

Original Publication

OPEN ACCESS

Breast Health Disparities: A Primer for Medical Students

Iveris L. Martinez, PhD*, Kumar Ilangovan, MD, MSPH, Ebony B. Whisenant, MD, Maryse Pedoussaut, MD, Onelia G. Lage, MD

*Corresponding author: imartine@fiu.edu

Citation: Martinez IL, Ilangovan K, Whisenant EB, Pedoussaut M, Lage OG. Breast health disparities: a primer for medical students. *MedEdPORTAL*. 2016;12:10471.
https://doi.org/10.15766/mep_2374-8265.10471

Copyright: © 2016 Martinez et al. This is an open-access publication distributed under the terms of the Creative Commons Attribution-NonCommercial license.

Abstract

Introduction: While breast cancer incidence rates have remained stable and mortality rates have declined for white women, breast cancer mortality has steadily increased for African American women since the 1950s. It has often been assumed that genetic risks linked to African ancestry are the cause for these disparities. However, a better understanding of the role of stress and social and environmental factors in health lends evidence to the social determinants behind the increasing gaps in breast health outcomes. This resource's goal is to raise awareness among undergraduate medical students about breast cancer disparities, particularly the late-stage diagnoses and the higher mortality rate for African American women.

Methods: Our educational session included a lecture on basic epidemiological data and information on breast cancer etiology followed by a case study, which was created with the founder of a local cancer support and resource center serving mainly African American women diagnosed with breast cancer. As part of the case exercise, we utilized concept mapping as a tool to apply learning. **Results:** Pre-/postquizzes showed significant improvements in knowledge and confidence in working with patients. Narrative reflections from students indicated an improvement in targeting at-risk populations, educating patients about their risk and options, and understanding the complex role that socioeconomic factors may play in patient outcomes. **Discussion:** By raising awareness and exposing medical students to the socioeconomic and cultural aspects of breast health, we hope to improve medical students' knowledge of risk factors and preventive strategies, as well as their abilities to guide patients through appropriate screening and follow-up.

Keywords

Social Determinants of Health, Breast Cancer, Health Disparities, Concept Mapping, Breast Health, African American, Women, Community

Educational Objectives

By the end of this session, learners will be able to:

1. Describe disparities in breast cancer prevalence and outcomes.
2. Identify the social determinants related to breast cancer outcomes.
3. Assess barriers to screening and treatment in local communities.

Introduction

In the United States, racial disparities in breast cancer mortality continue to exist despite an overall decrease in incidence. Since the 1950s, breast cancer incidence rates have stabilized and mortality has declined for white women, while breast cancer mortality has steadily increased for African American women.¹ Currently, African American women die more frequently from breast cancer than white women (30.2 vs. 21.3, respectively, per 100,000) and also have a lower 5-year survival rate (82% vs. 92%, respectively).² One cause of this disparity is thought to be the stage of diagnosis of most African American women. The most recent American Cancer Society guidelines recommend breast cancer screening for women over the age of 40,³ and the U.S. Preventive Task Force recommends screening starting at age 50.⁴ The data indicate that African American women may be at risk for breast cancer at younger ages due to accelerated aging associated with lifetime exposure to stress. Therefore, some have recommended that

Appendices

- A. Breast Cancer Pre- Postquiz .docx
- B. Breast Health Disparities Lecture.pptx
- C. Breast Cancer Case Study - Narrative.docx
- D. Breast Cancer Case Study - Clinical.docx
- E. Concept Map Key.pdf
- F. Faculty Facilitator Guide .docx

All appendices are peer reviewed as integral parts of the Original Publication.

breast cancer screening guidelines be modified to take into account the populations at risk at younger ages, such as African American women, especially since these national recommendations influence physician behavior and health insurance coverage.^{5,6}

Due to what is known about the higher likelihood of African American women for late-stage diagnosis, absence of stage-appropriate treatment, lower stage-for-stage survival rates, and poor-prognosis types of cancer,¹ it has often been assumed that genetic risks linked to African ancestry are the cause for these disparities. However, a better understanding of life-course psychosocial stressors and environmental factors underlying racial differences in severity, course, and treatment of breast cancer in African American women lends evidence to the social determinants behind the increasing gaps in breast health outcomes.

This lecture and case exercise were developed with support from the Susan G. Komen Foundation to train 120 future physicians to promote breast health and early diagnosis and treatment of breast cancer in underserved populations in Miami-Dade County, Florida, through a community-academic partnership. Several communities in Miami-Dade County experience excess burdens of late-stage breast cancer at the time of diagnosis—as high as 55% compared to 39% nationally.⁷ While these communities tend to have lower annual income, lower educational attainment, and a higher minority population, this does not fully explain the disparity. We hoped this project would create sustainable change by sensitizing future physicians to the issue of late diagnoses of breast cancer and premature death and engaging them as part of the solution.

Community input on the content to be included was a crucial part of this session development, in addition to conducting a literature review. The narrative case was developed over a year's time (2013-2014) by Dr. Iveris L. Martinez in collaboration with Pamela Burnett from Beautiful Gate, Inc., a local cancer support and resource center that provides support to African American women diagnosed with breast cancer. Ms. Burnett, a survivor herself, provided many insights on the community perspective of breast cancer, including details for the case from her experience and that of the women she has helped throughout the years. Adapting the narrative version of the case into a more clinically oriented patient history was done to present the history in the context a student might find when reviewing patient records. This was done through an iterative process of (1) reviewing the original narrative case, (2) identifying sections that transitioned easily into the clinical note format (e.g., history of present illness, past medical history, social history, etc.), (3) reorganizing the case to fit a commonly accepted initial history and physical exam, and (4) adding details that would be found in a clinically oriented patient note that supported the overall objectives of the case. This was reviewed and edited by physicians of multiple specialties (family medicine, internal medicine, pediatrics, adolescent medicine, and obstetrics/gynecology), resulting in a final version that was clinically oriented and modeled a comprehensive social history.

As part of the case exercise, we utilize concept mapping for applied learning. Concept maps⁸ are useful for moving students away from linear or unidirectional thinking when looking at a case. This helps the students think about the multiple factors that may be involved and how the factors connect to each other. Concept maps may be used as both a learning tool and an evaluation tool as they can help identify both valid and invalid ideas held by students.⁸ Additionally, there is evidence that incorporating concept maps into cases may help promote critical thinking and identify knowledge gaps, thereby enhancing student learning,⁹ and can identify how student learning or conceptualization is evolving if used longitudinally.¹⁰

Currently, there are only three publications in MedEdPORTAL on breast cancer, and none of them address breast cancer disparities.¹¹⁻¹³ Therefore, this learning resource contributes significantly to the literature and specifically adds the perspective of health disparities in breast health outcomes.

Methods

This session is part of a second-year course titled The Community-Engaged Physician, which aims to prepare socially accountable future physicians to be culturally competent and to integrate the social determinants of health into the holistic care of the patient. The Community-Engaged Physician course

incorporates the Center for Disease Control's Healthy People 2020,¹⁴ which utilizes a conceptual model of social determinants and health outcomes by life stages to address health disparities. In this context, we identified a genuine disparity in advanced breast cancer rates among the communities we provide care for and collaborated to develop this module to better assist students in their service learning.

Prior to the start of the session, we administer a prequiz (Appendix A), which we then readminister after the session in order to assess student learning. The quiz may be administered with pen and paper or through a learning management system.

The 2-hour session begins with a PowerPoint lecture (Appendix B) and discussion. The presentation covers several areas, including data on health disparities in breast cancer prevalence and outcomes. The slides currently include data from Florida and Miami-Dade County, but we suggest modification so as to include data from local and/or national sources to best suit your students' needs. The lecture should include a conceptual understanding of the health disparities in breast cancer outcomes that provide the context for the focus question, which clearly specifies the issue being resolved with the concept map.⁸

After the lecture, students are divided into small groups of 10 each for the case exercise. Each student receives a copy of one of the two versions of the case study. This publication includes both a narrative version (Appendix C) that can be used with students with limited or no clinical experience and a clinical case note version (Appendix D) for students with clinical experience who can read a clinical note. We recommend you use the version that better suits your students' needs.

The students start by reading parts A and B of the case and answering the questions that follow. For the questions on eliciting the patient perspective, students may benefit from prior understanding of Arthur Kleinman's explanatory model, which is an interview technique that tries to understand how the social world both affects and is affected by illness.¹⁵ The focus question in this case is "What leads to a delay in diagnosis and treatment?"

As students read the case and answer the questions, they should write down the issues, ideas, or words that stand out on the sticky notes provided. The recommended number is 15-25 concepts per question.⁸ Starting with *stage IV breast cancer* at the center of the map, they should arrange the rest of the notes on a whiteboard to aid in determining the causes of this patient's outcome (i.e., the lack of timely follow-up and treatment in this case). Students should also have whiteboard markers to be able to draw cross-connections between items, which should include terms so that, when read aloud, the map resembles a story.⁸ This serves as the outline of the concept map that students can finalize using the CMAP tool available at <http://cmap.ihmc.us/download>. The CMAP tool is optional, and the exercise can be conducted with pencil and paper; however, it is much easier to read and modify using a tool such as CMAP. Each small group submits its final concept map, which is reviewed based on the key (Appendix E).

Small-Group Facilitation

Several days prior to the session, faculty facilitators should receive the small-group discussion guide (Appendix F) in order to familiarize themselves with the case and the concept mapping methodology. The guide includes several useful links for background reading on concept mapping. Faculty should review this guide and ask questions of the course director or person leading the class session prior to the session. It may be beneficial to provide faculty development on small-group facilitation and concept mapping so they can better assist students.

Each small group should have a faculty facilitator to guide students through the case review and concept map drawing. The role of the faculty facilitators is to facilitate, moderate, and answer any student questions but not to lead the discussion, so one facilitator may be able to work with two groups at a time. It is important for facilitators to guide students through the process and encourage them not to skip steps as they create the concept map. Some students may be tempted to jump directly to creating the concept map online without going through the process of discussing the case and how the factors may relate to each other. Participating faculty may want to point to some of the missed risk factors or other case details

that students may overlook and can also draw from their own clinical experience to provide additional context and examples.

Results

This breast health session has been held annually for 3 academic years with a class of 120 second-year medical students. In this last year, we incorporated a pre- and postquiz to evaluate student learning. Assessing student learning is important, especially because it reveals to students what they do not know, what they have learned, and what they still need to work on to become skilled practitioners.

Pre-/postquizzes showed improvements in knowledge and confidence in working with patients on all measures. Table 1 shows increased knowledge of breast cancer incidence (128.6%) and mortality (11.7%) among ethnic subgroups. The relatively high prequiz percentage correct on the breast cancer mortality question (88.7%) may be a result of the College of Medicine’s community program for increasing access to mammography for African American women. Similarly, students in the course have already had a course on social determinants and health disparities in general and are also already doing household visits in medically underserved communities. This may explain the relatively low percentage improvement in knowledge of barriers to care (7.1%) and causes for disparities in outcomes (31.1%). Table 2 shows how students’ confidence in their ability to work with patients on the topic of breast health increased for all measures.

Table 1. Pre-/Postquiz Student Knowledge of Breast Cancer Topics

Topic	Knowledge ^a		
	Prequiz (n)	Postquiz (n)	Change
Breast cancer incidence	39.6% (42)	90.6% (96)	128.60%
Breast cancer mortality	88.7% (94)	99.1% (105)	11.70%
Behaviors that increase risk	39.6% (42)	88.8% (94)	123.80%
Barriers to care	93.4% (99)	97.2% (106)	7.10%
Ways of lowering risk	63.2% (67)	86.8% (92)	37.30%
Causes for disparities in outcomes	57.5% (61)	75.5% (80)	31.10%

^aQuestion answered correctly.

Table 2. Pre-/Postquiz Student Confidence in Breast Cancer Screening Abilities

Ability	Confidence ^a		
	Prequiz (n)	Postquiz (n)	Change
Counsel patient on breast health disparities	32.1% (34)	95.3% (101)	197.10%
Use knowledge of social determinants	61.3% (65)	96.2% (102)	56.90%
Use communication skills	64.1% (68)	96.2% (102)	50.00%

^aResponding “Agree” or “Strongly Agree.”

In response to the question “In 3-5 lines, describe how knowledge of health disparities can be used to counsel and/or otherwise assist patients in accessing timely and appropriate screening for breast cancer,” the students demonstrated understanding of targeting at-risk populations, educating patients about their risk and options, and the complex role that socioeconomic factors may play in patient outcomes, as evidenced by these quotes:

- “By acknowledging and anticipating socioeconomic and racial disparities that can influence the quantity and quality of care, I can focus extra effort and attention on the individual needs of the patient and community.”
- “I would provide patient education if necessary to demystify any myths and clarify their understanding of breast cancer. Knowing the statistics, I would try to screen them [women at high risk] as early as they guidelines allow, encourage them to get screened.”
- “Understanding the causes behind health disparities can guide treatment and screening plans. Simply providing education and reminders will not always be successful if that is not what is preventing proper or optimal care. It could be a lack of funds, transportation, or fear that hinders

them. Knowledge of health disparities can help us know what to look for when understanding a patient's healthcare practices.”

The concept maps submitted further demonstrated the complexity in thought of students on breast health disparities as they were observed moving from a focus solely on the clinical aspects of the case and linear thinking to a more nuanced understanding of the multiple factors that can impact patient health, behaviors, and outcomes.

Discussion

We have implemented this session three times since its original development and continue to learn lessons about how to improve it year to year. The development of materials with a community partner lent richness, details, and insight to lecture and case exercise, so others may wish to consider finding a local partner. It is helpful to include up-to-date local and national data since the local picture may look very different from national figures. Data slides should be updated as needed. It is also important to update the lecture and case materials with the latest evidence-based knowledge. While national guidelines may be provided, the importance of practicing personalized medicine is also important. For additional context on breast cancer in African American woman, we recommend assigning students and participating faculty the article by Williams, Mohammed, and Shields.¹

Faculty involvement is key. Faculty must be familiar with the concept mapping procedure in order to facilitate student learning. If possible, faculty should receive some type of formal training on concept mapping. A pre-session should be held with faculty to review the case and teaching methods and answer any questions. Faculty should provide guidance to students during the concept mapping exercise and move them beyond linear thinking about the case and away from taking shortcuts to complete the assignment without going through the process.

We also learned that we had overlooked or could enhance several important areas in the lecture. Future development of the lecture could include information on the following:

- The prevalence of depression after a breast cancer diagnosis,¹⁶ who is at highest risk,¹⁷ and the increased mortality rate,¹⁸ as well as factors for consideration in treatment adherence,¹⁹ quality of life,²⁰ potential drug interactions,^{21,22} and ensuring effective treatment.²³
- The importance of empowering patients in the clinical encounter to play an active role and practice positive self-care, which might include complementary and alternative medicine (e.g., yoga, meditation, massage, food, acupuncture, tai chi, qigong, and herbs) and art therapy (e.g., painting, music, dancing, etc.).²⁴
- The responsibility of the physician to make sure the patient understands the disease etiology, progression, and urgency of follow-up, including how residential instability in low-income neighborhoods may impact follow-up via phone or mail.

While data indicate that students gained both knowledge and confidence in their abilities in working with patients who have breast cancer, especially those at high risk, ultimately, the real impact of this educational intervention on student behavior would have to be evaluated through clinical application throughout medical education and in the postgraduation practice setting.

According to a 2011 report by the American Cancer Society, 41% of premature cancer deaths among African Americans could have been avoided by eliminating economic disparities, and 20% could have been avoided by eliminating racial disparities.²⁵ Therefore, it is essential for future physicians to understand and learn to work with patients and other health professionals to address the socioeconomic factors driving breast cancer disparities. By raising awareness and exposing medical students to the socioeconomic and cultural aspects of breast health, we hope to improve medical students' knowledge of risk factors and preventive strategies, as well as their abilities to guide patients through appropriate screening and follow-up and ultimately reduce breast health disparities.

Iveris L. Martinez, PhD: Associate Professor of Medicine, Department of Humanities, Health and Society, Florida International University Herbert Wertheim College of Medicine; Director of Population Health and Aging, Leon Center on Geriatric Research and Education, Florida International University Herbert Wertheim College of Medicine

Kumar Ilangoan, MD, MSPH: Assistant Professor of Medicine, Department of Humanities, Health and Society, Florida International University Herbert Wertheim College of Medicine

Ebony B. Whisenant, MD: Assistant Professor of Medicine, Department of Humanities, Health and Society, Florida International University Herbert Wertheim College of Medicine

Maryse Pedoussaut, MD: Assistant Professor of Medicine, Department of Humanities, Health and Society, Florida International University Herbert Wertheim College of Medicine

Onelia G. Lage, MD: Associate Professor of Medicine, Department of Humanities, Health and Society, Florida International University Herbert Wertheim College of Medicine

Acknowledgments

We would like to acknowledge Alialy Guillaume and Asma Dalal for helping collect the pre- and postdata for student evaluation. Thank you to Adriana Baron with her assistance with the literature review, and Dr. Barbra Roller for her training on concept mapping. We would also like to acknowledge and thank Valeria Raventos and Anaïs Cabezas for their assistance in organizing the data from student responses on the pre- and postquiz and preparing the concept map key. Dr. Carla Lupi assisted in the review of the evaluation and small-group case. A special thank you to Dr. Alan Wells for his assistance in working with the community partner.

Disclosures

None to report.

Funding/Support

The development of this material was supported by grant number CGA-2013-FL103-FLIN62-00098 from the Susan G. Komen Foundation.

Ethical Approval

Reported as not applicable.

References

1. Williams DR, Mohammed SA, Shields AE. Understanding and effectively addressing breast cancer in African American women: unpacking the social context. *Cancer*. 2016;122(14):2138-2149. <http://dx.doi.org/10.1002/cncr.29935>
2. Fast Stats. National Cancer Institute Surveillance, Epidemiology, and End Results Program Web site. <http://seer.cancer.gov/faststats>. Accessed March 18, 2016.
3. Oeffinger KC, Fontham ET, Etzioni R, et al. Breast cancer screening for women at average risk: 2015 guideline update from the American Cancer Society. *JAMA*. 2015;314(15):1599-1614. <http://dx.doi.org/10.1001/jama.2015.12783>
4. Siu AL; for the U.S. Preventive Services Task Force. Screening for breast cancer: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med*. 2016;164(4):279-296. <http://dx.doi.org/10.7326/M15-2886>
5. Martin N, Wingfield J. USPSTF screening recommendations for breast cancer: the potential impact on the African American community. *J Health Care Poor Underserved*. 2012;23(2)(suppl):91-97. <http://dx.doi.org/10.1353/hpu.2012.0072>
6. Farley C, Friedman D, Habtes I, et al. Screening mammography in a public hospital serving predominantly African-American women: a stage-survival-cost model. *Womens Health Issues*. 2015;25(4):322-330. <http://dx.doi.org/10.1016/j.whi.2015.02.006>
7. Disparities and Community Outreach Core. *Cancer Data for South Florida: A Tool for Identifying Communities in Need*. http://sylvester.org/documents/UM-HFSF_cancer_late_stage_report_100810.pdf. Published June 2010. Updated September 3, 2010.
8. Novak JD, Canas AJ. Theoretical origins of concept maps, how to construct them, and uses in education. *Reflecting Educ*. 2007;3(1):29-42.
9. Veronese C, Richards JB, Pernar L, Sullivan AM, Schwartzstein RM. A randomized pilot study of the use of concept maps to enhance problem-based learning among first-year medical students. *Med Teach*. 2013;35(9):e1478-e1484. <http://dx.doi.org/10.3109/0142159X.2013.785628>
10. West DC, Pomeroy JR, Park JK, Gerstenberger EA, Sandoval J. Critical thinking in graduate medical education: a role for concept mapping assessment? *JAMA*. 2000;284(9):1105-1110. <http://dx.doi.org/10.1001/jama.284.9.1105>

11. Roubidoux M. Breast cancer detective (out of print). *MedEdPORTAL Publications*. 2006;2:179. http://dx.doi.org/10.15766/mep_2374-8265.179
12. Simms-Cendan J, Cendan J, Boardman L, Voorhees D, Eakins M, Merritt D. The clinical breast exam: a video and animation enhanced self-learning module. *MedEdPORTAL Publications*. 2012;8:9131. http://dx.doi.org/10.15766/mep_2374-8265.9131
13. Duff J, Daily K, Close J. Breast cancer instructional module. *MedEdPORTAL Publications*. 2015;11:10023. http://dx.doi.org/10.15766/mep_2374-8265.10023
14. Healthy People 2020. Centers for Disease Control and Prevention Web site. http://www.cdc.gov/nchs/healthy_people/hp2020.htm. Updated October 14, 2011.
15. Kleinman A, Benson P. Anthropology in the clinic: the problem of cultural competency and how to fix it. *PLoS Med*. 2006;3(10):e294. <http://dx.doi.org/10.1371/journal.pmed.0030294>
16. Cvetkovic J, Nenadovic M. Depression in breast cancer patients. *Psychiatry Res*. 2016;240:343-347. <http://dx.doi.org/10.1016/j.psychres.2016.04.048>
17. Burgess C, Cornelius V, Love S, Graham J, Richards M, Ramirez A. Depression and anxiety in women with early breast cancer: five year observational cohort study. *BMJ*. 2005;330:702-707. <http://dx.doi.org/10.1136/bmj.38343.670868.D3>
18. Watson M, Haviland JS, Greer S, Davidson J, Bliss JM. Influence of psychological response on survival in breast cancer: a population-based cohort study. *Lancet*. 1999;354(9187):1331-1336. [http://dx.doi.org/10.1016/S0140-6736\(98\)11392-2](http://dx.doi.org/10.1016/S0140-6736(98)11392-2)
19. DiMatteo MR, Lepper HS, Croghan TW. Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. *Arch Intern Med*. 2000;160(14):2101-2107. <http://dx.doi.org/10.1001/archinte.160.14.2101>
20. Shapiro SL, Lopez AM, Schwartz GE, et al. Quality of life and breast cancer: relationship to psychosocial variables *J Clin Psychol*. 2001;57(4):501-519. <http://dx.doi.org/10.1002/jclp.1026>
21. Desmarais JE, Looper KJ. Interactions between tamoxifen and antidepressants via cytochrome P450 2D6. *J Clin Psychiatry*. 2009;70(12):1688-1697. <http://dx.doi.org/10.4088/JCP.08r04856blu>
22. Kelly CM, Juurlink DN, Gomes T, et al. Selective serotonin reuptake inhibitors and breast cancer mortality in women receiving tamoxifen: a population based cohort study. *BMJ*. 2010;340:c693. <http://dx.doi.org/10.1136/bmj.c693>
23. Walker J, Hansen CH, Martin P, et al. Prevalence, associations, and adequacy of treatment of major depression in patients with cancer: a cross-sectional analysis of routinely collected clinical data. *Lancet Psychiatry*. 2014;1(5):343-350. [http://dx.doi.org/10.1016/S2215-0366\(14\)70313-X](http://dx.doi.org/10.1016/S2215-0366(14)70313-X)
24. Greenlee H, Balneaves LG, Carlson LE, et al; for the Society for Integrative Oncology Guidelines Working Group. Clinical practice guidelines on the use of integrative therapies as supportive care in patients treated for breast cancer. *J Natl Cancer Inst Monogr*. 2014;(50):346-358. <http://dx.doi.org/10.1093/jncimonographs/lgu041>
25. American Cancer Society. Five factoids about cancer and poverty. <http://www.cancer.org/myacs/eastern/areahighlights/cancernynj-news-five-facts-poverty>. Published 2011. Accessed March 18, 2016.

Received: May 24, 2016 | Accepted: July 26, 2016 | Published: September 28, 2016