tr>
<td></td>
<td>c. To provide the blood with oxygen</td>
</tr>
<tr>
<td></td>
<td>d. To remove wastes from the body</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 (80%)</td>
</tr>
<tr>
<td></td>
<td>29 (96.67%)</td>
</tr>
<tr>
<td></td>
<td>+16.67%</td>
</tr>
<tr>
<td></td>
<td>0.0226</td>
</tr>
</tbody>
</table>
Chapter 4. Discussion

Our findings provide convincing evidence for the acceptance of our hypothesis—an interactive and culturally competent curriculum on CVD for training CHW who serve NHPP does indeed result in an increase and retention of cardiovascular health knowledge among training participants. Specifically, the significant increases in mean test scores from pre- to post-seminar demonstrate gains in knowledge, while the increase in the mean test score from pre- to 6-months post-seminar indicate retention of cardiovascular health knowledge following training.

4.1. Efficacy of Heart 101 for Training CHW in CVD Knowledge

As a culturally relevant and interactive training tool, Heart 101 serves as an effective model for educating CHW in cardiovascular health knowledge. The curriculum and training strategies of Heart 101 provides participants with a foundation of cardiovascular health knowledge, and offers skills to build on their ability to deliver CVD self-care and management information to NHPP.

Based on instructor and participant feedback, we believe that the success of Heart 101 can be attributed to the training’s culturally relevant curriculum, team teaching approach, and interactive class activities. These three teaching strategies provide non-traditional students with a cardiovascular health training that is conducive to their learning preferences. The program’s incorporation of practical knowledge, group cohesion, and its emphasis on personal connections to CVD seems to foster strong student engagement.

Use of CBPR principles in the development of Heart 101 may have also contributed to the success of the training, particularly in regards to the cultural and community
relevancy of curriculum content, teaching strategies, and implementation efforts. It also helped to foster a sense of community ownership and generate interest in the training—factors which likely added to strong participation by numerous health agencies. The positive community response to Heart 101 may in turn help to build research infrastructure among groups in Hawai‘i who have been traditionally averse to the infiltration of research into their health-serving organizations.

Although the Hawaiian Cultural Influences on Education (HCIE) theoretical model (Fig 1.5) was not used as the foundation for specific CBE strategies incorporated during the development of Heart 101, retrospective analysis of the curriculum reveal the presence of numerous principles outlined in the model and is believed to have contributed to the success of the training. Particularly affective for engaging Heart 101 participants was the cultural context in which the course was structured to create continuity between subject matter and the learners’ community environment. Most often this meant implementing approaches that involved delivering complex information in a casual manner, relatable to the learner. Other communities have also demonstrated the successful use of culturally relevant programs in the training of their CHW, some of which contain familiar elements of CBE. A notable example in another indigenous community was a 5-day wellness course on health promotion and disease prevention delivered to Alaska’s village-based CHW. The training incorporated Alaska Native cultural values and traditions that emphasize the interconnected relationships of family, community, and the land, as well as art and storytelling. By the end of the training 98% of participants felt more confident in their knowledge and ability to present community wellness information.
Finally, principles of adult learning theory may also have played a part in the statistically significant improvements in knowledge demonstrated by participants of Heart 101. At the core of this school of thought is the idea that adult learning is driven by factors dramatically different from those that motivate more youthful students. Renowned expert in adult education Malcom S. Knowles contends that adults (1) have a need to know why they should learn something, (2) have need to be self-directing, (3) have a greater volume and different quality of experience than youth, (4) become ready to learn when an experience in their lives which call for it, (5) enter into a learning experience with a task-centered orientation, and (6) are motivated to learn by both extrinsic and intrinsic motivators.\textsuperscript{49} Heart 101 takes advantage of a number of these factors. One example is the utilization of role-playing scenarios that place participants in the familiar situation of working with change-averse clients. Such a task-oriented exercise helps CHW participants to realize why they should expand their knowledge of CVD, while simultaneously allowing them to play off of the skills that they have gained through their experiences.

4.2. **Implications of Knowledge Test Results for Heart 101 Curriculum**

A question-by-question data analysis of the knowledge test results offers insight about general CHW knowledge and areas for improvement in the Heart 101 curriculum. Overall there were clear improvements in knowledge scores for each test question; however, there also remained some degree of variation in the frequency of correct answers by question at post-seminar (Table 3.3). When the 15 test questions of the “Coronary Heart Disease Knowledge Test” were reviewed by cardiovascular health subtopics (as designated by the source test creators), only very minimal differences were found between subtopic groups. A broader categorical review including all 16 test questions, however, indicate
baseline understanding to be higher on questions dealing with clinical knowledge (e.g., medication, signs and symptoms, etc.), as opposed to those testing a more basic science understanding of cardiovascular health (e.g., physiology, pathophysiology, nutrition, etc.). This is understandable because many CHW are hired by health agencies in Hawai‘i with only modest levels of educational attainment, principally high school diplomas or equivalencies, but likely have personal and job experience in the care of patients afflicted with CVD and its risk factors.

These findings highlight the importance of incorporating more basic science foundations into the chronic disease education of CHW. To be more effective in motivating the patients they serve, CHW should have a better understanding in the scientific bases of lifestyle modifications vital to managing chronic diseases. This is particularly significant in working with Indigenous and immigrant groups, like NHPP, who may not fully understand the benefit of modern healthy eating and exercise. For example, NHPP traditionally received the physical activity needed for proper health as part of a subsistence lifestyle that required constant rigorous labor. In moving away from an agrarian and into a post-industrial society, there arises a new need for individuals to purposely incorporate physical activity into their daily routines, a need that is often poorly recognized. A stronger understanding in the basic sciences of chronic diseases would benefit the efforts of CHW by providing them with more tools for working with patients towards improved lifestyle measures for better health.

In further evaluating areas of strength and weakness specific to the Heart 101 curriculum, we examined percent change in the frequency of correct answers from pre- to post-seminar by question individually. Here we found that questions exhibiting the
smallest degree of change were also those that failed to demonstrate statistical significance (question #’s 3, 4, 6, & 13). In all but one case these turned out to be questions with the highest baseline scores, which accordingly left very little room for improvement. The lone exception was question #13 which tested for knowledge of what should be considered a reasonable weight loss goal. Although the baseline score for this question was still quite high, the lack of improvement at post-seminar relative to similarly scored questions highlights a possible need to incorporate more discussion of weight loss strategies in the context of sustained healthy lifestyle modifications. The tested content of the remaining questions of this group vary slightly, but generally follow the trend we noted earlier of strong baseline scores in clinical knowledge. One of these questions (#4), which asks participants to select the risk factor for coronary artery disease that cannot be changed, may need to be removed from the evaluation as a correct answer can be inferred without background knowledge based on wording of the question prompt.

The question that demonstrated the strongest level of improvement (#9), which was also least often answered correctly at baseline, asked participants to identify the relationship between stress and atherosclerosis. In addition to its focus on basic science principles (an already stated weakness in CHW knowledge), it represents another potential problem area. The case may be that this question posed the greatest degree of difficulty because of its inclusion of the term “atherosclerosis.” We can report anecdotally from our experiences working with CHW of their general deficiency in comprehension of technical medical terminology. Often CHW are able to demonstrate their knowledge of the clinical features of various health conditions when the colloquial terms are used, but have difficulty when asked about the same condition using the proper medical term (e.g., high blood
pressure versus hypertension). The potential need to increase training in medical terminology further point to the importance of focusing more effort on the non-clinical education of CHW.

4.3. Study Limitations

A significant limitation to this evaluation is the lack of a control group. While scientific evidence through pre-post knowledge tests shows that Heart 101 is indeed effective for increasing cardiovascular health knowledge in CHW who serve NHPP, we are unable to report with the same level of confidence on how the innovations of cultural competency and interactivity contribute to its success. Ideally, this might be evaluated in a comparison of our findings here to that of a CHW training program identical in scholastic content to Heart 101, but devoid of all strategies meant to keep the seminar culturally relevant and interactive. Though a deeper understanding of said influences is both desirable and important, we realize that inherent in working within a CBPR framework is the community’s unwillingness to supply a control group.

Another considerable limitation to these efforts is the modest sample sizes. While a total of 46 individuals participated in three separate Heart 101 training workshops, held on O‘ahu, Maui and Hawai‘i Island throughout the first half of 2010, only 30 could be evaluated with data comparing pre- and post-seminar knowledge. Twelve participants were given a defective form of the test and four others were excluded because either a post-test was not completed or a consent form was not obtained. Even less (only 20 participants) provided the necessary data for the evaluation of knowledge retention at 6-months post-seminar. Furthermore, the study design did not incorporate any randomization of participants—all
who applied to participate were admitted, with all those beyond capacity allowed in the next available seminar at the nearest location.

There is also uncertainty in whether or not our long-term knowledge review reflects an actual retention of the concepts taught during the seminar. It may alternatively be that Heart 101 instead helped to increase the general intellectual ability of participants to deal with cardiovascular health information on their own. A similar question-by-question analysis as that discussed earlier may help to shed light over this concern. Further, an ANOVA analysis would help to account for any variances between the groups evaluated in the pre- to post-seminar knowledge review versus that of the longitudinal review.

Limitations in the participant satisfaction survey may exist as a reflection of the general positive and nurturing attitudes of CHW. While these qualities are appropriate and desirable to the nature of work they perform, it may have prevented survey respondents from being completely forthcoming with their most critical critiques of the training.

4.4. Summary

As demonstrated in our analyses of knowledge gain and retention, we conclude that a culturally relevant and interactive course, such as Heart 101, is a strong approach for cardiovascular health information dissemination to CHW in Hawai‘i. The success of the training can be measured in the overall improvement of scores, improvement in key areas of CVD knowledge, and retention of knowledge over time. The positive feedback received in participant satisfaction surveys offer additional support for our methods.

We believe that a training program modeled on the CBPR and culturally competent principles, as demonstrated in Heart 101, could serve as a standardized model for culturally competent health education training for CHW in Hawai‘i. Achieving this might
not only lead to improved patient care and capacity building within the state’s community health systems, but could also offer benefits for career development and advancement for this important class of healthcare worker.

The demographic data collected for participants of Heart 101 closely mirror that of the broader CHW workforce as defined by recent nationwide studies, specifically as it relates to the large proportion of minority women, age 50 years and older who attended the training. Nevertheless, the collection of more detailed demographic information from Heart 101 participants—including data on education, training, and past work experience—would be beneficial to better understand of the local CHW workforce and their needs and competencies. This information would be especially valuable in light of the fact that none of the national studies have surveyed CHW working in Hawai’i in their compilations of demographic data.

In the future, collection of data on participant perceptions for changes in self-confidence/self-ability would be helpful for assessing short-term study outcomes. Additional research in the area of health education training for CHW includes examining whether or not Heart 101 training influenced CHW activities and job performance. While beyond the scope of our investigation to understand the success of our curriculum as a tool for educating CHW in Hawai’i, it may also be enlightening to compare cardiovascular health outcomes in patients working with Heart 101 trained CHW against those working with CHW who have not yet been attended a Heart 101 seminar. Finally, although Heart 101 was developed specifically for CHW serving NHPP, we believe that other communities may be able to successfully adopt our strategies, particularly cultural relevancy, to the specific needs of their respective CHW.


collaborative employing community health workers to improve heart health. *Journal of Health Care for the Poor and Underserved, 23*, 988-999.


