Oncology Provider and Patient Perspectives on a Cardiovascular Health Assessment Tool utilized during Post-treatment Survivorship Care in Community Oncology (Mixed Method Results from WF-1804CD)

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Abstract

Background: The Automated Heart-Health Assessment (AH-HA) tool is a novel electronic health record clinical decision support tool based on the American Heart Association's Life's Simple 7 cardiovascular health (CVH) metrics to promote CVH assessment and discussion in outpatient oncology. Before proceeding to future implementation trials, it is critical to establish the acceptability of the tool among providers and survivors.

Objective: We assessed provider and survivor acceptability of the AH-HA tool and provider training at practices randomized to the AH-HA tool arm within WF-1804CD.

Methods: Providers (physicians, nurse practitioners, physician assistants) completed a survey to assess acceptability of the AH-HA training, immediately following training. Providers also completed surveys to assess AH-HA tool acceptability and potential sustainability. Tool acceptability was assessed after 30 patients were enrolled at the practice with both a survey developed for the study as well as with domains from the Unified Theory of Acceptance and Use of Technology (UTAUT) survey (Performance Expectancy, Effort Expectancy, Attitude Toward using Technology, and Facilitating Conditions). Semi-structured interviews at the end of the study captured additional provider perceptions of the AH-HA tool. Post-treatment survivors (breast, prostate, colorectal, endometrial, and lymphomas) completed a survey to assess acceptability of the AH-HA tool immediately after the designated study appointment.

Results: Providers (n=15) reported high overall acceptability of the AH-HA training (mean=5.8, SD=1.0) and tool (mean=5.5, SD =1.4); provider acceptability was also supported by UTAUT scores (e.g., Effort Expectancy mean=5.6, SD=1.5). Qualitative data also supported provider acceptability of different aspects of the AH-HA tool (e.g., It helps focus the conversation and give the patient a visual of continuum of progress). Providers were more favorable about using the AH-HA tool for post-treatment survivorship care. Enrolled survivors (n=245) were an average of 4.4 years post-treatment (SD =3.7). Most survivors reported that they strongly agreed/agreed that they liked the AH-HA tool (94.3%, n=231). A larger proportion of survivors with high health literacy strongly agreed/agreed that it was helpful to see their heart health score (98.2%, n=161) compared to survivors with lower health literacy scores (89.5%, n=68; p=0.005).

Conclusions: Quantitative surveys and qualitative interview data both demonstrate high acceptability of the AH-HA tool among both providers and survivors. Although most survivors found it helpful to see their heart health score, there may be room for improving communication with survivors who have lower health literacy. Clinical Trial: Assessing Effectiveness and Implementation of an EHR Tool to Assess Heart Health Among Survivors (AH-HA)
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Keywords: cancer; cardiovascular health; cancer survivors; community oncology; electronic health record integration; provider acceptability

Abstract

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Conclusions: Quantitative surveys and qualitative interview data both demonstrate high acceptability of the AH-HA tool among both providers and survivors. Although most survivors found it helpful to see their heart health score, there may be room for improving communication with survivors who have lower health literacy.

Trial Registration: NCT03935282

Introduction

Survivors of many common early-stage cancers are now more likely to die of cardiovascular disease than cancer, elevating the importance of addressing cardiovascular health (CVH) in routine survivorship care.[1-5] Over 90% of survivors have multiple cardiovascular risk factors,[6] increasing their risk of both poor cardiovascular and cancer outcomes.[7-15] Over 85% of survivors do not meet the American Heart Association's (AHA's) healthy standards in multiple CVH components [body mass index (BMI), physical activity, diet, smoking, blood pressure, cholesterol, and glucose],[6,16] many of which increase the risk for both cardiovascular disease and cancer.[7,17] Accordingly, better CVH among survivors is associated with improved survival[18] and reduced risk of both cardiovascular disease[17,19,20] and cancer recurrence.[11-13]

Despite Institute of Medicine (IOM) recommendations for prevention efforts and care coordination for cancer survivors,[21-23] up to 20% of breast and colorectal survivors may not see a primary care provider,[24,25] heightening their risk for lack of preventive services and poor comorbidity management.[25-27] Claims data reveal that only 31-39% of breast cancer survivors received cholesterol screening, significantly fewer than women without breast cancer matched on age, ethnicity, sex, region, and comorbidity.[27] Together, these findings emphasize the importance of addressing CVH during routine oncology survivorship care. Both American Society of Clinical Oncology[28] and the National Comprehensive Cancer Network guidelines[29] recommend cardiovascular risk assessment and discussion for cancer patients. In our prior work with 20 oncologists, 90% (n=18) reported CVH discussions to be "somewhat" or "very" important; however, 58% only "rarely" or "sometimes" discuss CVH with their patients. Further, nearly 35% of cancer survivors do not receive assistance from a healthcare provider for CVH-related lifestyle changes.[2]

To address these gaps in post-treatment survivorship care and promote guideline adherence, our team developed and deployed a novel, easy-to-use, electronic health record (EHR)-embedded CVH assessment tool, the Automated Heart-Health Assessment (AH-HA) tool. This tool was first implemented in primary care and now incorporates EHR data on receipt of cancer treatments with cardiotoxic potential alongside a visual, interactive display of CVH risk factors, automatically populated from the EHR.[30-32] Before proceeding to future implementation trials, it is critical to establish the acceptability of the tool among oncology providers and survivors.[33] As part of a larger pragmatic trial to test and evaluate AH-HA in survivorship care,[1] among practices randomized to the AH-HA tool, we assessed acceptability of the AH-HA tool among both patients and providers during routine oncology care, along with provider perceptions of potential sustainability.

Methods

Ethical Approval and Informed Consent

This study (WF-1804CD) was approved by the NCI Central Institutional Review Board (IRB). Each participating institution granted authority to the NCI Central IRB to serve as the IRB of record for NCI Community Oncology Research Program (NCORP) studies, in accordance with National Institute of Health's single IRB policy. All participants provided consent. NCORP is a national network of community oncology practices with infrastructure to support the recruitment of patients to clinical trials.[34] This study was facilitated through the Wake Forest NCORP Research Base (UG1CA189824).

Study Eligibility & Recruitment Procedures

See Foraker et al.[1] for complete eligibility criteria and methods for the larger randomized trial. NCORP practice eligibility criteria included: (1) use of the Epic© EHR; (2) willingness to incorporate the AH-HA tool in their EHR; (3) have two or more providers willing to be trained and use AH-HA; (4) identified combined providers saw ≥100 potentially eligible patients for follow-up in prior 6 months. Providers were recruited and consented by cancer care delivery research leads within their practice. Eligible providers included physicians and advance practice providers (APP) (nurse practitioners and physician assistants) willing to complete the AH-HA provider training. This manuscript focuses on providers within practices randomized to use the AH-HA tool in the pragmatic trial.[1] To identify eligible survivors, staff at NCORP sites screened clinic schedules and reviewed survivors' medical records. Survivors were contacted by phone, patient portal, or in-person and were eligible if they were at least 6 months post-potentially curative cancer treatment for breast, prostate, colorectal, or endometrial cancers or Hodgkin and non-Hodgkin lymphomas and scheduled for a routine cancer-related follow-up care visit.[1]

AH-HA Training and Intervention

A full description of the AH-HA tool and provider training is available in the protocol paper.[32] In brief, providers completed two 30-minute video trainings prior to the practice enrolling patients. The training covered: 1) the importance of addressing CVH as part of routine post-treatment follow-up care for cancer survivors, 2) the basics of the AHA's Life's Simple 7 CVH factors[8] and overall CVH metric, 3) navigation of the AH-HA tool within the EHR, and 4) how to use the tool to guide discussions with survivors. The AH-HA tool was launched using a best practice alert for enrolled patients during a routine post-treatment outpatient oncology visit. Providers could choose to use the tool or not in accordance with their clinical judgment. Five of the CVH factors were automatically populated from the EHR when available ([BMI], smoking, blood pressure, cholesterol, and hemoglobin A1c/ blood glucose); physical activity and diet data were collected on paper and entered directly into the tool by the provider. AH-HA color codes each CVH factor as red (poor), yellow (intermediate), or green (ideal) according to the Life's Simple 7 classification framework[8] and also provides a total CVH score. Interactive slider bars can be used to demonstrate how improvements in CVH factors can lead to shifts in the categorization and overall CVH score. A second tab included information about the patient's receipt of cancer treatments with cardiotoxic potential.

Data Collection and Measures

Providers and survivors provided information about sex, age, race, and ethnicity. Survivor cancer type and time since diagnosis were abstracted from the EHR. Survivor's health literacy was also assessed with one item (*How confident are you filling out medical forms by yourself*?) with response options ranging from not at all confident to extremely confident.[35] Provider items also included provider type (physician, nurse practitioner, physician assistant), years in current position, time spent providing direct patient care, time spent using the EHR for direct individual patient care, and proficiency with current EHR. Providers completed two surveys: one immediately after participating in the initial AH-HA training before participant enrollment and one after 30 patients were enrolled at the practice. Provider surveys assessed acceptability of the training and AH-HA tool, and preferences for when and how often to use the AH-HA tool in the cancer treatment trajectory. Survivors completed one survey to assess the acceptability of the AH-HA tool immediately after the designated routine oncology appointment.

Provider Perspectives on Training. We developed a 7-item survey for the purpose of this study to assess various aspects of acceptability (e.g., *The AH-HA training provided useful information about the importance of addressing CVH with cancer survivors*) with response options ranging from 1 (strongly disagree) to 7 (strongly agree). A composite score was calculated using the average of all 7 items. Also, one item assessed acceptability of the AH-HA training duration (response options ranging from too short to too long). An additional item assessed comfort in discussing CVH with survivors following the training (*Please indicate your level of comfort discussing CVH with your post-treatment, good prognosis patients*) with a 5-point Likert-scale (not at all comfortable to very comfortable). In a separate follow-up survey, providers were asked one item retrospectively about their preparedness to use the AH-HA tool at the time they completed the training (*Following the provider training, how prepared were you to use the AH-HA tool with patients?*). Response options included not at all prepared, somewhat prepared, and very prepared.

Provider Perspectives on the AH-HA Tool. Six items, utilized in our prior work,[31,36] assessed aspects of provider acceptability of the AH-HA tool (e.g., *The information AH-HA provides is useful*) with response options ranging from 1 (strongly disagree) to 7 (strongly agree). A composite score was calculated using the average of all 6 items. We further assessed acceptability using items from the Unified Theory of Acceptance and Use of Technology (UTAUT) survey.[37] Specifically, fifteen items assessed the Performance Expectancy (e.g., *The AH-HA tool is useful in my job*), Effort

Expectancy (e.g., *I find the AH-HA tool easy to use*), Attitude Toward using Technology (*Using the AH-HA tool is a good idea*), and Facilitating Conditions (e.g., *I have the resources necessary to use the AH-HA tool*) domains of the UTAUT survey.[5,37] Response options ranged from 1 (strongly disagree) to 7 (strongly agree). We calculated scores for each domain using the average of domain items.[37] An additional item that was developed for this study to assess potential sustainability, asked providers to report the timing and frequency they would like to use the AH-HA tool (*After the study ends, how often would you like to use the AH-HA Tool when providing care to patients during: (a) initial treatment planning, (b) active treatment, and (c) post-treatment survivorship care*) with response options including: never/almost never; seldom/about half the time; most of the time; always/almost always).

Survivor Acceptability. Five items previously used in our pilot work assessed overall acceptability of the AH-HA tool (e.g., *I liked the heart health tool I used today with my provider)* with a 5-point Likert scale ranging from strongly disagree to strongly agree.[36]

Providers also participated in a semi-structured qualitative interview conducted via telephone at the end of patient enrollment at their practice to further understand perceptions of the AH-HA tool. Interviews were conducted by two trained qualitative research team members from the Qualitative and Patient-Reported Outcomes (Q-PRO) Shared Resource of the Atrium Health Wake Forest Baptism Comprehensive Cancer Center. Interviews lasted an average of 20 minutes and were audio-recorded.

Analyses

Descriptive statistics were quantified with mean (standard deviation, SD) and frequency (percent) for continuous and categorical outcomes respectively. Figures display mean and corresponding 95% confidence intervals (95% CI) for providers' answers on a 1-7 scale. Total scores for scales are quantified with mean (SD) and range. Univariate associations of demographics characteristics (age, gender, race, ethnicity, health literacy) and cancer type (breast, colorectal, prostate, endometrial, and lymphoma) with acceptance of the AH-HA tool (using the following items: 1) *It was helpful to see my heart health score; 2) I would like to use this tool to talk about my heart health with my oncology provider at a future appointment*) were tested using Fisher's exact tests.

Qualitative interviews were analyzed in collaboration with the Qualitative and Patient-Reported Outcomes (Q-PRO) Shared Resource of the Atrium Health Wake Forest Baptism Comprehensive Cancer Center. Interview audio was transcribed verbatim and two Q-PRO teammates and co-authors (AA and KW) reviewed the transcripts and developed a draft codebook. The study team reviewed the codebook and provided input, which was incorporated into a new version of the codebook. Transcripts were imported into ATLAS.ti [38] and the codebook was tested by coding several transcripts and revised as necessary. All interviews were independently coded by two Q-PRO teammates and co-authors (AA and KW) and compared; any discrepancies were discussed and resolved. Once all transcripts were coded, code reports were run and summaries for each report were written. Summaries for provider's perceptions of the AH-HA tool were synthesized and analyzed for patterns and themes.

Results

Seventeen providers were recruited for the pragmatic trial to participate in the intervention arm from 4 sites; 15 reported using the AH-HA tool with patients in a clinic appointment (Table 1) and 2 did not report using the AH-HA tool. Amongst the 15 providers who used the tool, together they saw 296 survivors (46% of survivors participating in the larger randomized trial). Of these, 245 reported seeing the AH-HA tool (33 did not see the tool; 18 unknown).

Provider and Survivor Characteristics. Providers included physicians (n=8, 53.3%, Table 1), nurse practitioners (n=6, 40%) and a physician assistant (n=1, 6.7%). Most providers (n=10, 66.7%) reported spending 76-100% of their time providing direct patient care and more than half (n=8, 53.3%) reported spending 76-100% of their time using the EHR for direct patient care. Most providers (73.3%, n=11) reported that they were "very proficient" with their current EHR.

Survivors (n=245, Table 2) completed treatment for breast (n=230, 93.9%), endometrial (n=1, 0.4%), or colorectal (n=9, 3.7%) cancers, or lymphoma (n=5, 2.0%). Most survivors were White/ Caucasian (n=203, 82.9%); 13.1% (n=32) were Black/ African American. 5.3% were Hispanic/Latino (n=13). Survivors were on average 61 years of age (SD=10.9) and most commonly married/ living as married (n=176, 71.8%). Most survivors had a college degree (n=111, 45.3%) or some college including vocational or technical school (n=82, 33.5%). Mean time since diagnosis was 4.4 years (SD =3.72).

Provider Perspectives on AH-HA Training. Figure 1 depicts provider training acceptability findings. Overall, providers reported high acceptability (mean=5.8, SD=1.0), with the highest item acceptability rating (mean=6.1, SD=0.8) for *The AH-HA training provided useful information about the importance of addressing CVH with cancer survivors.* Providers reported the lowest acceptability rating (mean=5.5, SD=1.3) for the following item: *I feel prepared to use the AH-HA tool in clinic with post-treatment, good prognosis patients.* More than half of providers reported that the duration of the AH-HA training was "about right" (n=7, 53.9%), followed by "a little too long" (n=4, 30.8%), "a little too short" (n=1, 7.7%), and "much too long" (n=1, 7.7%). At the conclusion of the training, all providers reported that they were somewhat (n=9, 69.2%) or very (n=4, 30.8%) comfortable discussing CVH with post-treatment, good prognosis patients. When providers reflected on their preparedness after using the AH-HA tool, most reported they were "very prepared" (n=8, 57.1%) followed by "somewhat prepared" (n=6, 42.9%).

Provider Perspectives of the AH-HA Tool. Quantitative surveys and qualitative interview data converged to demonstrate provider acceptability of the AH-HA tool. Figure 2 shows survey results; providers reported being satisfied with the AH-HA tool (mean=5.5, SD=1.4) with the highest rating for two items: *The information AH-HA provides is useful* (mean=5.9, SD=1.2); *The information in AH-HA is presented in a useful format* (mean=5.9, SD=1.1) and the lowest rating (mean=4.9, SD=1.8) for the following: *AH-HA makes the information I want easier to access*. Providers felt the interactivity and visuals provided in the AH-HA tool were particularly useful for patients. One provider stated, “*I think the biggest thing is the visual aspect of the tool is really nice for them and the interactive-ness, the way you can slide the bars and show them if they achieve X, Y, or Z goal, how it can make a difference in their [CVH] score.*” One provider mentioned that having these data available would allow them to easily track their patients’ progress: “*it was something that, in a follow up visit, you could look—would be able to look back on to compare and talk with the patient and they can see how they made progress in this area or is there something we can continue to work on. It helps focus the conversation and give the patient a visual of continuum of progress.*” Providers reported acceptability of AH-HA (Table 3) for the Performance Expectancy (mean=4.0, SD=2.0), Effort Expectancy (mean=5.6, SD=1.5), Attitude Toward using Technology (mean=4.8, SD=2.1), and Facilitating Conditions (mean=5.5, SD=1.5) domains of the UTAUT. Related to performance, providers felt AH-HA helped them have deeper discussions of cardiovascular risk with patients. One provider stated, “*Before, our CVH approach might have been more of a blanket statement about you are a breast cancer survivor, and you may have increased cardiovascular risks, so you need to optimize your blood pressure, cholesterol with your primary care doctor and what not, but this is a much more thorough tool.*”

Some providers noted already having these conversations with patients, which made them less receptive to the tool. For example, one provider stated “*because I already do that anyway, I think it was just kind of time-consuming…to actually do it and make extra time in the visit to go through that particular part on the computer and have them ask—or answer very specific questions when we really kind of discuss all of this anyway.*” In contrast, favorable effort expectancy was supported qualitatively as some providers noted that the tool was “very simple to use” and “user friendly.” Providers did feel it could be easier to use if it required less “maneuvering” or having to go back and forth” within the EHR.

Potential Sustainability of the AH-HA Tool. When asked about using the tool after the study ended, Most providers reported interest in using the AH-HA tool for post-treatment survivorship care (always/almost always (n=3, 21.4%), most of the time (n=7, 50%), seldom/about half the time (n=2, 14.3%), never/almost never (n=2, 14.3%). There was less interest in using the tool for patients in active treatment or during initial treatment planning for which results were the same (most of the time (n=2, 14.3%), seldom/ about half the time (n=5, 35.7%), or never/almost never (n=7, 50%).

Survivor Acceptability of the AH-HA Tool. Figure 3 shows results for survivor acceptability of the AH-HA tool. Most survivors reported that they strongly agree/ agree that they liked the AH-HA tool (94.3%, n=231), it was helpful to see their heart health score (93.5%, n=229), AH-HA was easy to understand (93.1%, n=228), the picture/ diagram (of CVH risk factors) improved their understanding of their heart health (83.3%, n=204), and they want to use AH-HA to talk about heart health with their oncology provider at a future appointment 84.9%, n=208).

Associations with Survivor Acceptability of the AH-HA Tool. Health literacy was the only survivor demographic characteristic significantly associated with survivors' acceptability of the AH-HA tool. Survivors who indicated they were "extremely confident" filling out medical forms on their own (i.e. high health literacy) strongly agreed/agreed that it was helpful to see their heart health score (98.2%, n=161) compared to survivors with lower health literacy scores (89.5%, n=68; p=0.0052). Yet, the perceived helpfulness of seeing the heart health score was generally high.

Discussion

Our mixed methods results support the acceptability of the AH-HA CVH assessment tool when used as part of routine post-treatment oncology care in community settings. Cancer survivors were positive about using the tool in the clinic with their provider. Both oncology physicians and APP's across four community practices reported favorable perceptions of the AH-HA training and use of the tool with cancer survivors. This suggests AH-HA may be well received in a variety of survivorship care models[39] (e.g., APP-led survivorship clinics or follow-up with the treating physician).

The overall high acceptability among both patients and providers supports further implementation of the AH-HA tool, with continued focus on post-treatment cancer survivors. Most providers reported they would prefer to use the AH-HA tool for post-treatment survivorship care, and that they would rarely use AH-HA for patients in active treatment or during initial treatment planning. Our prior usability assessments considered the tool's appropriateness of the CVH tool for post-treatment survivorship care and we learned that oncology providers also wanted to see potentially cardiotoxic treatments received by survivors,[40] as incorporated in this current study. Moving forward, if the tool is to be used for treatment planning, usability assessments should be repeated with consideration of possible future cardiotoxic effects of treatments incorporated in the design of the tool.

Despite overall positive feedback from both providers and survivors about the AH-HA tool, our results suggest there may be some room for improvement in communicating the heart health score to patients with lower health literacy. Provider training could be augmented to include tips for using the tool with patients who have different levels of health literacy along with scripts to help guide the discussion with patients. Research shows providers often overestimate patient's literacy levels, and patients may be too embarrassed about their limited health literacy to ask questions.[41-44] Increasing provider's awareness of a survivor's health literacy may be an important step prior to initiating the CVH discussion with survivors. Although we assessed health literacy in this study, this information was not shared with providers. One potential strategy is to include assessment of survivor health literacy as part of the AH-HA tool to help inform the CVH provider-survivor discussion. Additionally, providing basic information prior to the appointment on the components of CVH and their impact on a patient's overall health may better prepare patients for the upcoming discussion with the provider. Similarly, enhancing patient-facing information in the format of an after-visit summary of CVH recommendations may enhance understanding for patients with lower health literacy.[45]

Other potential modifications to the tool may address provider desires for a more streamlined experience. Although most providers found the tool simple to use, others suggested refining AH-HA by requiring less maneuvering within the EHR. One way in which the tool could be simplified for providers would be to collect the self-reported diet and physical activity data via patient portal prior to the visit so that the data would be available in the EHR and callable by the tool. This method would be expected to streamline the utility of the tool at the point-of-care if these data would not need to be manually entered into the tool.

There were notable strengths to this study. Provider feedback on AH-HA acceptability included both quantitative and qualitative data to provide a fuller picture of both overall acceptability and specific characteristics of the AH-HA tool, consistent with reported strengths of mixed-methods research.[46] In this study, these data were complementary and enhanced understanding of provider acceptability. This study was also strengthened by the assessment of perspectives from both providers and survivors as the “end-user”, to inform next steps and promote sustainability for AH-HA when implementing widely.[47] Further, the inclusion of providers and survivors from four community oncology practices demonstrating the AH-HA tool is acceptable across diverse oncology practices.[48] One limitation of the present study is the predominant enrollment of breast cancer patients despite broad inclusion criteria. This likely reflects specialization of enrolling providers and/or the patient mix with respect to cancer type within survivorship programs. Our study team has reported interest in CVH discussions among survivors of gynecologic cancers, yet we acknowledge a more diverse survivor sample is needed to determine generalizability of these results.[49] Due to the overall high acceptability of AH-HA, there was limited variability to detect potential differences in patient acceptability by gender, age or race/ethnicity. Further, although the sample size for our provider key informants is within or exceeds current recommendations,[50] it also limited us from making comparisons in acceptability by provider type.

Building upon our strong acceptability findings, the next steps for this line of research is to test the AH-HA implementation package to promote guideline concordant CVH assessment and discussion among a larger and more diverse sample of oncology providers and patients. Tailoring CVH discussion to meet the needs of patients with higher and lower health literacy will be an important factor to consider in this future direction. It will also be important to assess the sustainability of the AH-HA tool in community practice.

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Conflicts of Interest:
The authors report no conflicts of interest.

Abbreviations:
AHA: American Heart Association
AH-HA: Automated Heart-Health Assessment
BMI: Body Mass Index
CVH: Cardiovascular Health
EHR: Electronic Health Record
IOM: Institute of Medicine
IRB: Institutional Review Board
NCORP: NCI Community Oncology Research Program (NCORP
UTAUT: Unified Theory of Acceptance and Use of Technology’s

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Table 1. Provider Characteristics (n=15)

Sex	**n (%)**
Female	11 (73.3%)
Male	4 (26.7%)
Age[1]	
26 – 35	2 (16.7)
36 – 45	6 (50.0)
46 – 55	3 (25.0)
65+	1 (8.3)
Race	
White/Caucasian	11 (73.3)
Asian	3 (0.2)
Not reported	1 (0.1)
Ethnicity	
Non-Hispanic	13 (86.7)
Not reported	2 (13.3)
Provider Role	
Physician	8 (53.3)
Nurse Practitioner	6 (40.0)
Physician Assistant	1 (6.7)
Years in current position	
1-5 years	5 (33.3)
6-10 years	5 (33.3)
11-20 years	4 (26.7)
>20 years	1 (6.7)
Time spent providing direct patient care	
51-75%	5 (33.3)
76-100%	10 (66.7)
Time spent using EHR for direct individual patient care	
26-50%	3 (20.0)
51-75%	4 (26.7)
76-100%	8 (53.3)
Proficiency with current EHR	
Very proficient	11 (73.3)
Somewhat proficient	3 (20.0)
Neutral	1 (6.7)
Number of survivors that used AH-HA per provider, mean (SD), range	19.7 (17.1), 2-56
[1]n=12	

	n (%)

Age	
18 – 39	9 (3.7)
40 – 64	131 (53.5)
65 – 74	84 (34.3)
75+	21 (8.6)
Race	
American Indian or Alaskan Native	1 (0.4)
Asian	3 (1.2)
Black/ African American	32 (13.1)
More than one race, Not Hispanic or Latino	2 (0.8)
White, non-Hispanic or Latino	193 (78.8)
White/ Other/ Unknown, Hispanic or Latino	13 (5.3)
Other/ Unknown, Not Hispanic or Latino	1 (0.4)
Ethnicity	
Hispanic or Latino	13 (5.3)
Not Hispanic or Latino	232 (94.7)
Marital Status	
Married / Living as married	176 (71.8)
Single, Divorced, Separated, or Widowed	69 (28.2)
Education	
High school or less	52 (21.2)
Some college (including vocational/ technical)	82 (33.5)
College degree or more	111 (45.3)
Cancer Type	
Breast	230 (93.9)
Colorectal	9 (3.7)
Endometrial	1 (0.4)
Lymphoma	5 (2.0)
Time Since Diagnosis (years)[1]	
Median (IQR)	3.61 (2.14, 5.22)
Mean (SD)	4.39 (3.72)
Range	0.52, 32.87
[1]n=239	

Table 2. Survivor Characteristics (n=245)

Table 3. Provider Acceptability for the Performance, Effort, Attitude, and Facilitating Conditions Domains of the UTAUT Survey (n=13)

UTAUT Domain	**Mean (SD), Range**
Performance	3.98 (2.04), 1-7
Effort	5.62 (1.49), 2-7

Attitude	4.75 (2.06), 1-7
Facilitating Conditions	5.54 (1.51), 2-7

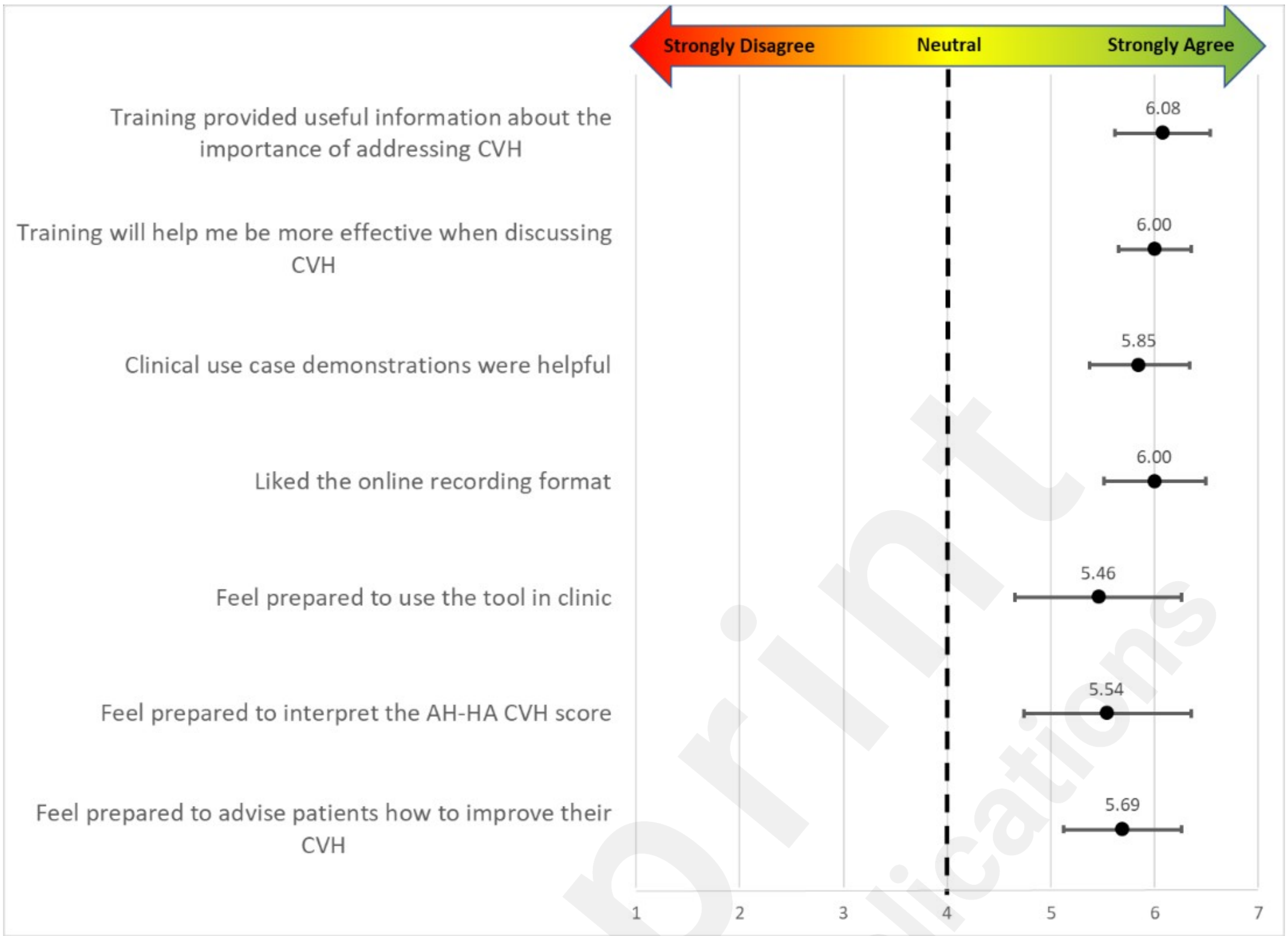

Figure 1. Provider Acceptability of the AH-HA Training Session

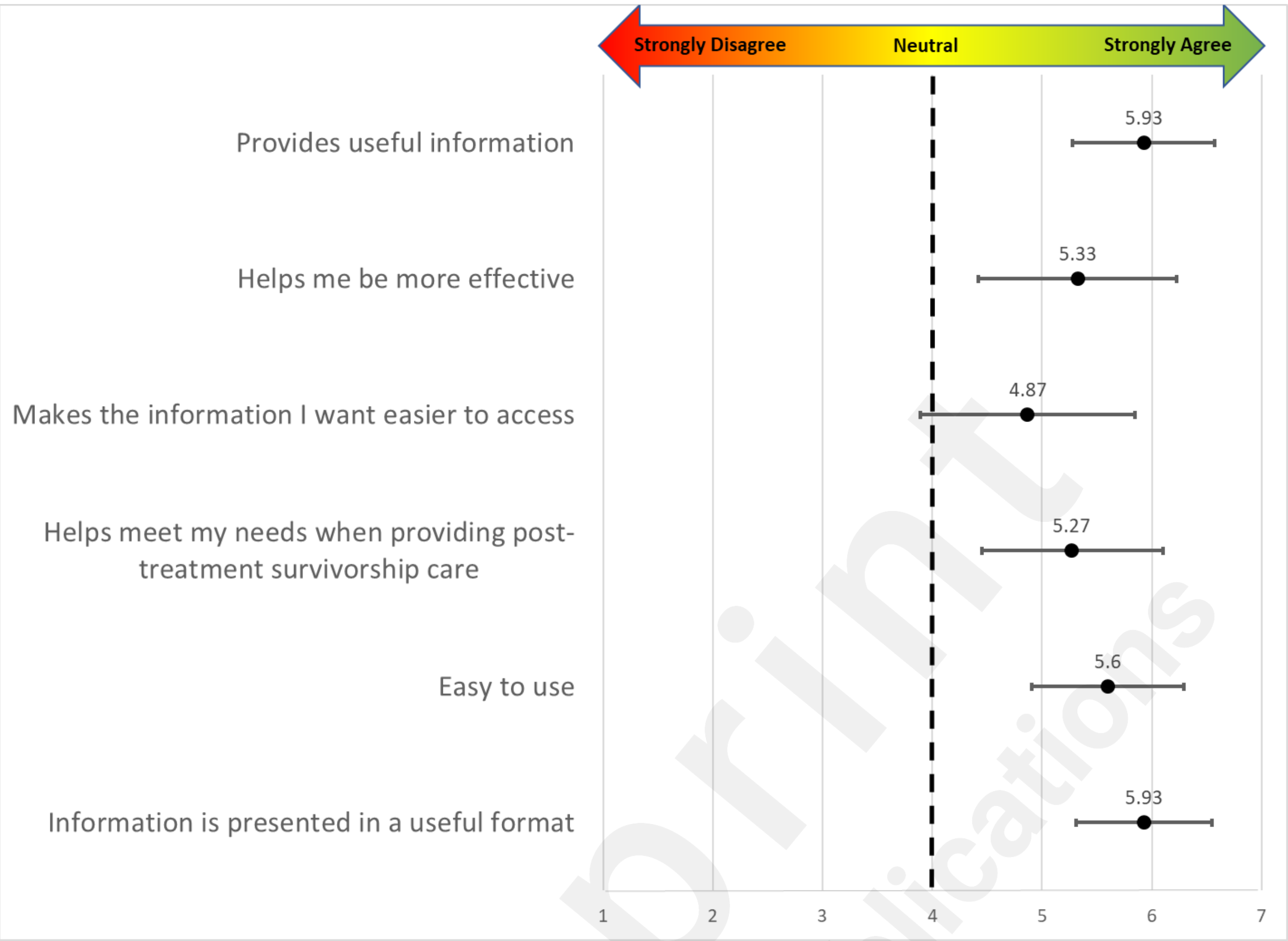

Figure 2. Provider Acceptability of the AH-HA Tool

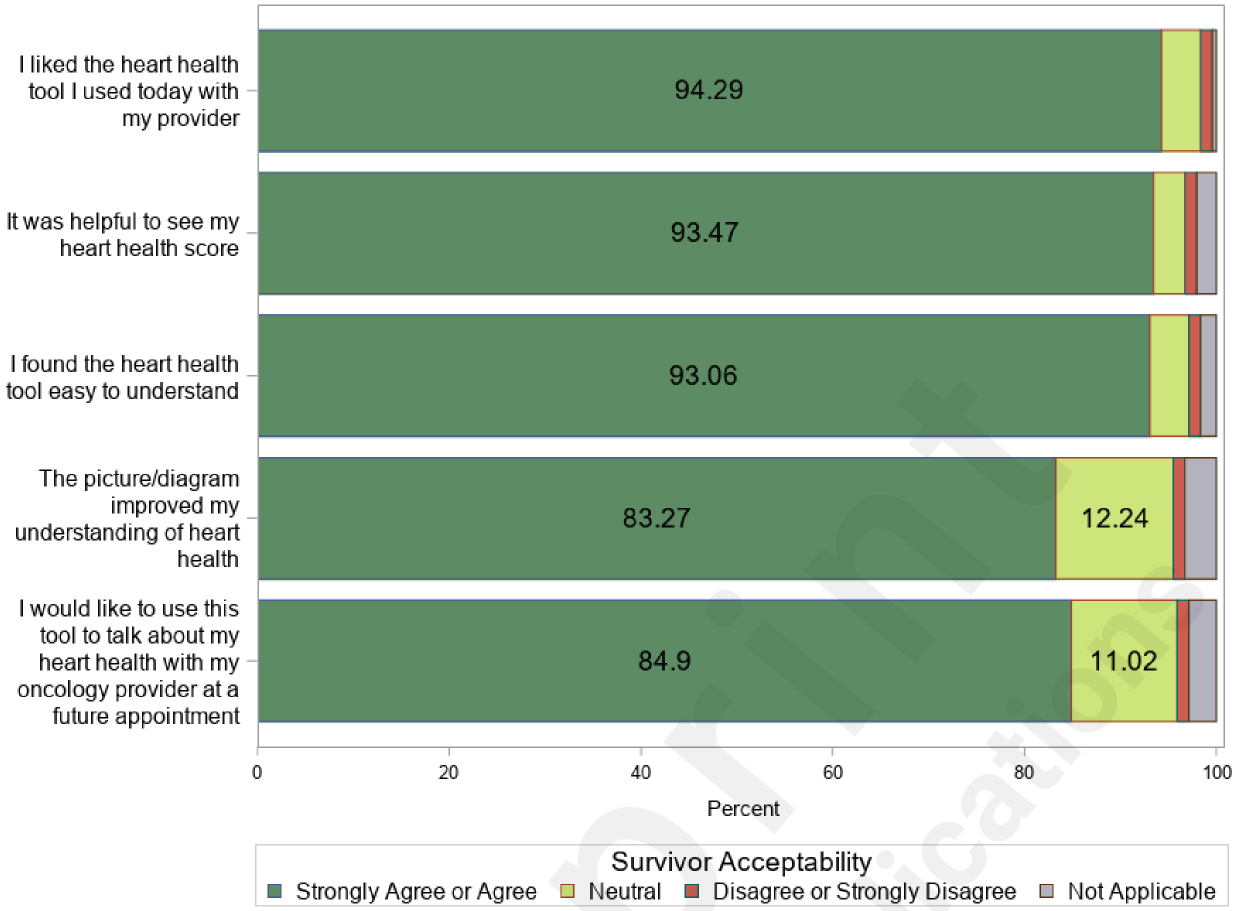

Figure 3. Survivor Acceptability of the AH-HA Tool (n=245)