Evaluation of Computer-Based Training for Health Workers in Echocardiography for RHD

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Background: The implementation of screening for rheumatic heart disease at a population-scale would require a considerable increase in human resources. Training nonexpert staff in echocardiography requires appropriate methods and materials.

Objectives: This pre/post study aims to measure the change in the knowledge and confidence of a group of health workers after a computer-assisted training intervention in basic echocardiography for rheumatic heart disease.

Methods: A syllabus of self-guided, computer-based modules to train nonexpert health workers in basic echocardiography for rheumatic heart disease was developed. Thirty-eight health workers from Uganda participated in the training. Using a pre/post design, identical test instruments were administered before and after the training intervention, assessing the knowledge (using multiple-choice questions) and confidence (using Likert scale questions) in clinical science and echocardiography.

Results: The mean total score on knowledge tests rose from 44.8% to 85.4% (mean difference: 40.6%, 95% confidence interval [CI]: 35.4% to 45.8%), with strong evidence for an increase in scores across all knowledge theme areas ($p < 0.001$). Increased confidence with each key aspect was reported, and there was strong evidence for an increase in the mean score for confidence scales in clinical science (difference: 7.1, 95% CI: 6.2 to 8.0; $p < 0.001$) and echocardiography (difference: 18.3, 95% CI: 16.6 to 20.0; $p < 0.001$).

Conclusions: The training program was effective at increasing knowledge and confidence for basic echocardiography in nonexpert health workers. Use of computer-assisted learning may reduce the human resource requirements for training staff in echocardiography.

Rheumatic heart disease (RHD) continues to be a major cause of morbidity and mortality in many resource-limited settings, causing in excess of 275,000 deaths annually [1]. The control of this disease is a priority of the World Heart Federation [2]; however, most patients present to clinical services with advanced disease [3], requiring surgical or medical treatments that are often unavailable, extremely costly, and ineffective as prevention.

Screening of high-prevalence populations has been recommended by the World Health Organization to detect cases that can be commenced on secondary antibiotic prophylaxis (most commonly regular penicillin injections) [4]. Echocardiography is a highly sensitive test for RHD [5,6]; however, the human resource requirements for echocardiographic screening are considerable. When considering the global shortage in specialist health professionals [7], it is not feasible for cardiologists or accredited technicians to perform screening at a population level in resource-limited settings.

Recent studies have attempted to address this issue by task-shifting screening to health workers without formal training in echocardiography, using simplified imaging algorithms consistent with the principles of focused cardiac ultrasonography [8]. Initial results with small numbers of health workers have demonstrated the potential of this approach to deliver acceptable sensitivity [9–11].

Task-shifting of echocardiography requires the development of an innovative training curriculum [12,13] in order to effectively and rapidly deliver the required skills that traditionally require years of study and supervised practice [14]. Echocardiography is a practical skill, but it requires a solid foundation of theoretical knowledge. The knowledge required to perform echocardiography for RHD includes anatomy and physiology of the heart, the pathophysiological changes of disease and their appearance on an echocardiogram, and a knowledge of the standard echocardiographic views: how to obtain, optimize, and interpret images. A curriculum encompassing these key learning areas has been developed for face-to-face training in Fiji [15].

Computer-assisted instruction has been shown to be an effective teaching method for a range of clinical skills,

Dr. Longenecker has received research grants from Bristol-Myers Squibb. All other authors report no relationships that could be construed as a conflict of interest.
The funders did not play any role in the design of the study; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the paper for publication.
D. Engelman is supported by an Australian National Health and Medical Research Council/National Heart Foundation research fellowship and is also supported by The University of Melbourne Nossal Global Health Scholars Programme. C.T. Longenecker is supported by the National Institutes of Health (K23 HL123341), a Wolf Family Foundation Scholars Grant, and Medtronic Philanthropy. A.C. Steer is supported by an Australian National Health and Medical Research Council/National Heart Foundation research fellowship. The development of the modules was assisted by a grant from Medtronic Philanthropy to WiRED International.
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GLOBAL HEART

VOL. 12, NO. 1, 2017
ISSN 2211-8160/$36.00.
http://dx.doi.org/10.1016/j.gheart.2015.12.001

including ultrasonography [16–19], and e-learning methods are increasingly being used to teach cardiology in resource-limited settings [20]. Self-instruction using a guided, computer-based curriculum has the potential to reduce the human resource requirements for face-to-face training in RHD screening, which may enable training and RHD screening at a population scale.

Therefore, the aim of this study was to measure the change in the knowledge and confidence of a group of health workers after a computer-based, self-guided training intervention in basic echocardiography for RHD.

METHODS

Study design, setting, and participants

This prospective, single group, pre/post study compared the knowledge and confidence of nonphysician health workers before and after completing an online curriculum of training modules for RHD screening.

The study was carried out in May 2014 in the Kampala district of Uganda. Local physicians recruited participants from Makerere University, Mulago Hospital, and the Joint Clinical Research Centre. Eligible participants were health workers who were literate in English and had access to a computer during the intervention period. Doctors and health workers with previous training in echocardiography or ultrasonography were excluded, as the modules are designed for nonexperts. The study was approved by the Research and Ethics Committee of the School of Medicine, Makerere University.

Training intervention

The training package was authored by clinicians with experience in training health workers for RHD screening and was based on a face-to-face training curriculum [15] and experiences of training nurses to perform focused echocardiographic screening in a previous study in Fiji [9]. In that program, nurses receive 5 days of physician-led, theoretical training in the first week and another one-half day per week for 7 weeks. The computer training package was designed to reduce the clinician-led teaching time and intended as a component of a program that also includes hands-on training. The curriculum includes 10 topics, with larger topics divided so that there are a total of 14 modules (Table 1). The modules were designed to be completed in sequence, and each module was expected to take 30 to 45 min to complete. All modules were reviewed by at least 2 independent experts in pediatric cardiology or echocardiography. Each key learning point is followed by several multiple-choice questions to promote active participation. Users cannot advance through the module without attempting the questions. Explanations of correct answers are provided after each question is attempted. Each module ends with a formative multiple-choice questions quiz to consolidate learning, including new questions and repetition of previous questions in a randomly selected order. Anatomical diagrams, multimedia animations, and videos were created specifically for the package. A library of echocardiographic images and videos, showing normal and disease states, was established from the authors' own libraries and existing online resources. The package of modules was programmed by WiRED International, a nonprofit, volunteer-driven organization that provides medical information and education to underserved communities, and incorporated into the WiRED Health Education Learning Portal. The modules are available to access online or download without cost [21]. For this study, each participant was provided with a USB flash drive containing the package of modules, which can be opened in all standard Internet browsers. An interval of 3 weeks between pre- and post-tests was scheduled to complete the modules. Training was completed outside of regular work or study, in the participants' own time.

TABLE 1. Details of training modules

Module	Topic
1	Rheumatic heart disease and rationale for screening
2a	Anatomical terminology and important structures
2b	Physiology and the cardiac cycle
3	Rheumatic heart disease pathophysiology
4	How echocardiography works
5a	Overview of echocardiographic imaging
5b	Parasternal long-axis view
5c	Parasternal short-axis view
5d	Apical 4/5 chamber views
6	Adjusting the 2-dimensional images
7	Color Doppler imaging
8	Rheumatic heart disease findings on echocardiogram
9	Measuring regurgitation
10	Using ECG with echocardiography

ECG, electrocardiography.

Outcomes and survey instrument

Pre-test. Basic demographics and participant experience with echocardiography, RHD, and computer-based learning were collected (see the Online Appendix). Knowledge was assessed by 30 multiple-choice questions covering the all key concepts taught in the training intervention: cardiovascular anatomy (6 questions); physiology and pathophysiology (6); anatomy on echocardiography (4); echocardiography views and skills (8); and Doppler echocardiography (6). Each question had 1 correct answer out of 5 possible answers. The questions used in the testing instruments were different to those used in the modules, but tested similar key concepts. Participants were not provided with any feedback or correct answers after the test.

Confidence was assessed by 14 Likert-type questions covering the important areas required for RHD screening that are taught in the training package (Figure 1). Each question was answered on a scale of 1 to 5 (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree). The Likert items were summed to form a clinical science confidence scale (including anatomy, physiology, and pathology) and an echocardiography confidence scale, each comprising 7 questions (maximum scale score 35). Responses to individual questions were coded as either not confident (response 1 or 2) or confident (response 4 or 5).

Post-test. The post-intervention instrument contained identical questions to assess knowledge and confidence. In addition, 7 five-point Likert-type questions assessed feedback on the user experience of the training modules and were coded as either positive or negative. To assess participation, health workers were required to enter a password received at the completion of each module.

Survey instruments were accessed online, using an individualized link e-mailed to participants. Participants completed the tests at computer facilities at their host institution and were supervised by an investigator at all times. The tests were not accessible after completion, and participants were not aware that questions would be repeated after training. No additional materials were permitted in the test venue. Test results were deidentified, and there were no employment incentives for participants related to test performance.

Statistical methods

Only those who completed both the pre- and post-tests were included in the analysis. The paired *t* test was used to compare mean scores of knowledge tests and Likert confidence scales before and after the intervention. Results were analyzed using Stata (version 13, StataCorp, College Station, TX).

RESULTS

Thirty-eight health workers participated in the program, and all completed the pre- and post-intervention instruments. Partial data for 4 participants were not captured due to a technical issue with the online instrument; therefore, 34 participants were included in the analysis.

Health worker participants included nursing students and registered nurses. None had any previous training in echocardiography, and few spent substantial time working with RHD patients. The cohort was experienced with use of computers for professional development (Table 2). Based on self-report and collection of module passwords, 100% of subjects completed all modules in the series prior to the post-intervention test.

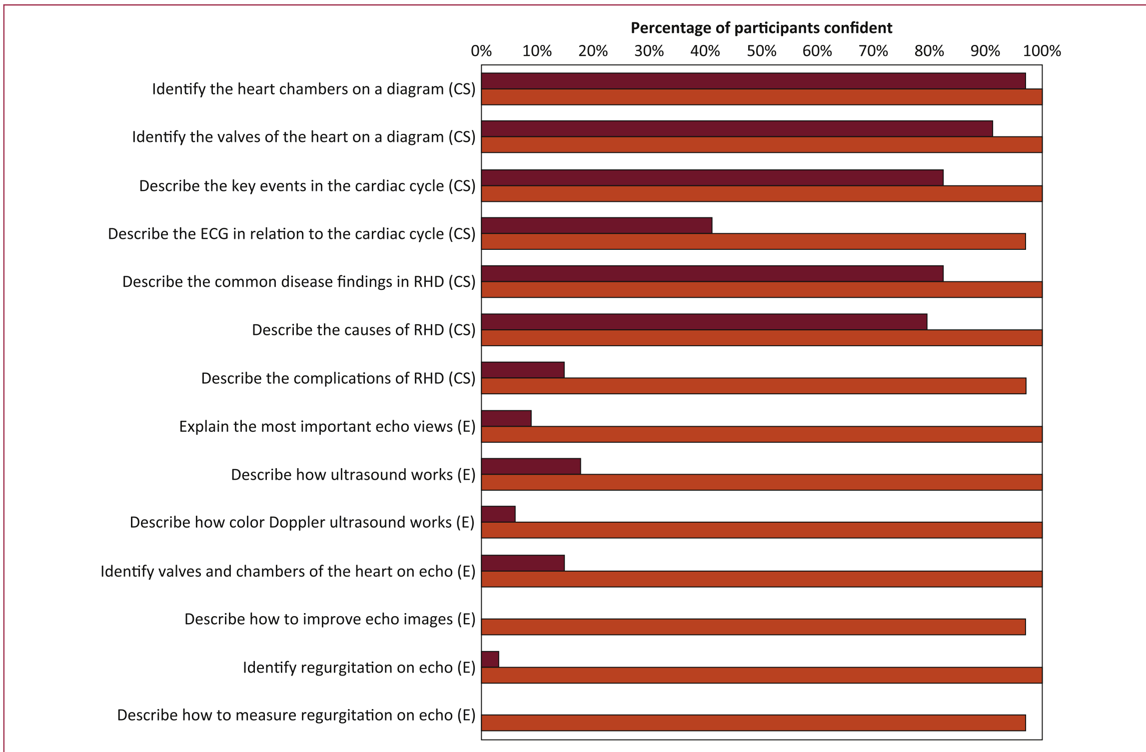

FIGURE 1. Percentage of participants confident on aspects of clinical science (CS) or echocardiography (E) for rheumatic heart disease (RHD) before and after training intervention. ECG, electrocardiography.

TABLE 2. Characteristics of participants (n = 34)

Age, yrs	
≤25	26 (76.5)
26–35	6 (17.6)
36–45	2 (5.9)
>46	0 (0.0)
Sex	
Male	9 (26.5)
Female	25 (73.5)
Occupation	
Nursing student	30 (88.2)
Registered nurse	4 (11.8)
Experience with echocardiography	
None	14 (41.2)
Minimal	18 (52.9)
Basic (no training)	2 (5.9)
Intermediate (some training)	0 (0.0)
Percentage of work involving rheumatic heart disease	
None	16 (47.1)
0–25	14 (41.2)
25–50	2 (5.9)
50–75	0 (0.0)
75–100	2 (5.9)
Use of computers	
Less than weekly	0 (0.0)
About once per week	2 (5.9)
Most days	15 (44.1)
Multiple times each day	17 (50.0)
Previous computer-based learning	
Yes	25 (73.5)
Previous Internet-based learning	
Yes	23 (67.6)
Confident using Internet for work purposes	
Agree	34 (100.0)

Values are n (%).

Knowledge

The proportion of participants selecting the correct answer increased for 28 of 30 questions (absolute difference, range 5.9% to 88.2%) and did not change for 2 questions (Figure 2). The mean total score on knowledge tests rose from 44.8% to 85.4% (mean difference: 40.6%, 95% confidence interval: 35.4 to 45.8%) (Figure 3). There was strong evidence for an increase in mean scores across all knowledge-theme areas ($p < 0.001$) (Table 3).

Confidence

The confidence of the group increased significantly, such that the proportion of participants reporting confidence after training was >90% for all 14 questions (Figure 1). There was strong evidence for an increase in the mean score for confidence scales in clinical science, echocardiography, and overall ($p < 0.001$ for all 3 scales) (Table 4).

Feedback

Feedback on the modules was strongly positive on ease of use (97% positive), helpfulness of multimedia pictures and videos (97% positive) and difficulty level of module content (91% positive). Regarding technical use of the computer-based package, 26% experienced some difficulties using the modules on the Internet (68% no difficulties; 6% neutral), and 12% experienced some difficulties using the computers (88% no difficulties). Participants were divided about the length of the modules, with 44% agreeing modules were too long and 44% disagreeing (12% neutral).

DISCUSSION

In this evaluation of computer-assisted training materials for RHD screening, we report strong evidence for an increase in knowledge across all required learning areas, as well as increased confidence in core competencies for a group of health workers without previous training in ultrasonography. The statistical associations were consistently strong, with clear confidence intervals and p values all <0.001. Feedback from participants was generally very positive.

The large effect observed across all learning areas may be related to the low baseline knowledge of the group in these topics. Nevertheless, the results demonstrate that this computer-assisted learning package is effective at teaching concepts such as echocardiographic views and ultrasonography theory to nonexpert health workers. The mean knowledge score of 85% suggests a significant foundation of knowledge after training. Use of the training modules may reduce face-to-face teaching times and therefore the human resource requirements for busy clinicians and faculty. The modules are not intended to replace practical demonstrations and experiential learning, which remain essential for skill acquisition and basic echocardiographic competence, but may enhance these sessions by adequately preparing health workers.

Study limitations

In order to maximize the number of health workers trained, we did not include a control group and, therefore, are unable to allow for confounders or the effects of pre-testing. However, the likelihood of external factors influencing the knowledge scores is considered low, as participants were not exposed to other teaching during the study period. Furthermore, participants are unlikely to have concentrated on topics covered in the pre-test, as they were not aware the test questions would be repeated, and test questions covered the full range of learning topics. Although the authors of the training package were also involved in the evaluation, in-country testing was led by an independent investigator (E.O.) and therefore the potential for bias is low. The study design did not permit evaluation of the retention of knowledge, as the testing was completed shortly after training. We did not test for an effect of the

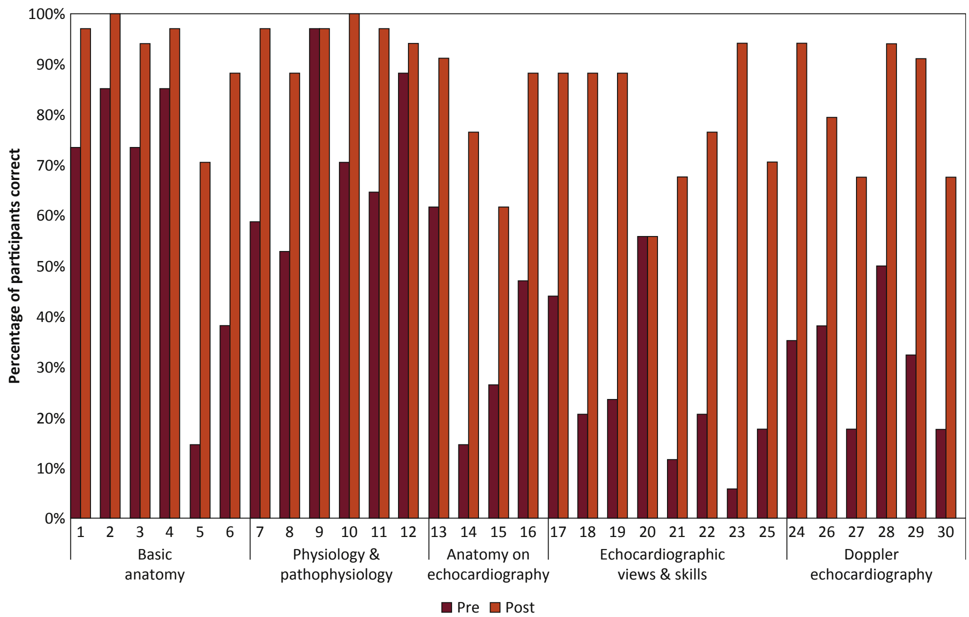

FIGURE 2. Percentage of participants correctly answering individual knowledge question before and after training.

theoretical training on practical skills, which could be investigated in future studies of groups receiving standard face-to-face versus computer-led training. The participating health workers were predominantly young, computer-literate nurses and nursing students, and therefore findings may differ in other settings.

Population-based screening as a public health strategy for RHD control remains a topic of research and debate. If it is to be effective, critical health systems infrastructure must be implemented to ensure appropriate secondary prophylaxis and management of cases detected through screening. The accuracy of RHD screening by health

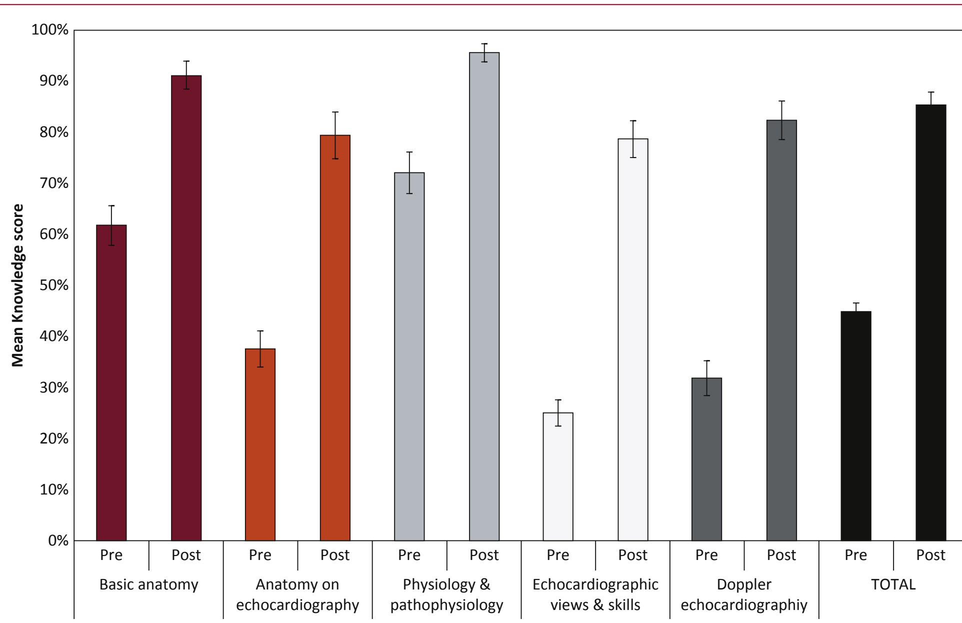

FIGURE 3. Knowledge scores by learning theme, before and after training. Error bars represent standard error of the mean. There is strong evidence for an increase in scores after training (paired t test, $p < 0.001$).

TABLE 3. Difference in knowledge scores before and after training

Knowledge Theme (Questions, n)	Pre-Intervention (%)	Post-Intervention (%)	Difference	p Value
Basic anatomy (6)	61.8 ± 22.3	91.2 ± 16.0	29.4 (19.9–36.0)	<0.001
Physiology and pathophysiology (6)	72.1 ± 23.8	95.6 ± 10.3	23.5 (14.6–32.5)	<0.001
Anatomy on echocardiography (4)	37.5 ± 20.6	79.4 ± 26.5	41.9 (29.8–54.0)	<0.001
Echocardiography views and skills (8)	25.0 ± 15.1	78.7 ± 15.1	53.7 (45.1–62.2)	<0.001
Doppler echocardiography (6)	31.9 ± 19.8	82.4 ± 22.1	50.5 (40.7–60.3)	<0.001
Total (30)	44.8 ± 10.5	85.4 ± 14.5	40.6 (35.4–45.8)	<0.001

Values are mean ± SD or mean (95% confidence interval).

workers requires further evaluation in a variety of settings before it can be recommended as a valid strategy. The significance of mild echocardiographic findings and the effect of secondary prophylaxis in preventing disease progression remain uncertain pending long-term follow-up studies. However, the development and evaluation of screening methodologies, including training methods, should occur concurrently to these other considerations. Strengthening and expanding the evidence base in all of these areas are needed for the development of appropriate policy for screening in various settings.

CONCLUSIONS

This series of modules in echocardiographic screening for RHD was highly effective in increasing the knowledge and confidence of a group of nonexpert health workers. The modules have now been translated into Portuguese and Spanish and have been used for training in many countries in Africa, South America, and the Pacific. The nature of the web-based resource means further development is practicable and may include translation into further languages and additional modules, for example, for the use of handheld ultrasonogram devices, which have the potential to further increase the reach of echocardiographic screening [10,11,22].

TABLE 4. Difference in confidence scale scores before and after training

Confidence Scale	Pre-Intervention	Post-Intervention	Difference	p Value
Clinical science	26.5 ± 2.9	33.6 ± 2.2	7.1 (6.2–8.0)	<0.001
Echocardiography	14.1 ± 4.3	32.5 ± 2.4	18.3 (16.6–20.0)	<0.001
Overall	40.7 ± 5.6	66.1 ± 4.2	25.4 (23.5–27.4)	<0.001

Values are mean ± SD or mean (95% confidence interval).

ACKNOWLEDGMENTS

The authors are grateful to a number of people who have contributed to this study. WiRED International IT staff programmed the modules and test instruments. Susan Sawyer, Agnes Dodds, and Amy Gray provided advice regarding the design of the instruments. Susan Donath assisted with the statistical analysis plan. Joseph Kado, Samantha Colquhoun, Janet Scheel, Mariana Mirabel, and Carlos Barrios were involved in the development and review of training materials.

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APPENDIX

Test questionnaire

These questions were administered using a web-based survey. Survey formatting and multimedia (images and videos) have not been reproduced.

Section A: Demographics and experience.

1. How old are you?
   A. Under 25
   B. 26–35
   C. 36–45
   D. 46–55
   E. Over 55
2. Are you male or female?
   A. Male
   B. Female
3. What is your role/occupation?
   A. Community health worker
   B. Nursing student
   C. Nurse
   D. Medical student
   E. Doctor—less than 3 years' work experience
   F. Doctor—more than 3 years' work experience
   G. Other—please specify
4. What is your previous experience with echocardiography?
   A. No experience (e.g., I have never seen an echo)
   B. Minimal experience (e.g., I have seen one but never done one)
   C. Basic/beginner (e.g., I have done a few echos without training but am not confident)
   D. Intermediate (e.g., I have had basic training and have some experience and confidence)
   E. Advanced (e.g., completed previous training and have experience and confidence)
   F. Expert (e.g., Cardiologist)
5. My work involves patients with rheumatic heart disease
   A. None
   B. 0% to 25% of my work
   C. 25% to 50%
   D. 50% to 75% of my work
   E. 75% to 100% of my work
6. How often do you use a computer?
   A. Less than once per week
   B. About once per week
   C. Most days
   D. Multiple times each day
7. Have you previously used computer-based courses for learning?
   A. No
   B. Yes
8. Have you previously used Internet-based courses for learning?
   A. No
   B. Yes
9. Please indicate **how strongly** you agree with the following statement.
   I am confident using the Internet to find information for my work.
   A. Disagree Strongly
   B. Disagree
   C. Neither Agree nor Disagree
   D. Agree
   E. Agree Strongly

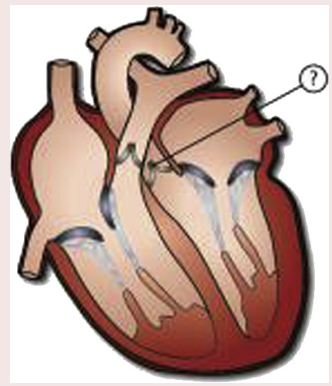
Section B: Confidence. Please indicate **how strongly** you agree with the following statements

I Am Confident That I Am Able to …	Disagree Strongly	Disagree	Neither Agree Nor Disagree	Agree	Agree Strongly
Identify the heart chambers on a diagram					
Identify the valves of the heart on a diagram					
Describe the key events in the cardiac cycle					
Describe the ECG in relation to the cardiac cycle					
Describe the common disease findings in rheumatic heart disease					
Describe the causes of rheumatic heart disease					
Describe the complications of rheumatic heart disease					
Explain the most important echocardiography views					
Describe how an ultrasonogram works					
Describe how color Doppler ultrasonography works					
Identify valves and chambers of the heart on echocardiography					
Describe how to improve echocardiography images					
Identify regurgitation on echocardiography					
Describe how to measure regurgitation on echocardiography					

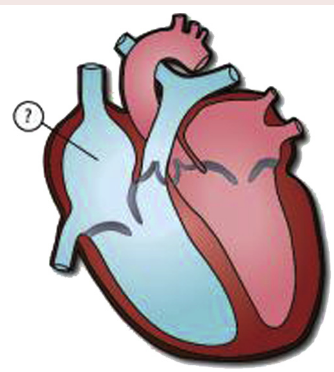
ECG, electrocardiography.

Section C: Knowledge.

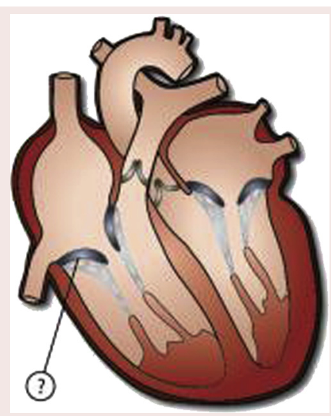
1. What is the structure indicated?
   A. Rheumatic valve
   B. Tricuspid valve
   C. Arterial valve
   D. Mitral valve
   E. Aortic valve



2. What is the structure indicated?
   A. Right ventricle
   B. Left pulmonary artery
   C. Right atrium
   D. Left atrium
   E. Right pulmonary artery



3. What is the structure indicated?
   A. Pulmonary valve
   B. Tricuspid valve
   C. Aortic valve
   D. Mitral valve
   E. Rheumatic valve



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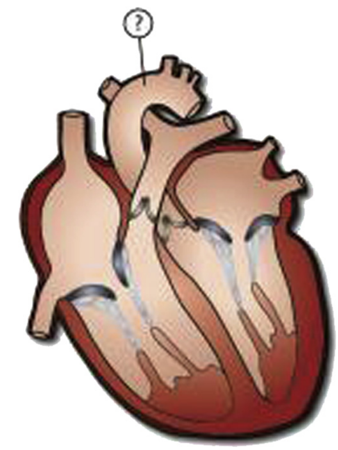
4. What is the structure indicated?
   A. Pulmonary artery
   B. Pulmonary vein
   C. Inferior vena cava
   D. Aortic arch
   E. Superior vena cava



5. Compared with the left ventricle, the right ventricle is located:
   A. Posteriorly and laterally
   B. Anteriorly and medially
   C. Anteriorly and laterally
   D. Posteriorly and medially
   E. Superiorly and laterally
6. How many leaflets does the aortic valve normally have?
   A. 1
   B. 2
   C. 3
   D. 4
   E. 5
7. From the left atrium, where does the blood flow?
   A. Through the aortic valve into the left ventricle
   B. Through the pulmonary valve into the right ventricle
   C. Through the tricuspid valve into the left ventricle
   D. Through the mitral valve into the left ventricle
   E. Through the tricuspid valve to the right ventricle
8. During diastole:
   A. The left ventricle relaxes and blood flows into the left atrium
   B. The left atrium contracts and blood flows into the aorta
   C. The left ventricle relaxes and blood flows into the aorta
   D. The left ventricle relaxes and blood flows into the left ventricle
   E. The left ventricle contracts and blood flows into the left atrium

(continued)

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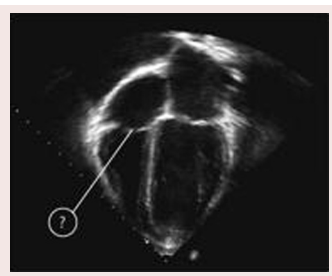
9. What is stenosis?
   A. A leaky valve
   B. A narrow valve
   C. A burst valve
   D. A floppy valve
   E. An insufficient valve
10. Which structure is most affected most often by rheumatic heart disease?
    A. Aorta
    B. Aortic valve
    C. Tricuspid valve
    D. Mitral valve
    E. Left ventricle
11. Which valve allows blood flow from the right atrium to the right ventricle?
    A. Rheumatic
    B. Pulmonary
    C. Aortic
    D. Mitral
    E. Tricuspid
12. What happens in aortic regurgitation?
    A. There is poor blood flow from the left ventricle to the aorta
    B. There is poor blood flow from the left atrium to the left ventricle
    C. Blood leaks back from the left ventricle to the left atrium
    D. Blood leaks back from the aorta to the left ventricle
    E. Blood leaks back from the aorta to the left atrium
13. What is the structure indicated?
    A. Aortic valve
    B. Pulmonary valve
    C. Mitral valve
    D. Tricuspid valve
    E. Rheumatic valve



14. What is structure indicated?
    A. Right ventricle
    B. Left atrium
    C. Left ventricle
    D. Right atrium
    E. Aorta

(continued)

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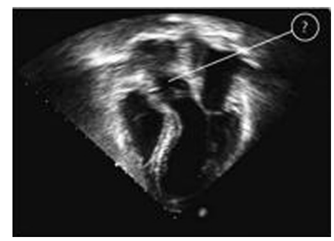
15. What is the structure indicated?
    A. Mitral valve
    B. Aortic valve
    C. Aorta
    D. Left ventricle
    E. Left atrium

16. What is the structure indicated?
    A. Left ventricle
    B. Aorta
    C. Mitral valve
    D. Tricuspid valve
    E. Right atrium



17. What are the most important echocardiography views for RHD screening?
    A. Parasternal short-axis, subcostal, and apical
    B. Suprasternal, subcostal, and apical
    C. Parasternal long-axis, parasternal short-axis, and apical
    D. Parasternal short-axis, suprasternal, and subcostal
    E. Parasternal short-axis, suprasternal, and apical
18. What is this echo view called?
    A. Parasternal long-axis
    B. Apical 5-chamber
    C. Parasternal short-axis: aortic valve level
    D. Parasternal short-axis: mitral valve level
    E. Apical 4-chamber

19. How do we attempt to avoid the imaging problem that would occur if the ultrasound waves had to travel through bone?
    A. Ask the patient to lie on their left hand side
    B. Ask the patient to lie on their right hand side
    C. Use conductive gel
    D. Ask the patient to breathe in deeply
    E. Position the probe between the ribs

(continued)

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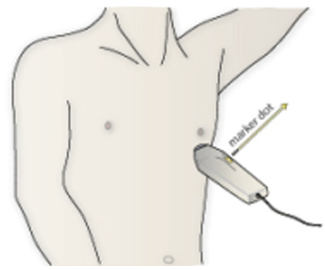
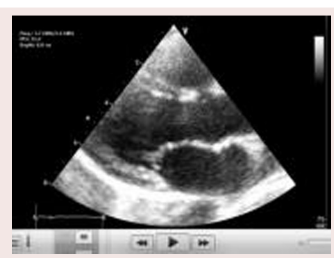
20. The figure shows the correct probe position for the
    A. Abdominal view
    B. Subcostal view
    C. Parasternal short-axis view
    D. Parasternal long-axis view
    E. Apical view



21. How would you manipulate the probe/transducer in order to move from the apical 4-chamber view to the apical 5-chamber view?
    A. Tilt the transducer upward
    B. Tilt the transducer downward
    C. Rotate the transducer 90° clockwise
    D. Rotate the transducer 90° counter-clockwise
    E. Angulate laterally

22. What is the plane indicated?
    A. Apical plane
    B. Long-axis plane
    C. Short-axis plane
    D. Subcostal plane
    E. Mitral plane

23. How would you improve the quality of this echo?
    A. Rotate the probe
    B. Ask the patient to breathe in
    C. Ask the patient to breathe out
    D. Reduce the gain
    E. Reduce the depth



24. If blood is flowing away from the probe, what colour will it be in the color Doppler mode?
    A. Red
    B. Yellow
    C. Green
    D. Purple
    E. Blue

(continued)

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25. Which echocardiography views are used to measure regurgitation in RHD screening?
    A. Parasternal long-axis and parasternal short-axis
    B. Apical and subcostal
    C. Parasternal long-axis and apical
    D. Parasternal short-axis and apical
    E. Parasternal long-axis and subcostal
26. What color would aortic regurgitation appear in the apical Doppler view?
    A. Red
    B. Yellow
    C. Green
    D. Purple
    E. Blue
27. How should you measure regurgitation?
    A. When the valve is open
    B. Parallel to the valve
    C. To the very edge of the color
    D. On the brightest frame
    E. On the mid-systole frame
28. Where should you position the region of interest box to look for aortic regurgitation?
    A. Over the aortic valve and the aorta
    B. Over the middle of the aortic valve
    C. Over the aortic valve and the left ventricle
    D. Over the left ventricle
    E. Over the aortic valve and the left atrium
29. Regurgitation of the mitral valve is seen as a jet in the:
    A. Left atrium
    B. Left ventricle
    C. Right atrium
    D. Right ventricle
    E. Aorta
30. Color seen on Doppler can be all of these, except:
    A. Closing volumes
    B. Normal
    C. High blood pressure
    D. Patient movement
    E. Artefact

RHD, rheumatic heart disease.

Section D: Feedback (post-test only).

Enter “password” from each module completed:

1	5c
2a	5d
2b	6
3	7
4	8
5a	9
5b	10

	Disagree Strongly	Disagree	Neither Agree Nor Disagree	Agree	Agree Strongly
The format of the resource was easy to follow					
The pictures and videos were helpful					
I had difficulties with the Internet					
I had difficulties with the computer					
The modules were too long					
The modules were too difficult					
The format of the resource was easy to follow					