Evaluation of the National Kidney Foundation of Hawai'i's Kidney Early Detection Screening Program

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Abstract

Purpose: *Discussion of the formative program evaluation results of the National Kidney Foundation of Hawai'i (NKFH) Kidney Early Detection Screening (KEDS) program for Chronic Kidney Disease (CKD). The formative program evaluation had 921 participants who enrolled in the NKFH KEDS screening program between 2006-2009. The evaluation included 14 KEDS sites in Honolulu, Maui, and Hawai'i counties.*

Main Findings: *Based on the results of the formative evaluation, process changes were made to program recruitment, training, and procedure. A majority of participants were women, between 46 and 75 years old. The ethnic groups represented were: White, Japanese, Hawaiian/Part Hawaiian, Filipino, Chinese, Hispanic, and Other. The three most common risk factors identified were: (1) blood relative with diabetes, (2) blood relative with cardiovascular disease, and (3) self-reported high blood pressure. Participants in Hawai'i County had the highest mean for total risk factors. Ethnicity, gender, and age were significantly associated with selected vital signs, physiological measures, and lab tests. Fourteen percent of KEDS participants had an abnormal albumin:creatinine (A:C) ratio and 12% had an abnormal glomerular filtration rate (GFR), requiring follow-up by a health care professional.*

Principal Conclusions: *The KEDS formative program evaluation findings improved program planning and implementation. Summative program evaluation and implications for conducting research studies in this area will be the next step in the evaluation process.*

Keywords

Health Screening Program, Health Promotion, Disease Prevention, Program Evaluation, Chronic Kidney Disease

Introduction

Chronic Kidney Disease (CKD) is one of the ten leading causes of death in the United States.[1] According to the most recent national estimates by the Centers for Disease Control and Prevention (CDC), 16.8% of US adults aged 20 and older had CKD between 1999-2004.[2] While comprehensive state-level data exists on End Stage Renal Disease and treatment, no state-specific data are available on CKD and its early stages. Applying national estimates of CKD prevalence to the population in Hawai'i, an estimated 156,000 local adults aged 20 and older may have CKD and another 100,000 are at-risk.[2,3]

CKD is a debilitating disease and a majority of patients die before being placed on long-term dialysis or receiving a kidney transplant.[4] Dialysis treatments average four to five hours per visit, three times per week. The cost of care for dialysis patients ranges from $60,000 - $80,000 per person per year.[5] Using an average of $70,000, the estimated cost of treatment for Hawai'i's 2,700 dialysis patients exceeds $180 million a year.[5]

Hawai'i's kidney failure rate is 30% higher than the national level.[6] A large proportion (88%) of our kidney patients on dialysis are of Asian and/or Pacific Island (API) ancestry with major ethnic groups being Japanese (26.7%), Filipino (24.7%), and Native Hawaiian (17%).[6] The percentage breakdown of the State of Hawai'i population based on Japanese, Filipino, and Native Hawaiian was 13.6%, 14.5%, and 5.9%, respectively.[7] In 2005, the National Kidney Foundation of Hawai'i (NKFH) developed the Kidney Early Detection Screening (KEDS) program to raise awareness about individual risk for kidney disease and stimulate early screening of risk factors among people in Hawai'i. KEDS is a free-standing health screening which was adapted from a national program called Kidney Early Evaluation Program (KEEP).

Hawaiian values of collaboration (laulima), inclusiveness (kakou), and responsibility (kuleana) were emphasized in the development and operation of KEDS.[8] Key informants from community health centers, state hospitals, and other community agencies helped guide decisions on how to recruit participants and partner with local organizations. Community outreach workers served as participant recruiters, having already established a rapport with many of the area residents. Community-based businesses offered support in the form of manpower, facilities, advertisement, and donated supplies. Finally, health care professionals (ie, physicians, nurses, medical technicians, pharmacists, dietitians, and community health workers) volunteered their time to make the screening culturally sensitive and "welcoming" for the local community.

The purpose of this article is to describe the formative program evaluation results of the Kidney Early Detection Screening (KEDS) program for CKD conducted in Hawai'i from 2006 to 2009. The article will specifically address KEDS program objectives: (a) utilize a grassroots, community-based approach when collaborating with partners to implement the program and (b) collect data and observe trends in CKD prevalence and risk in selected communities.

Methods

Design

This is a formative program evaluation of the NKFH KEDS program. The program evaluation was approved by the University of Hawai'i at Manoa Committee on Human Studies.

Participants

The participants, regardless of health insurance or health condition, ethnicity, or gender, were encouraged to participate in KEDS without a fee. This "open door policy eliminated barriers to participation, and provided the NKFH with an opportunity to cast a "wider net" by reaching those at possible risk for CKD. The

eligibility criteria for the evalualtion included: (1) enrollment in a KEDS screening program between 2006-2009, (2) 18 years and older, and (3) residents of the State of Hawai'i. Based on this enrollment eligibility criteria, 921 of the 1014 participants (90.8%) were included in this formative program evaluation. A total of 93 participants (9%) were excluded because they did not meet the enrollment eligibility criteria.

Settings

Of the fourteen KEDS events, six were held in Honolulu County, six in Maui County, and two in Hawai'i County. Five events were held in urban (metropolitan) O'ahu and the other nine were held in rural (non-metropolitan) areas of the State (ie, Hilo, Kahului, Hana).[9] The KEDS sites ranged from shopping malls, community colleges, community health centers, hospitals, community centers, and the Hawai'i State Capitol. Venues were chosen collaboratively with community partners and on several criteria such as adequate space, availability, affordability, convenience, and accessibility to the public. Other logistical requirements were the presence of electrical outlets, adequate number of bathrooms, moderate room temperature and/or air conditioning, and tables and chairs.

Data Collection Forms

KEDS program evaluations after each event were used to collect information on recruitment of participants, training of volunteers, and program procedures. Participant demographic information including gender, age, ethnicity, zipcode, and individual/total risk factors were obtained for purposes of marketing and planning future programs. Clinical risk factors included a medical history of diabetes, hypertension, or hypercholesterolemia; a family history of diabetes, cardiovascular disease, or kidney disease; or a social history of cigarette smoking. Anthropometric measurements of blood pressure (BP), height, weight, body mass index (BMI), and lab values (ie, glomerular filtration rate (GFR), fasting and non-fasting glucose levels, total cholesterol, urine microalbuminuria, and albumin to creatinine ratio [A:C ratio]) were obtained.

The two assessment forms utilized in the KEDS program evaluation were the NKFH KEDS Participant Form and the Hilo Medical Center Assessment Form. Five content experts from the NKFH and the University of Hawai'i School of Nursing and Dental Hygiene at Manoa completed a content analysis to compare both forms. After careful review, they concluded that although there were slight differences in the wording of questions, the two forms were similar in content. Process improvements for future evaluations will need to include standardization of screening forms (ie, rewording of risk factor questions, use of categories similar to national surveys, questions eliciting information about participant use of medications, revising ethnicity categories to include additional ethnic groups).

Data Analysis

Descriptive statistics were used to characterize the participants who came to the KEDS program and to detect trends in CKD prevalence. Data was collected on participants' demographic characteristics, risk factors (total and individual), vital signs, physiological measures, and lab values (blood and urinalysis) (see Tables 1, 2, and 3). Pearson's chi-square tests were performed on demographic characteristics (gender, ethnicity, and age) with BMI, total cholesterol, microalbuminuria, A:C ratio, GFR, systolic and diastolic BP readings, and glucose (fasting and non-fasting). The significant *P*-value cutoff was 0.5. Ethnicity included seven major ethnic categories: Hawaiian/Part Hawaiian, Japanese, Chinese, Filipino, White, Hispanic, and Other.[10] Age categories included 18-30, 31-45, 46-60, 61-75, and 75 years or greater.[11] BMI, total cholesterol, systolic and diastolic BP, non-fasting and fasting glucose were re-coded to provide sufficient numbers in each category and easier interpretation.[12-17] Data was entered into an Excel file and transferred to SPSS-PC Version 18 for analysis.

Results

Recruitment of Participants and Lessons Learned

A standard protocol consisting of fliers and radio/newspaper ads were utilized. Word of mouth, "snowball effect," and use of key informants proved effective in smaller communities (such as Hana, Maui).[18] For screenings held in larger communities on O'ahu (Honolulu County), interested participants could walk-in or pre-register by phone. A lesson learned was that a "one-size-fits-all" approach does not work when marketing the program to different communities. It was best to consult with key informants in the community. Strategic placement of banners, T-shirt giveaways, and other grassroots tactics were successful in smaller rural communities, whereas radio, newspaper, or television ads worked best in larger urban areas such as Honolulu. Attempting to utilize radio or newspaper ads in smaller, rural communities was not as successful.

Training of Volunteers and Lessons Learned

Approximately 25 to 45 volunteers were present at each event. Volunteers consisted of students in the health professions, health care professionals, and lay individuals. A standardized orientation was conducted prior to each event and included: (a) screening purpose and program procedures, (b) paperwork and documentation, (c) interviewing techniques, (d) equipment protocols for blood testing, (e) physical measurements, (f) urinalysis, and (g) screening follow-up recommendations. KEDS events relied solely on trained volunteers. While some community volunteers participated regularly, a majority of volunteers at each event were new. Not only was training time consuming, but standardizing the training procedure was difficult. As a result, a series of short training segments was created on YouTube (http://www.youtube.com/kedsorientation) so that new volunteers could access the standardized training at their convenience.

Program Procedure and Lessons Learned

A typical KEDS event consisted of five stations, in the following order: Station One, Registration; Station Two, Physical Measurements; Station Three, Urinalysis; Station Four, Blood Draw; and Station Five, Exit Interview (Clinician Consultation).

Station One-Registration: Participants signed in and completed the assessment form. Community volunteers were on hand to assist individuals with visual impairments or language barriers.

Station Two-Physical Measurements: Student or professional volunteers performed BP readings and height and weight measurements. For most events held in Honolulu County, volunteers used a Welch-Allyn Spot Vital Signs (420 Series) BP monitor and a Tanita BWB-800 digital weight scale. BP cuffs were fitted for proper arm size and clothing was removed on the left or right upper arm of participants.

Station Three-Urinalysis: Volunteers provided participants with a specimen cup and instructions on how to provide a "clean-catch" urine sample. Specimens were processed utilizing either a Clinitek 50 or Clinitek Status Analyzer. Bayer/ Siemens Diagnostics Microalbumin Reagent test strips were utilized.

Station Four-Blood Draw: Venous or capillary blood specimens were collected by professionals skilled in phlebotomy. Venous blood draw specimens were transported via couriers to local laboratories for processing. For capillary blood specimens, Accu-Check Aviva blood glucose meters and test strips by Roche were used.

Station Five-Exit Interview: Clinicians conducted brief (approximately 5-10 minute) interviews with participants and reviewed screening results. General recommendations and education regarding risk factors for CKD were also provided. Participants with concerns or abnormal results were advised to follow-up with their primary care providers. Venous blood specimen results were mailed to the participants' homes seven to ten days after the screening.

It was discovered that certain process functions could be monitored to increase the success of KEDS. Arranging stations from least invasive to most invasive maximized comfort and cooperation from participants, allowing for improved accuracy of measurements and quality of participant/clinician experience. Secondly, when participants turn-out was high (75 or more participants), it was not advisable to allow participants to "skip stations" or "fall out of order." Many participants would request to proceed to the next station rather than wait, however, doing so impeded the coordinator's ability to keep participants moving through the stations in an organized manner. If the screening turn out was less than 60 to 70 people, allowing participants to proceed out of order through the stations was manageable with an experienced coordinator. Lastly, it was not recommended that community screenings accommodate more than 150 individuals per day. Screening beyond 150 people in one day diminished the quality of the screening as volunteers became fatigued and the likelihood of errors increased.

Table 1. Characteristics of NKFH KEDS Participants and Risk Factors (N=921)

Variable	Mean (SD)	Sample Size
Gender		n=900
Male		337 (37.4%)
Female		563 (62.6%)
Missing = 21[a]		
Age	**55 (16.7)**	n=847
18-30		69 (8.1%)
31-45		173 (20.4%)
46-60		271 (32.0%)
61-75		223 (26.3%)
75+		111 (13.1%)
Missing = 74[a]		
Ethnicity		n=808
Hawaiian/Part Hawaiian		168 (20.8%)
Filipino		141 (17.5%)
Japanese		182 (22.5%)
Chinese		56 (6.9%)
White		197 (24.4%)
Hispanic		14 (1.7%)
Other[b]		50 (6.2%)
Missing = 113[a]		
RISK FACTORS		
Total Risk (cumulative count of individual risk factors)	**1.79 (1.6)**	N=921
0		236 (25.6%)
1		223 (24.2%)
2		187 (20.3%)
3		129 (14.0%)
4		84 (9.1%)
5		44 (4.8%)
6		17 (1.8%)
7		1 (.1%)
Individual Risk Factors[c]		n=1650
Blood Relative with Diabetes		413 (44.8%)
Blood Relative with Cardiovascular Disease		273 (29.6%)
Blood Relative with Kidney Disease		107 (11.6%)
High Blood Pressure		360 (39.1%)
Diabetes		185 (20.1%)
High Cholesterol		265 (28.8%)
Smoking Behaviors[d]		47 (5.1%)

[a]Missing data are due to participants leaving a blank response.
[b]includes non-Hawaiian mixed, African-American, and American Indian
[c]participants could check off more than one
[d]Of the N=921, 288 participants were not assessed for risk of smoking behaviors prior to September 2007. (47/633=7.4%)

Table 2. Vital Sign and Physiological Measures (N=921)		
Variable	**Mean (SD)**	**Sample Size**
VITAL SIGN MEASURES		
Systolic Blood Pressure[16-17]	**127.23 (17.8)**	n=899
<119 mmHg Normal		
120-139 mmHg Pre-hypertension		310 (34.5%)
140-159 mmHg Stage 1 hypertension		410 (45.6%)
160> mmHg Stage 2 hypertension		133 (14.8%)
Missing =22[a]		46 (5.1%)
Diastolic Blood Pressure[31-32]	**76.2 (10.1)**	n=899
<79 mmHg Normal		
80-89 mmHg Pre-hypertension		572 (63.6%)
90-99 mmHg Stage 1 hypertension		246 (27.4%)
>100 mmHg Stage 2 hypertension		65 (7.2%)
Missing=22[a]		16 (1.8%)
PHYSIOLOGICAL MEASURES		
Height	**64.54 (4.1)**	n=900
48-61 inches		202 (22.4%)
62-66 inches		432 (48.0%)
67-71 inches		217 (24.1%)
72-76 inches		49 (5.4%)
Missing=21[a]		
Weight	**162.76 (46.0)**	n=900
0-124 lbs		171 (19.0%)
125-168 lbs		401 (44.6%)
169-202 lbs		176 (19.6%)
>203 lbs		152 (16.9%)
Missing=21[a]		
Body Mass Index (BMI)[12]	**27.27 (6.5)**	n=899
<18.5 (Underweight)		25 (2.8%)
18.6-24.9 (Normal)		314 (34.9%)
25.0-29.9 (Overweight)		316 (35.2%)
>30.0 (Obese to Extreme Obesity)		244 (27.1%)
Missing=22[a]		

[a]Missing data are due to participants leaving a blank response.

Table 3. Lab Values (N=921)		
BLOOD	**Mean (SD)**	**Sample Size**
Glomerular Filtration Rate (GFR) ml/min[13-15]	**58.40 (7.0)**	n=104
Less than 60 ml/min (Abnormal)		12 (11.5%)
60 or greater ml/min (Normal)		92 (88.5%)
Missing = 817[a]		
Glucose		
Non-fasting[14]	**115.86 (46.4)**	n=671
0-59 mg/dl (Low)		4 (.6%)
60-139 mg/dl (Normal)		574 (85.5%)
140-199 mg/dl (High)		60 (8.9%)
>200 mg/dl (Urgent)		33 (4.9%)
Missing = 121[a]		
Fasting[14]		n=129
0-59 mg/dl - Low		0
60-126 mg/dl -Normal		120 (93.0%)
127-199 mg/dl - High		8 (6.2%)
>200 mg/dl – Urgent		1 (.8%)
Missing = 0[a]		
Total Cholesterol[13]	**181.73 (36.4)**	n=201
0-199 mg/dl (Normal)		141 (70.1%)
>200 (Abnormal)		60 (29.8%)
Missing = 720[a]		
URINALYSIS		
Microalbuminuria[14]		n=869
Less than 30 mg/L (Normal)		426 (49.0%)
Greater than 30mg/L (Abnormal)		443 (51.0%)
Missing = 52[a]		
Albumin-to-Creatinine A:C Ratio[14]		n=870
Less than 30 mg/gm - Normal		749 (86.1%)
Greater than 30 mg/gm – Abnormal		121 (13.9%)
Missing = 51[a]		

[a]Missing data are due to participants leaving a blank response.

Table 4. Comparison of KEDS and KEEP		
Variables	**KEDS 2006-2009 data N = 921**	**KEEP 2000-2008 data (KEEP 2009 report) N=107,309**
Gender		
Male	337 (37.4%)	34,190 (31.9%)
Female	563 (62.6%)	73,049 (68.1%)
Age		
18-30	69 (8.1%)	8,015 (7.5%)
31-45	173 (20.4%)	22,344 (20.8%)
46-60	271 (32.0%)	37,512 (35.0%)
61-75	223 (24.2%)	29,650 (27.6%)
75+	111 (12.1%)	9,788 (9.1%)
Ethnicity		
Hawaiian/Part-Hawaiian	168 (20.8%)	Other[a]
Filipino	141 (17.5%)	Other[a]
Japanese	182 (22.5%)	Otherv
Chinese	56 (6.9%)	Other[a]
Mixed Non-Hawaiian	42 (4.6%)	Other[a]
White	197 (24.4%)	50,908 (47.4%)
African-American	4 (.4%)	35,022 (32.6%)
Native American	4 (.4%)	4,059 (3.8%)
Hispanic	14 (1.7%)	Other=14,425 (13.5%)
Observed Albumin-to-Creatinine (A:C) Ratio >30 mg/gm	121 (13.9%)	11,342 (11.7%)

[a]KEEP specified only White, African-American, and Native American. Other ethnicities were grouped as "Other." (*KEEP 2009 Report*)

Description of the Participants Who Attended KEDS Between 2006 - 2009 (see Table 1)

A majority of participants were women (62.6%), 46.7% resided in Maui, 41.6% in Honolulu, and 11.5% in Hawai'i counties. The mean (SD) age = 55 (16.7) years. Over 50% of the participants were between the ages of 46-75 years of age. By ethnicity, participants represented in this evaluation were White (24.4%), Japanese (22.5%), Hawaiian/Part Hawaiian (20.8%), and Filipino (17.5%). The mean (SD) of self-reported total; risk factors = 1.79 (1.6). Individual risk factors included (a) blood relative with diabetes (44.8%), (b) blood relative with cardiovascular disease (29.6%), (c) blood relative with kidney disease (11.6%), (d) high blood pressure (39.1%), (e) diabetes (20.1%), (f) high cholesterol (28.8%), and (g) smoking behavior (5.1%). Hawai'i County participants had the highest mean for total risk factors (Mean = 2.32) compared to Honolulu County (Mean = 1.67), and Maui County (Mean = 1.77).

Descriptive Analyses of Vital Signs, Physiological Measures, and Lab Values (see Table 2 and 3)

Forty-six percent of participants had systolic BP readings in the pre-hypertensive range (120-139 mmHg), 14.8% had Stage 1 hypertension (140-159 mm Hg), and 5.1% had Stage 2 hypertension (greater than or equal to 160 mm Hg). Thirty-six percent of the participants had diastolic BP readings of 80-89 mmHg or greater. The mean (SD) height = 64.5 (4.1) inches, and the mean (SD) weight = 162.8 (46) pounds. Sixty-two percent of the participants had a BMI of 25.0 or greater, indicating overweight or obesity. Fourteen percent of the sample had a non-fasting glucose of 140 mg/dl or greater and 7% had a fasting glucose above 127 mg/dl or greater; both these results are indicative of abnormal blood glucose levels. Fifty-one percent had an abnormal result for microalbuminuria, (greater than 30 mg/L) and 14% had an abnormal A:C ratio (greater than 30 mg/gm), potential markers for CKD.[19] GFR and total cholesterol readings were obtained for a subset of participants, n = 104 and n = 201, respectively. Among those measured, 12% had an abnormal GFR of less than 60 ml/min, another potential marker for CKD.[19] The mean (SD) total cholesterol level = 181.7 (36.4). Seventy percent had normal total cholesterol readings of less than 200 and 30% had abnormal total cholesterol readings greater than 200. The overall A:C ratio results for KEDS (13.9%) were similar with KEEP (11.7%) (see Table 4).

Crosstabulations were done on ethnicity, gender, and age with systolic and diastolic BP readings, glucose (fasting and non-fasting), BMI, total cholesterol, GFR, microalbuminuria, and A:C ratio. Ethnicity was significantly associated with BMI ($P < .001$). Gender was significantly associated with BMI ($P < .001$), systolic ($P < .001$) and diastolic BPs ($P = .002$), and total cholesterol ($P = .030$). Age was significantly associated with BMI ($P = .001$), systolic ($P < .001$) and diastolic BP ($P < .001$), glucose (non-fasting) levels ($P = .003$), and GFR ($P < .001$). Increase in BP, glucose (non-fasting), BMI levels, and abnormal GFR percentages were noted with an increase in age, particularly for participants 31 to 75 years of age.

Discussion

This is a formative program evaluation of the NKFH KEDS program of 921 participants who enrolled between 2006-2009. Three counties were included: Honolulu, Maui, and Hawai'i. Process changes were made based on lessons learned. Example of process changes were (a) different marketing approaches were targeted for urban versus rural areas of the State, (b) creation of a YouTube standardized video for training, (c) organization of KEDs stations from least to most invasive and maintaining each screening to less than 150, and (d) standardization of assessment forms.

The majority of participants were between the ages of 46 and 75 years of age, and were primarily women. The ethnic groups most represented were White, Japanese, Chinese, Filipino, and Hawaiian/Part Hawaiian. Participants had an average of one or two risk factors out of seven total risk factors. The three most identified individual risk factors included; (1) blood relative with diabetes, (2) blood relative with cardiovascular disease, and (3) self-reported high BP. Hawai'i County participants had the highest mean for total risk factors. Ethnicity was significantly associated with BMI and Hawaiian/Part Hawaiian ethnicity had a higher percentage of BMI than other ethnicities. It is noted

that Native Hawaiians have the highest mean BMI for men and women in comparison to different ethnic groups in Hawai'i, increasing the risk factors for other co-morbidities.[20-22] Gender was significantly associated with BMI, systolic and diastolic BPs, and total cholesterol. A higher percentage of women had higher cholesterol levels when compared with men.[23] In contrast, a higher percentage of men had higher BMI levels and systolic and diastolic BP levels than women. The results were consistent with similar studies in the literature.[21,24-26] Age was significantly associated with BMI, systolic and diastolic BPs, glucose (non-fasting), and GFR, particularly, among participants 31 to 75 years of age. There was also an inverse relationship between GFR and age. For older participants, there was a natural degree of expected decline in GFR.[27] Hypertension, diabetes, obesity, and CKD are associated with increased risk factors in adults during mid-life, and results are congruent with studies in the literature.[28-32]

A comparison with KEDS and Kidney Early Evaluation Program (KEEP) data on selected variables was done.[33] The two programs had similar proportions of men to women and age distributions. KEDS differentiated between the various API subgroups such as Japanese, Chinese, Filipino, and Hawaiian/Part Hawaiian, whereas KEEP aggregated all APIs in the "other" category. The unique contribution of KEDS was the use of disaggregated API data not found in KEEP. Also while overall A:C ratio results were similar with KEEP, the percentage of abnormal results were higher for KEDS.

Recommendations

The formative program evaluation addressed KEDS program objectives in assessing for efficient use of a grassroots, community-based approach and collecting data and observing trends in CKD prevalence and risk in selected communities. Limitations of the formative program evaluation were related to large numbers of missing data on selected information collected and lack of standardization of assessment forms. Standardizing the data collection forms and procedure, should decrease the extent of missing data and improve the validity and reliability of the data collected for the program. The next step will be to address the summative program evaluation of the KEDS program by examining whether the program facilitated early detection of CKD in a diverse group of people in the State of Hawai'i and whether the program was effective in providing early education and awareness to the general public about the importance of early CKD detection.

Primary objectives in formative program evaluation were to assure program plans and procedures were efficient and address the composition of the target population who participated.[34] The program incorporated culturally sensitive values of collaboration, worked closely with key informants in the community, and partnered with community-based businesses and health care professionals throughout the state. Over a period of three years, the KEDS program was able to reach over 1000 individuals through 14 events held throughout the state. Future program summative evaluation plans may include use of pre-post testing of process and outcome measures to determine whether the KEDS program was able to facilitate early detection of CKD and provide early education and awareness to the general public about the importance of early CKD detection.

Ethical Approval

The study was approved by the University of Hawai'i at Manoa, Committee on Human Studies.

Disclosure Statement

None of the authors identify any conflict of interest.

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