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Occurrence of comorbidities among African-American and Latina breast cancer survivors

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Abstract
Background The co-occurrence of multiple chronic conditions in cancer patients is common and can have negative impact on cancer and cancer survivorship outcomes. This study aimed to document comorbidity occurrence among African-American and Latina (English language preferred (ELP) and Spanish language preferred (SLP)) breast cancer survivors (BCS).
Methods Eighty-eight African-American, 95 ELP Latina, and 137 SLP Latina BCS were recruited via case ascertainment from the California Cancer Registry and hospital registries. BCS completed a self-report questionnaire assessing demographic and cancer characteristics, and presence of comorbidities.
Results Overall, 75 % of BCS reported at least one comorbidity with arthritis (37 %), high blood pressure (37 %), psychological difficulties (29 %), and diabetes (19 %) being most commonly endorsed. SLP Latinas were more likely to report diabetes (29 %), psychological difficulties (42 %), and >3 comorbidities ($p<0.05$). Latina BCS were twice as likely to report osteoporosis and headaches compared to African-Americans; while one in two African-Americans reported hypertension and arthritis. Older age was correlated with arthritis, diabetes, glaucoma, high blood pressure, and osteoporosis.
Conclusions Our findings suggest that investigating the occurrence of comorbidities across ethnic groups may shed some light in understanding cancer survivorship risk for poor health outcomes and health disparities. Having a better grasp of comorbid conditions may aid in more appropriate early assessment, better follow-up care, surveillance, and management of the cancer and the comorbid condition(s).
Implications for Cancer Survivors Integrated control and management of comorbidities among cancer survivors has the potential to improve quality care for the whole person, and increase survival and decrease morbidity.

Keywords Comorbidity · Breast cancer · African-American · Latina · Chronic disease · Co-occurrence · Cancer survivorship

Disease co-occurrence is not uncommon. Comorbidities are concurrent, etiologically independent chronic health conditions, unrelated to the disease under study [1]. Cancer unfortunately is no exception, with 68–85 % of adult cancer patients diagnosed with other chronic illnesses [2–4]. Many comorbidities in cancer patients are preexisting conditions [5–7]. Some comorbid illnesses, like diabetes, increase the risk for (1) poorer cancer outcomes including heightening survivorship burden [4, 8], and morbidity and mortality [9–12], and (2) certain types of endocrine-related cancers such as prostate and breast cancers [13–15].

In breast cancer patients, comorbidities affect the length of survival regardless of stage at diagnosis [9, 11, 16–18]. Also, breast cancer patients with more severe comorbidities are less likely to receive treatment congruent to recommended guidelines and often receive less intensive treatment compared to patients without comorbidities [1, 9, 19]. Further, the presence

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of comorbidities is associated with increased age and decreased overall survival and all-cause mortality among breast cancer patients [10, 11]. Ethnic differences have also been found, with reports indicating that African-American women experience more comorbidities [18, 20]. Among Latina and African-American women, comorbidities are reported to negatively affect overall health status and quality of life [21, 22].

In the past 10 years, attention to comorbidities and their influence on cancer outcomes has increased [1]. Given that cancer patients with co-occurring chronic conditions may be less likely to receive treatment that is in line with recommended guidelines, it is imperative to increase our understanding of the impact of comorbidities on (1) active treatment, (2) care coordination, (3) surveillance and follow-up care, (4) patient self-care and management, and (5) overall patient outcomes including morbidity, mortality, survival, and survivorship. However, in order to better understand how comorbidities interact and interplay with cancer, it may be necessary to explore comorbidities separately rather than use a comorbidity index that produces a composite score. The literature suggests that comorbidity indices may not always adequately predict survival since comorbid conditions may vary depending on the population and type of cancer [11, 23, 24]. Therefore, documenting the occurrence of individual comorbidities separately, rather than using a summary measure of comorbidities, may assist in the assessment of patients' prognosis and treatment management.

This exploratory descriptive study aimed to document the occurrence of comorbidities among African-American and Latina breast cancer survivors (BCS). Prior research from our laboratory as well as other researchers showed significant differences on various medical characteristics (e.g., stage, type of surgery and treatment, follow-up care) reported by Latina cancer patients who were English language preferred (ELP) and Spanish language preferred (SLP) [25–29]. Therefore, in our analyses, we examined the presence of comorbidity by language preference (i.e., ELP and SLP) within the Latina population. To our knowledge, no study to date has explored and described the occurrence of comorbidities with a sample of multiethnic BCS.

Methods

Study design and participants

We analyzed baseline data from a HRQOL psychoeducational intervention study with African-American and Latina BCS. The intervention outcomes have been presented elsewhere [30]. For this specific investigation, participant inclusion criteria consisted of disease-free women who were (1) 18 years of age and older, (2) self-identified ethnically as African-American or Latina, (3) within 1–6 years of a breast cancer diagnosis, (4) diagnosed with stage 0–III breast cancer, and (5) not diagnosed with any other type of cancer. We used a mixed-method recruitment approach to enroll BCS from population-based sources (i.e., California-, City of Hope- and UCLA-Cancer Registries, support groups). Institutional Review Board approval was obtained, and all participants signed an informed consent form for study participation. BCS who agreed to participate were mailed a package containing consent forms and the baseline assessment in their language of preference, and prepaid return envelopes. All participant materials were available in English and Spanish. Measures that were only available in English were translated into Spanish by two bilingual native Spanish speakers and back-translated into English by two separate bilingual individuals to verify accuracy. Trained bilingual staff conducted the participant recruitment. After completion of the baseline assessment, participants received a $20 grocery store gift card.

Measures

Participants completed a comprehensive self-report questionnaire including standard measures and new culturally informed measures developed from the principal investigator's previous research with multiethnic BCS [31, 32].

Demographic and cancer-related medical characteristics Participant age, household income, educational attainment, marital and employment status, and health insurance status (i.e., no insurance, HMO/PPO, and Medi-Cal coverage) were assessed. Cancer-related medical characteristics included breast cancer stage, type of surgery (e.g., lumpectomy), and adjuvant therapy received (e.g., chemotherapy, radiation).

Comorbidities To assess comorbidities, we used an eight-item comorbidity checklist that asked participants to indicate (yes/no) if they had or did not have each condition listed (e.g., diabetes, high blood pressure, psychological difficulties). Psychological difficulties were defined as experiencing moderate to severe symptoms of anxiety, depression, or any recent mental health hospitalizations. The checklist also contained an additional open-ended question asking participants to list any other medical condition(s) not included in the eight-item list.

Data analysis

Descriptive statistics including means, standard deviations, and frequencies were computed for the sample. Differences in demographic and cancer-related medical characteristics across ethnic and linguistic groups (African-American, ELP Latina, and SLP Latina) were examined with chi squares. Differences in occurrence of comorbid conditions across ethnic and linguistic groups were examined with chi squares. Correlation analyses examined relationships between age and

comorbid conditions. All analyses were conducted using SPSS 21.

Results

Demographic and cancer-related medical characteristics

The study sample consisted of 320 BCS of which 88 (27 %) were African-American, 95 (30 %) were ELP Latinas, and 137 (43 %) were SLP Latinas. Table 1 presents sample demographic characteristics. Most BCS were between 50 and 64 years of age (M=54.2, SD=11.4), low income, and had HMO/PPO as their health insurance coverage. SLP Latinas were more likely to report having lower education (72 vs. 5 vs. 13 %; $p<0.001$) and lower household income (71 vs. 31 vs. 31 %; $p<0.001$), and to be partnered (62 vs. 42 vs. 59 %; $p<0.05$), and less likely to have health insurance coverage (32 vs. 8 vs. 7 %; $p<0.001$) compared to African-Americans and ELP Latinas, respectively. ELP Latinas were more likely to be younger (46 vs. 28 vs. 35 %; $p<0.05$) and currently employed (60 vs. 36 vs. 25 %; $p<0.001$) compared to African-Americans and SLP Latinas.

In terms of cancer-related medical characteristics (Table 2), a majority of BCS were diagnosed at an early stage (83 %). ELP and SLP Latina BCS reported being diagnosed at stage II (43 and 40 %, respectively) and African-American BCS at stage I (40 %). Slightly over half of BCS reported that their breast abnormality (breast lump) was first detected via nonmedical means. ELP (58 %) and SLP (57 %) Latina BCS were more likely to report nonmedical breast abnormality detection than African-American BCS (48 %). African-American BCS (72 %) were more likely to report receiving a lumpectomy compared to ELP (59 %) and SLP (50 %) Latinas ($p<0.01$). SLP Latina BCS (48 %) were most likely to report having a mastectomy ($p<0.05$) but least likely (7 %) to report breast reconstruction compared to African-American (16 %) and ELP Latina (17 %) BCS ($p<0.05$). Among BCS, about 70 % reported receiving chemotherapy and radiation therapy. Approximately 70 % SLP and ELP Latina BCS had a

Table 1 Demographic characteristics by ethnic group

	Total (%)	African-American (n=88) Total (%)	ELP Latina (n=95) Total (%)	SLP Latina (n=137) Total (%)	X^2
Age					
<50	117 (37)	25 (28)	44 (46)	44 (35)	12.5*
50–64	141 (44)	37 (42)	36 (38)	68 (50)	
65+	62 (19)	26 (30)	15 (16)	21 (15)	
Education					
<High school	113 (36)	4 (5)	12 (13)	97 (72)	149.9***
High school	45 (14)	12 (13)	14 (15)	19 (14)	
>High school	160 (50)	72 (82)	69 (72)	19 (14)	
Income					
<$25k	152 (48)	27 (31)	29 (31)	96 (71)	77.7***
$25–$45k	73 (23)	26 (30)	15 (16)	32 (23)	
>$45–$75k	41 (13)	16 (18)	18 (19)	7 (5)	
>$75k	52 (16)	18 (21)	32 (34)	2 (1)	
Currently employed					27.5***
No	196 (61)	56 (64)	38 (40)	102 (75)	
Yes	123 (39)	32 (36)	56 (60)	35 (25)	
Marital status					
Partnered	177 (55 %)	37 (42)	56 (59)	84 (62)	9.06*
Unpartnered	142 (45 %)	51 (58)	39 (41)	52 (38)	
Insurance status					55.7***
No insurance	58 (18)	7 (8)	7 (7)	44 (32)	
HMO/PPO	173 (55)	63 (72)	67 (71)	43 (32)	
Medi-Cal	86 (27)	17 (20)	20 (22)	49 (36)	
Place of birth					203.2***
USA	149 (47)	85 (97)	57 (60)	4 (3)	
Outside USA	169 (53)	2 (3)	37 (40)	132 (97)	

ELP English language preferred, *SLP* Spanish language preferred

*$p<0.05$; ***$p<0.001$

Table 2 Cancer-related medical characteristics by ethnic group

	Total (%)	African-American (n=88) Total (%)	ELP Latina (n=95) Total (%)	SLP Latina (n=137) Total (%)	X^2
Stage at diagnosis					2.1
0	17 (5)	6 (7)	6 (6)	5 (4)	
1	119 (38)	34 (40)	34 (36)	51 (38)	
2	127 (40)	32 (37)	41 (43)	54 (40)	
3	52 (17)	14 (16)	14 (15)	24 (18)	
How lump detected					2.26
Medical exam	143 (45)	45 (52)	39 (42)	59 (43)	
Nonmedical	175 (55)	42 (48)	55 (58)	78 (57)	
Type of surgery					
Lumpectomy					9.96**
No	132 (41)	25 (28)	39 (41)	68 (49)	
Yes	188 (59)	63 (72)	56 (59)	69 (50)	
Mastectomy					7.66*
No	196 (61)	59 (67)	65 (68)	72 (52)	
Yes	124 (39)	29 (33)	30 (32)	65 (48)	
Mastectomy+recons					
No	281 (87)	74 (84)	79 (83)	128 (93)	7.10*
Yes	39 (13)	14 (16)	16 (17)	9 (7)	
Type of treatment					
Chemotherapy					4.05
No	107 (33)	37 (42)	29 (31)	41 (30)	
Yes	213 (67)	51 (58)	66 (69)	96 (70)	
Radiation					2.20
No	98 (31)	29 (33)	33 (35)	36 (26)	
Yes	222 (69)	62 (67)	62 (65)	101 (74)	
Hormone therapy					1.12
No	113 (35)	35 (40)	31 (33)	47 (34)	
Yes	207 (65)	53 (60)	64 (67)	90 (66)	

ELP English language preferred, *SLP* Spanish language preferred

*p<0.05; ** p<0.01

slightly higher reporting rate of receiving chemotherapy than African-American BCS (58 %). Additionally, 65 % of BCS reported receiving hormone therapy. Over 66 % of Latina BCS (ELP 67 % and SLP 66 %) reported receiving hormone therapy compared to African-American BCS (60 %).

Comorbidities

Overall, 75 % of BCS reported at least one comorbid condition (range 1–6; M=1.6, SD=1.3), among whom 23 % reported one comorbidity, 22 % reported two comorbidities, 19 % reported three comorbidities, and the remaining 11 % reported four or more comorbidities. Amongst all African-American BCS, 79 % reported at least one comorbid condition (range 1–5; M=1.6, SD=1.2), with 28 % endorsing one comorbidity, 27 % endorsing two comorbidities, 16 % endorsing three comorbid conditions, and the remaining 8 % endorsing four or more comorbid conditions. Within ELP Latina BCS, 68 % reported at least one comorbid condition (range 1–4; M=1.3, SD=1.2), among whom 27, 20, and 15 % reported one, two, and three comorbid condition(s), respectively, and the remaining 6 % reported four or more comorbidities. Among SLP Latina BCS, 77 % reported at least one comorbid condition (range 1–6; M=1.9, SD=1.4), among whom 18 % reported one comorbid condition, 21 % reported two comorbidities, 23 % reported three comorbidities, and the remaining 15 % reported four or more comorbid conditions. Bivariate analyses showed that SLP Latinas were more likely to report three or more comorbid conditions (38 %) compared to ELP Latinas (21 %) and African-American BCS (24 %) (p<0.05)

Table 3 presents occurrence of specific comorbid conditions for all BCS and by ethnic and linguistic group. Among BCS, the reported occurring comorbidities were arthritis (37 %), high blood pressure (37 %), psychological difficulties

Table 3 Occurrence of comorbidities by ethnic group

	Total (%)	African-American (n=88) Total (%)	ELP Latina(n=95) Total (%)	SLP Latina (n=137) Total (%)	X^2
Arthritis					6.87*
No	202 (63)	46 (52)	67 (70)	89 (65)	
Yes	118 (37)	42 (48)	28 (30)	48 (35)	
Diabetes					17.6***
No	258 (81)	71 (81)	89 (94)	98 (71)	
Yes	62 (19)	17 (19)	6 (6)	39 (29)	
Glaucoma					2.26
No	304 (95)	81 (92)	91 (6)	132 (96)	
Yes	16 (5)	7 (8)	4 (4)	5 (4)	
Headache/migraine					3.86
No	266 (83)	79 (90)	76 (80)	111 (81)	
Yes	54 (17)	9 (10)	19 (20)	26 (19)	
High blood pressure					9.34**
No	203 (63)	45 (51)	69 (73)	89 (65)	
Yes	117 (37)	43 (49)	26 (27)	48 (35)	
Osteoporosis					3.44
No	276 (86)	81 (92)	80 (84)	115 (84)	
Yes	44 (14)	7 (8)	15 (16)	22 (16)	
Thyroid					2.25
No	285 (89)	82 (93)	84 (88)	119 (87)	
Yes	35 (11)	6 (7)	11 (12)	18 (13)	
Psychological difficulties					22.7***
No	228 (71)	75 (85)	74 (78)	79 (58)	
Yes	92 (29)	13 (15)	21 (22)	58 (42)	

ELP English language preferred, *SLP* Spanish language preferred

*p<0.05; ** p<0.01; *** p<0.001

(29 %), diabetes (19 %), headache/migraine (17 %), and osteoporosis (14 %). We observed differences in the occurrence of comorbidities across ethnic and linguistic groups. African-American BCS were more likely to report having arthritis (48 %) compared to ELP (30 %) and SLP (35 %) Latina BCS (p<0.05). SLP Latina BCS were more likely to report having diabetes (29 %) compared to ELP Latina (6 %) and African-American (19 %) BCS (p<0.001). African-American BCS were most likely to report having glaucoma (8 %) than ELP (4 %) and SLP (4 %) Latinas. Latina BCS reported twice as much headache/migraines (about 20 %) compared to African-American (10 %) BCS. African-American BCS were more likely to report high blood pressure (49 %) than ELP (27 %) and SLP (35 %) Latina BCS (p<0.01). Latina BCS (16 %) were more likely to report having osteoporosis than African-American (8 %) BCS. Latina BCS (13 %) were almost twice as likely to report having a thyroid condition compared to African-American (7 %) BCS. Also, SLP Latina BCS were more likely to report experiencing psychological difficulties (42 %) compared to ELP Latina (22 %) and African-American (15 %) BCS (p<0.001).

We conducted correlation analyses to preliminarily examine the association between age and specific comorbidities. The analyses showed that older age was correlated with arthritis (r=0.28; p<0.01), diabetes (r=0.19; p<0.01), glaucoma (r=0.18; p<0.01), high blood pressure (r=0.46; p<0.01), and osteoporosis (r=0.17; p<0.01). Younger age was correlated with headache/migraine (r=−0.11; p<0.05).

Discussion

The advancements in cancer treatment have resulted in a growing cancer survivor population, a population that will have an increased risk for poor health outcomes due in part to the impact of comorbid conditions. To our knowledge, our study is the first to describe the occurrence of comorbid conditions among a multiethnic sample of BCS. Our findings show that 75 % of the overall sample endorsed at least one major comorbid condition. When looking at comorbid conditions by ethnic and linguistic group, the findings show that 79 % of African-American, 68 %

of ELP Latinas, and 77 % of SLP Latinas endorsed at least one major comorbid condition. The most commonly endorsed comorbid conditions were arthritis, high blood pressure, psychological difficulties, diabetes, headache/migraine, and osteoporosis. Our analyses found that the occurrence of comorbidities differed by age and ethnic and linguistic groups. The literature documents that risk of comorbid conditions increases with age, and 60 % of cancers and almost 50 % of breast cancer are diagnosed in older adults aged 65 years and older [33–35]. Thus, given the 54 years mean age of our study population, it stands to reason that they may have low endorsement of comorbidities; however, our sample reports comparable levels of co-occurring conditions as rates reported in the literature (60–85 %). Our findings highlight the importance of screening, monitoring, and treating comorbid conditions not only among older survivors, but also among middle adult and premenopausal survivors.

Our results suggest that African-Americans and ELP Latinas were more likely to endorse at least one or two comorbid conditions. However, SLP Latina BCS were more likely to endorse three or more comorbid conditions including co-occurring diabetes, arthritis, and hypertension. Additionally, SLP Latina BCS were more likely to report psychological difficulties. Hypertension and arthritis most commonly co-occurred in African-American BCS. The findings also show that SLP Latina BCS had the least favorable outcomes across most demographic variables, outcomes that may be influenced by place of birth. Among our overall Latina sample, 73 % reported having been born outside the USA, and among SLP Latinas, 97 % reported being born outside the USA. The findings from this preliminary study add socioecological (i.e., income, education, health-care coverage, place of birth) and cultural (i.e., linguistic, acculturation) dimensions to the limited literature examining comorbidities among Latina BCS [21, 22, 36]. Further, given that African-American and SLP Latina BCS tended to be older, and that older age was correlated with specific comorbidities, the age factor must be considered in understanding and addressing cancer and co-occurring comorbid conditions.

Chronic conditions that co-occur with cancer, including diabetes, have been associated with increased risk of poor health outcomes among Latina BCS [22]. Further, this study supports emerging data that highlights that Latinas, especially the most vulnerable who are lower income and medically underserved, are at greater risk for poor overall health and cancer-related outcomes. SLP Latinas were more likely to endorse diabetes (29 %) and >3 co-occurring chronic conditions compared to ELP Latinas and African-American BCS. The high occurrence of psychological difficulties (42 %) among SLP Latina BCS is of great concern given that Latina BCS are reported to be at increased risk for depressive symptoms [26, 36–40].

In our study, African-American BCS reported high prevalence of diabetes (20 %), arthritis (48 %), and elevated blood pressure (49 %). Also, our findings support previous research reporting that high blood pressure is pervasive among African-American BCS [18]. The limited research indicates that comorbidities contribute to the disparity in survival among African-American BCS [18, 20, 41].

Study limitations include that the sample may not be representative of all BCS; specifically 73 % of Latina BCS were born outside the USA, and the majority were of Mexican descent. Additionally, the inclusion criteria limited participation to women diagnosed with stages 0–III and thus excluded women with more advanced stages. Also, given the cross-sectional design of this study, we are not able to determine whether comorbid conditions developed after the breast cancer diagnosis or if they were preexisting. Further, the data are self-report and retrospective in nature; thus, recall bias may have biased the findings. Also, our study had a 64 % response rate and a 55 % completion rate [42]; thus, it is possible that the survivors who declined participation or did not complete the study may have higher incidence and/or burden due to co-occurring chronic conditions. However, despite these limitations, this study contributes to the small body of research on occurrence of comorbid conditions among African-American and ELP and SLP Latina BCS.

In summary, our findings suggest that it is important to examine the risk and associations between cancer and comorbidities by ethnic as well as socioecological and cultural variables. For example, socioeconomic status (e.g., low income and educational attainment) and English language proficiency influence access to care [43, 44]. A more thorough understanding of the relationship between comorbidities, cancer, and health outcomes is needed in order to better address the comprehensive care needs of cancer patients. Thus, health-care professionals need to engage in cross training and effective communication to be better prepared to address the comorbidities that in conjunction with cancer affect the care and health outcomes of cancer patients. Appropriate and timely assessment and management of comorbid conditions have important clinical and public health implications for disease prevention and control, and affect critical patient outcomes such as better survival and quality of life [22, 27, 37, 45]. More research investigating comorbidity risk, incidence, prevalence and management, and inclusion of ethnic minority patients is urgently needed. Clinical studies must focus on developing interventions aimed at improving the coordinated health-care management of comorbidities and the cancer that includes oncology, primary care and other specialty care teams, supportive care, and patients and their caregivers.

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Conflict of interest All authors have no potential conflicts of interest.

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