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<T>Quantitative Assessment of Participant Knowledge and Evaluation of Participant Satisfaction in the CARES Training Program

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<runhead>Quantitative Assessment of the CARES Training Program

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<abstract subhead>Abstract

<abstract>**Background:** The purpose of the Community Alliance for Research Empowering Social change (CARES) training program was to 1) train community members on evidence-based public health, 2) increase their scientific literacy, and 3) develop the infrastructure for community-based participatory research (CBPR).

Objectives: We assessed participant knowledge and evaluated participant satisfaction of the CARES training program to identify learning needs, obtain valuable feedback about the training, and ensure learning objectives were met through mutually beneficial CBPR approaches.

Methods: A baseline assessment was administered before the first training session and a follow-up assessment and evaluation was administered after the final training session. At each training session a pretest was administered before the session and a posttest and evaluation were administered at the end of the session. After training session six, a mid-training evaluation was administered. We analyze results from quantitative questions on the assessments, pre- and post-tests, and evaluations.

Results: CARES fellows knowledge increased at follow-up (75% of questions were answered correctly on average) compared with baseline (38% of questions were answered correctly on average) assessment; post-test scores were higher than pre-test scores in 9 out of 11 sessions. Fellows enjoyed the training and rated all sessions well on the evaluations.

Conclusions: The CARES fellows training program was successful in participant satisfaction and increasing community knowledge of public health, CBPR, and research methodology. Engaging and training community members in evidence-based public health research can develop an infrastructure for community–academic research partnerships.

<abstract subhead>Keywords

<abstract>Community-based participatory research, community-academic partnerships, suburban population, community research training, social change

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<N>CBPR has emerged as a promising approach in public health and is often used by universities to engage community stakeholders and address priority public health concerns.¹⁻⁴

Engaging community members in the research process is often the missing link to improving the quality and outcomes of health promotion activities, disease prevention initiatives, and research

studies.^{1,5} This paradigm is particularly useful for increasing community research capacity (e.g., ability to identify, mobilize) to address a broad array of public health concerns.^{2,6-8}

Training community stakeholders on CBPR and public health increases community capacity and facilitates research partnerships integral for the development of culturally appropriate interventions designed to improve health outcomes.⁹ When effective, training demystifies research methodologies and develops a common language between community members and researchers while building trust, enhancing knowledge, and addressing community health needs.⁸ Within this paradigm, there is a co-learning process or reciprocal exchange of information and expertise among researchers and community members.²

Training programs for lay health advisors or community health advocates are a promising health promotion strategy.¹⁰⁻¹⁵ Several CBPR projects have used community research training as a mechanism for increasing research capacity among vulnerable, minority and underserved communities. In the Alternatives for Community & Environment project, youth in Roxbury, Massachusetts, were trained to educate the community on the relationship between air pollution and health.¹⁶ The Community Action Against Asthma program in Detroit, Michigan, trained outreach workers as “Community Environmental Specialists” to conduct household assessments and personal monitoring of exposure.¹⁷ In Brooklyn, New York, El Puente and The Watchperson Project trained community health educators to conduct interviews and facilitate focus groups.¹⁸ The West Side Community Asthma Project in the Lower East Side of Buffalo, New York, conducted a training to increase the community’s ability to participate in asthma research.¹⁹

CARES

<N>Minority communities in Long Island, a residentially segregated suburb of New York City, experience a disproportionate burden of poor health outcomes. These communities have

increased morbidity and mortality from chronic illnesses, older housing stock, poorer school systems, and lower socioeconomic status.^{20,21} Through community forums called mini-summits on minority health, researchers, practitioners, community health workers, and faith- and community-based organizations worked collaboratively to develop region specific solutions for the public health problems facing minority communities in the region.²² Based on the recommendations developed through this multifaceted, community-driven approach was CARES, an academic–community-based research partnership designed to 1) train community members on evidence-based public health, 2) increase their scientific literacy, and 3) develop the infrastructure for CBPR such that local stakeholders can examine and address racial/ethnic health disparities in their communities.²³

The CARES training curriculum and goals were designed by the CARES leadership team. The CARES leadership had equal representation from academic and community partners and all members of the CARES leadership team also served as CARES faculty.²³ This comprehensive, 15-week, evidence-based public health research course included 11 didactic training sessions and 4 experiential workshops and was based on a standard Masters in Public Health curriculum (see online supplement to Goodman et al²³ for detailed curriculum) taught by multidisciplinary faculty from research institutions. Each 3-hour training session was held at a community library and was geared to community health workers, leaders of community-based organizations, and community members.

Nineteen diverse fellows enrolled in the CARES training cohort. The majority of fellows were female (79%) and born in the United States (79%). Ten (52%) were Black, four (21%) were White, three (16%) were Hispanic, and two (10%) were Native American. Fellows ranged in age from 22 to 78, with a mean age of 51. Fellows were members of community-based organizations

(32%), community health workers (32%), and community members (36%); all had completed some college coursework. CARES fellows represent diversity of thought, educational backgrounds, and demographics, yet they share a collective vision to use research as a tool to elucidate existing health disparities and become social change agents. Detailed information on the CARES training program, recruitment of participants, leadership team, selection of faculty, participant demographics, and program results are presented elsewhere.²³

We assess participant knowledge and evaluate participant satisfaction of the CARES training program to identify learning needs, obtain valuable feedback about the training, and ensure learning objectives were met through mutually beneficial CBPR approaches.

<A>Methods

Assessment of Participant Knowledge

<N>Of the 19 fellows enrolled in the CARES training program, 13 (68%) completed the 15-week training course, and 11 (58%) completed both baseline and follow-up assessments. The majority of fellows who completed both the baseline and follow-up assessment were female (73%) and born in the United States (73%); seven (64%) were Black, three (27%) were White, and one (9%) Hispanic. Fellows ranged in age from 22 to 78, with a mean age of 55. The majority of fellows were members of community-based organizations (45%) and community health workers (36%); all had a college degree (Table 1).

<T>Table 1

<N> Fellows' baseline and follow-up assessments were linked using ID numbers. Each assessment (baseline and follow-up) consisted of 16 identical questions (Appendix I). Because of the small sample size ($n = 11$), we used nonparametric statistical methods to analyze the data. Wilcoxon signed-rank tests (nonparametric counterpart of the paired t -test) were used to examine

differences in participants overall scores on the baseline assessment compared with the follow-up assessment. The percent of CARES fellows who correctly responded to each question on baseline compared with the percent of CARES fellows who answered the same question correctly on the follow-up assessments were also examined using the Wilcoxon signed-ranked test. To gain better insight into the change in assessment scores, we stratified participant responses to questions into four categories: 1) Correct at baseline and incorrect at follow-up, 2) incorrect at baseline and incorrect at follow-up, 3) correct at both baseline and follow-up, and 4) incorrect at baseline and correct at follow-up to determine whether differences seen between baseline and follow-up assessment reflect learning.

At each of the 11 didactic training sessions, a pretest was administered before the session and a posttest was administered after the session to assess participant knowledge of the training topic. Fellows' pre- and post-test responses were linked using ID numbers; pre-test and post-test had same number of questions but not always the same content (Appendices II and III). Ten questions were asked on the pre- and post-tests for session 1; for most of the subsequent sessions,^{2-6,9-11} five questions were asked. Four questions were asked on the pre- and post-tests for sessions 7 and 8. Wilcoxon signed-rank tests were used to examine the percent of correct scores on pre-test compared with the post-test for each session.

Evaluation of Participant Satisfaction

<N>After each session, participants were asked to complete a session evaluation form. Three quantitative questions were included on the session 1 evaluation: 1) Exercise learning objectives were met, 2) the group exercises were well facilitated, and 3) overall, how would you rate this session. For all other sessions (2-5,7-11), 7 quantitative questions were asked on the evaluation: 1) Exercise learning objectives were met, 2) information learned in this session was useful, 3)

group activities in this session were useful, 4) understood the concepts presented in this session, 5) facilitator(s) were well organized, 6) facilitator(s) seemed knowledgeable about the subject, and 7) overall, how would you rate this session. Participants were asked to respond to each question using a 5-point Likert scale; for all questions except the last question on each evaluation, response options were: 1, strongly disagree; 2, disagree; 3, neutral; 4, agree, or 5, strongly agree. For the last question on each evaluation (question 3 on session 1 evaluation and question 7 on all other session evaluations) the response options were: 1, poor; 2, fair; 3, neutral; 4, good; or 5, excellent. We calculated the mean and standard deviation of each question for each session and compute an overall session evaluation mean score. No session evaluation was conducted for session 6; an overall mid-training evaluation was given at the end of this session to assess participants' satisfaction with the training up to this point.

On the mid-training evaluation, seven quantitative evaluation questions were asked: 1) The facilitator(s) have been prepared and well organized, 2) the facilitator(s) seemed knowledgeable about the subject, 3) the information learned so far in this training was helpful, 4) the CARES project staff is knowledgeable and helpful, 5) I would recommend this training to others, 6) none of the information presented is new to me, and 7) I would prefer distance learning instead of in class training. A 5-point Likert response scale (1, strongly disagree; 2, disagree; 3, neutral; 4, agree, or 5, strongly agree) was used for questions 1 through 3; true/false responses were used for the last four questions.

On the follow-up assessment, nine quantitative evaluation questions were asked; questions 1 through 5 and 7 from the mid-training evaluation, along with three new questions: 1) An appropriate amount of material covered during this training, measured on a 5-point Likert scale (1, strongly disagree; 2, disagree; 3, neutral, 4, agree, or 5, strongly agree). There were two

true/false questions—the structure and the format of the training was beneficial to the learning process and the information presented in the training has adequately prepared me for the next phase of the CARES project. Mean values and standard deviations were computed for each Likert response question and frequencies and percentages were computed for true/false questions on the mid-training and follow-up evaluations.

SAS 9.2 (SAS Institute Inc., Cary, NC) was used to conduct statistical analyses; significance was assessed at $p < .05$. This study was approved by the Stony Brook University Committee on Research Involving Human Subjects.

<A>Results

Assessment of Participant Knowledge

<N>Overall, there were indications that fellows knowledge improved; out of 16 questions, on average fellows answered 6 (38%) questions correctly at baseline (mean, 6.2; SD, 3.3; median, 7.0) and 12 (75%) questions correctly at follow-up (mean, 11.7; SD, 3.0; median, 12.0; $p = .01$). The three greatest improvements were for defining health literacy (no one got it correct at baseline and 8 [73%] got it correct at follow-up), defining the Belmont Report (1 [9%] answered correctly at baseline versus 8 [73%] at follow-up), and explaining the differences between quantitative and qualitative research methods (4 [36%] correct at baseline and 10 [91%] at follow-up). Based on the Wilcoxon signed-rank tests, these differences were statistically significant ($p = .01$ for all three; Table 2). Significant differences also existed when participants were asked to define the purpose of focus groups, HIPPA, and ethnography ($p < .05$ for all three). The three smallest differences were for defining the role of an Institutional Review Board (8 [73%] participants providing correct responses at baseline and 8 [73%] at follow-up), defining the overarching goal of *Healthy People 2010* (4 [36%] correct at baseline and 5 [46%] at follow-

up), and defining the Tuskegee Experiment (9 [82%] correct at baseline and 11 [100%] at follow-up). Fellows performed poorly when asked to define the role of an Institutional Review Board and the overarching goal of *Healthy People 2010* (highest percentage of participants with correct response at baseline and incorrect at follow-up, 18% for both); the most difficult question was defining the term ethnography (the majority of fellows were incorrect at both baseline and follow-up [64%]).

<T>Table 2

<N> Comparisons for the mean percent of correct scores on pre- and post-tests at each session showed that in 9 out of 11 sessions, post-test scores were higher than pre-test scores; two sessions had average post-test scores that were lower than pre-test scores. Based on the Wilcoxon signed-rank tests, sessions 1, 7, 9, and 11, post-test scores were significantly higher than pre-test scores ($p = .01, .02, .03, \text{ and } .03$, respectively); post-test scores for sessions 5 ($p = .02$) and 8 ($p = .05$) were significantly lower than pre-test scores (Table 3).

<T>Table 3

Evaluation of Participant Satisfaction

<N>Fellows' rated all sessions well on the evaluations; overall evaluation average range from 4.4 to 4.9 (between good and excellent). The mean of the evaluation scores for each session were between 4.3 (session 1) and 4.8 (sessions 3 and 9; Figure 1). The mean of the mid-training evaluation scores were between 4.3 and 4.7, and mean of follow-up assessment evaluation scores were between 4.1 and 4.4. CARES fellows all reported that the CARES project team/staff was knowledgeable and helpful, they would recommend the training to others, information presented was new to them, and had adequately prepared them for the next phase of the CARES project;

the majority (90% at mid-training, 80% at follow-up) of CARES fellows prefer in-class training over distance learning.

<T>Figure 1

<A>Discussion

<N>The CARES training was designed to increase research literacy in minority communities and develop the infrastructure for CBPR in Long Island. When CBPR was introduced to this community, one of their primary requests was to be trained in research methodology.

Community members requested training as a necessary tool for them to operate as equal partners in research projects. The ability to act as partners in the research process allows for the community to take ownership of the research done in their community and ensure that projects conducted are based on a community-driven research agenda.

The optimal measure of success for the CARES project was the response to the CARES request for proposals and the development of two successful pilot CBPR projects. These projects reflect the true spirit of CBPR, such that the ideas are generated by and are important to the community. Four CARES fellows developed a study where they conducted door-to-door surveys in a predominately Hispanic community to gain better insight to the barriers in obtaining health care. Two CARES fellows developed a 12-week (6 sessions) educational obesity intervention for Black women; each educational session was followed by a focus group with participants to elucidate the reasons for the increased prevalence of obesity among Black women and foster a supportive environment for the discussion of successful strategies for incorporating healthy lifestyle changes. The CARES training program prepared fellows to develop CBPR projects using a broad array of research methodologies (quantitative and qualitative) to address health disparities.

We assessed participant knowledge and conducted a comprehensive (formative and summative), mixed-methods evaluation of the CARES training program. Quantitative assessments include baseline and follow-up assessments, and session pre- and post-tests. Quantitative evaluation components include closed ended evaluation questions from the session evaluations, mid-training evaluation, and follow-up evaluation (questions on follow-up assessment). Qualitative evaluation components include open ended questions asked on session one evaluation, mid-training evaluation, follow-up evaluation, and summative evaluation semistructured interviews conducted several months after the training was complete. The results from the quantitative evaluation suggest the CARES training program was highly successful and well-received by participants. Results of the qualitative evaluation components will be presented elsewhere.

We stratified the assessment results by correct or incorrect response at baseline and follow-up. Ideally, fellows would be in the incorrect at baseline and correct at follow-up group, demonstrating information learned during the training. If fellows already knew material before the training, they would be in the correct at both baseline and follow-up group. There were never more than two respondents (18%) in the correct at baseline and incorrect at follow-up group for any of the assessment questions. However, there were several instances where respondents answered questions incorrectly at both baseline and follow-up. This occurred most often for the questions on ethnography ($n = 7$ [64%]), evidence-based public health ($n = 4$ [36%]), and overarching goals of *Health People 2010* ($n = 4$ [36%]). We believe the major contributing factor for fellows being in this group was due to missed sessions.

Although CARES was a pilot project and the size of the cohort was selected to ensure a manageable first time implementation, we believe a cohort of approximately 20 fellows is ideal;

this size allows the cohort to break into a few small groups of two to five for group activities and CBPR pilot projects. The CARES training cohort became a cohesive unit as fellows' own experiences brought a great deal to the training; many fellows shared similar interest about change for their communities. We believe the size of the cohort greatly contributed to the cohesiveness of the cohort and that this was a major factor for commitment by fellows to completion of the program.

The structure of the CARES training program (weekly in-person sessions) was a major reason for attrition of participants. Although the training was scheduled based on fellows' responses to an availability survey, we could not find a time that worked for everyone and thus some fellows missed sessions owing to a conflict with the timing of the training sessions. Most of the attrition took place in the first 4 weeks of training. Fellows signed a participant agreement at the orientation session that stated they would not miss more than two training sessions; by week 4 we lost four (21%) participants because of the attendance policy. We lost another three fellows between weeks five and six of the program, and we believe this is because the course started over the summer months but transitioned into the fall months; a few participants had schedule changes and could no longer attend the training as scheduled.

CARES produced a paradigm shift, emphasizing a community-driven research agenda, enhancing community knowledge of research, and uniting key stakeholders into a comprehensive academic-community based research network. In this setting, community members are fully engaged and instrumental to the development of research conducted in their communities. The CARES training program was instrumental in developing an infrastructure for true CBPR where the projects developed are initiated by the community and lend themselves to community action.

<A>Acknowledgments

<N>The authors thank the CARES fellows for their participation and insight, and the CARES faculty for volunteering their time and going into the community to share their knowledge.

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<table number>Figure 1. <table title>CARES fellows' mean evaluation scores for each session. Session 6 had no evaluation data. *Ratings: 1, strongly disagree; 2, disagree; 3, neutral; 4, agree; 5, strongly agree. ** Ratings: 1, poor; 2, fair; 3, neutral; 4, good; 5, excellent.

<table title>Table 1. <table number>Characteristics of CARES Fellows Who Completed Both Baseline and Follow-up Assessments (*n* = 11)

<table>

Characteristic	<i>n</i>	%
Gender		
Female	8	72.7
Male	3	27.3
Race		
Non-Hispanic Black	7	63.6
Non-Hispanic White	3	27.3
Hispanic	1	9.1
Education		
College degree	5	45.5
Graduate degree	5	45.5
Doctoral degree	1	9.1
Country of birth		
United States	8	72.7
Foreign born	3	27.3
Affiliation		
Community health worker	4	36.4
Community-based organization	5	45.5
Community member	2	18.2
Age (yrs)		
Mean	54.7	
Standard deviation	14.0	

<table number>Table 2. <table title>CARES Fellows ($n = 11$) Percent of Questions Correct at Baseline and Follow-up

<table>

CARES Fellows Responses at Baseline and Follow-up Assessments	% CARES Fellows answered questions correctly					BS1FU0, [†] n (%)	BS0FU0, [†] n (%)	BS1FU1, [†] n (%)	BS0FU1, [†] n (%)
	Baseline	Follow-up	Difference	Wilcoxon Signed-Ranks Test					
				Z_w	P				
Informed consent	63.6	90.9	27.3	1.342	.18	1 (9.1)		6 (54.5)	4 (36.4)
Belmont Report	9.1	72.7	63.6	2.646	.01 ^{**}		3 (27.3)	1 (9.1)	7 (63.6)
Tuskegee Experiment	81.8	100	18.2	1.414	.16			9 (81.8)	2 (18.2)
Health literacy	0	72.7	72.7	2.828	.01 ^{**}		3 (27.3)		8 (72.7)
Evidence-based public health	36.4	63.6	27.2	1.732	.08		4 (36.4)	4 (36.4)	3 (27.3)
Cultural competency	54.6	81.8	27.2	1.342	.18	1 (9.1)	1 (9.1)	5 (45.4)	4 (36.4)
IRB role	72.7	72.7	0	0.000	1.00	2 (18.2)	1 (9.1)	6 (54.5)	2 (18.2)
HIPAA	36.4	81.8	45.4	2.236	.03 [*]		2 (18.2)	4 (36.4)	5 (45.4)
Differences between quantitative and qualitative methods	36.4	90.9	54.5	2.449	.01 [*]		1 (9.1)	4 (36.4)	6 (54.5)
Differences between CBPR and traditional Research	54.6	81.8	27.2	1.342	.18	1 (9.1)	1 (9.1)	5 (45.4)	4 (36.4)
Mixed-methods approach	36.4	72.7	36.3	1.633	.10	1 (9.1)	2 (18.2)	3 (27.3)	5 (45.4)
Ethnography	0	36.4	36.4	2.000	.05 [*]		7 (63.6)		4 (36.4)
Purpose of focus groups	27.3	72.7	45.4	2.236	.03 [*]		3 (27.3)	3 (27.3)	5 (45.4)
overarching goal of Healthy People 2010	36.4	45.5	9.1	0.447	.66	2 (18.2)	4 (36.4)	2 (18.2)	3 (27.3)
Information expect to get from community health assessment	63.6	90.9	27.3	1.732	.08		1 (9.1)	7 (63.6)	3 (27.3)
BEST health promotion planning model	9.1	45.5	36.4	1.633	.10	1 (9.1)	5 (45.4)		5 (45.4)

<table note>* $p < .05$; ** $p < .01$.

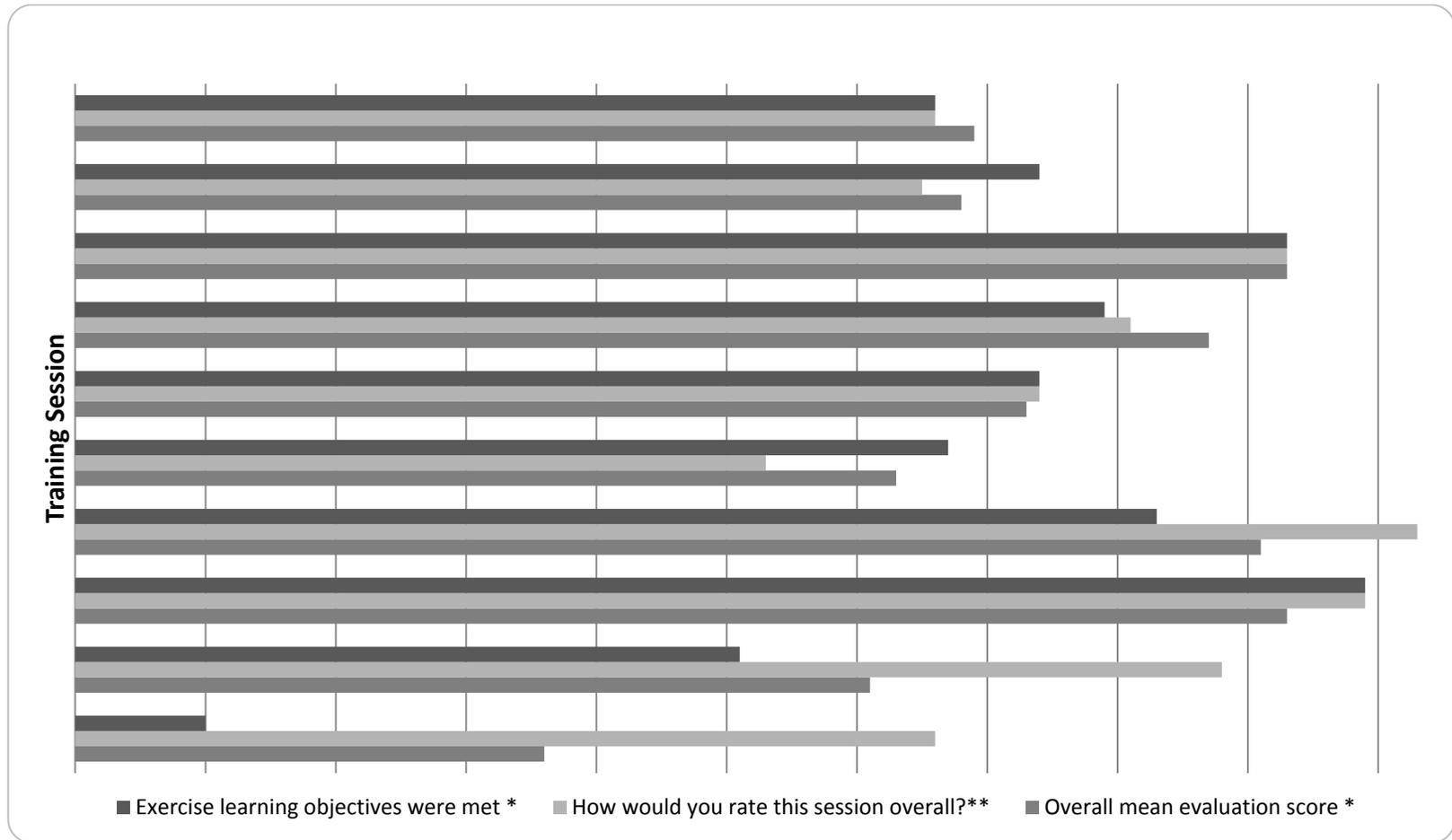
[†]BS1FU0, correct at baseline and incorrect at follow-up; BS0FU0: incorrect at baseline and incorrect at follow-up; BS1FU1: correct at both baseline and follow-up; BS0FU1: incorrect at baseline and correct at follow-up

<table title>Table 3. <table number>CARES Fellows Training Pre- and Posttest Scores (Percent of Total Correct at Each Session)

Percent Correct at Each Session		Pre-test Score		Post-test Score		Score Difference (post-pre)		Wilcoxon Signed-Ranks Test	
Sessions	<i>n</i>	Mean	SD	Mean	SD	Mean	SD	<i>z_w</i>	<i>p</i>
1. Introduction to Research	16	67.5	16.5	83.1	7.0	15.6	18.6	2.689	.01**
2. E-Health and Health Literacy	18	76.7	18.5	88.9	14.1	12.2	26.7	1.866	.06
3. Ethics	18	71.1	14.1	74.4	20.4	3.3	20.9	.676	.50
4. Research Methods	15	60.0	21.4	61.3	26.7	1.3	19.2	.277	.78
5. Library Resources/Data/Cultural Competency	15	77.3	21.2	53.3	24.7	-24.0	31.4	-2.381	.02*
6. Qualitative Methods	12	50.0	30.2	61.7	24.8	11.7	32.4	1.144	.25
7. Census 2010: Stand Up and Be Counted/Quantitative Methods	12	62.5	16.9	81.3	18.8	18.8	21.7	2.310	.02*
8. Community-Based Participatory Research	14	76.8	26.8	51.8	22.9	-25.0	40.4	-1.987	.05*
9. Community Health	12	81.7	15.9	91.7	10.3	10.0	13.5	2.121	.03*
10. Introduction to Epidemiology	12	75.0	21.1	80.0	17.1	5.0	21.1	.791	.43
11. Workforce Assessment and Health Literacy	9	46.7	17.3	75.6	16.7	28.9	28.5	2.214	.03*

<table note>**p* < .05; ***p* < .01.

Figure 1: CARES Fellows' mean evaluation scores for each session†



† Session 6 had no evaluation data;

* Ratings: 1 – Strongly Disagree 2 – Disagree 3 – Neutral 4 – Agree 5 – Strongly Agree

** Ratings: 1 – Poor 2 – Fair 3 – Neutral 4 – Good 5 – Excellent