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Research article

Comparison of the impact and quality of life of breast and lung cancer survivors in the medium-term

Rachid Ismaili[1)], Ahmed Nejmeddine[1)], Sofia El Yahyaoui[4)], Hind Mimouni[1)], Imane El Haouachim[3)], Abderraouf Hilali[1)], Bouchra Haddou Rahou[2)], Rachid Bekkali[3)], and Leila Loukili[1)]

[1)] *Hassan First University of Settat, Morocco*
[2)] *Research department, High Institute of Nursing Professions and Technical Health, Rabat, Morocco*
[3)] *Fondation Lalla Salma Prevention and Treatment of Cancers, Rabat, Morocco*
[4)] *Faculty of Medicine and Pharmacy of Rabat, Mohammed V University of Rabat, Morocco*

Abstract

Purpose: Breast and lung cancers are the most diagnosed cancers worldwide. This study aims to compare the impact of breast and lung cancer on survivors' quality of life in the medium term.

Methods: Three hundred-four breast cancer survivors and seventy-seven lung cancer survivors were recruited between May 2019 and September 2020. Thus, EORTC QLQ- C30, EORTC QLQ- BR23, EORTC QLQ- LC13, and the Living Conditions Questionnaires were used as assessment tools.

Results: The health status of breast cancer survivors was significantly better than the health status of lung cancer survivors. The adverse effects of the disease on the sexual relationship were more often formulated by lung cancer survivors than by survivors of breast cancer (70% vs. 55%, P = 0.050). Second, they found living on a monthly income more challenging after the disease diagnosis than the breast cancer survivors (80% vs. 66%, P = 0.006).

Conclusion: All items of the EORTC-QLQ-C30 for both cancers showed a statistically significant difference, except for emotional function. The quality of life, physical functioning, and all symptoms in lung cancer survivors were worse than in breast cancer survivors.

Keywords: Breast cancer, Lung cancer, Quality of life, impact, QLQ-C30, QLQ-BR23, QLQ-LC13.

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Introduction

Currently, cancer is a public health burden worldwide in terms of morbidity and mortality[1)]. In 2020, the world recorded approximately 19.3 million new cases and 10 million deaths from cancer. According to GLOBOCAN, breast cancer is among the most frequently diagnosed cancers, representing 11.7% of new cases reported worldwide in 2020, followed by lung cancer at 11.4%. Lung cancer is the leading cause of death by cancer accounting for 18% of cases, followed by colorectal cancer 9.4%, liver 8.3%, stomach 7.7%, and breast cancer 6.9%[2)]. In 2020, Morocco recorded approximately 59 370 new cancer cases, with breast cancer being the most diagnosed (11 747 women; or 19.8%), followed by lung cancer (7 353 cases; or 12.4%). The latter is the leading cause of cancer death (6 551 deaths; or 18.6%), followed by breast cancer (3 695 deaths; or 10.5%)[3)]. The prognosis of cancer has improved significantly over the last few decades due to the evolution of therapeutic management, allowing for an increase in life expectancy and even, in some cases, a cure. In spite of these advances, treatments often remain long, expensive, and not without complications.

In oncology, medical management's objective is not only to cure or prolong life but also to preserve or improve the quality of life[4)]. Quality of life measures are composed of multiple, rather heterogeneous medical, psychological, social, or economic criteria[5)]. The impact of cancer is often estimated in terms of clinical criteria. Although these measures are essential, they do not provide insight into the impact of cancer on a person's functioning and well-being. For this reason, there is a growing interest in health-related quality of life (HRQoL) assessment[6)]. Indeed, the occurrence of cancer has a significant effect not only on the patient but also on their spouse, family, and social network[7, 8)]. Thus, it significantly impacts their daily life and changes the patient's specific daily activities either positively or negatively[9)]. In addition, breast cancer treatments (surgery, chemo-

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Corresponding Author: Rachid Ismaili, Phd Student, Hassan First University of Settat, Immeb 1, App 12, Allée Abdellah Hassard Sala Al Jadida, Morocco, TEL: 00 212 672860216, E-mail: ra.ismaili1965@gmail.com

therapy, radiation therapy, adjuvant hormone therapy) can have significant physical, psychological, and emotional consequences for women in the long term[10, 11]. Besides, it significantly negatively impacts libido, sexual arousal, and the ability to have pleasurable sex[12]. The costs of these therapies are continually increasing over time[13, 14]. A study of breast cancer patients with private health insurance found that direct expenses and lost income averaged $1,455 per month. In other words, the financial burden averaged 98%, 41%, and 26% of monthly income with annual household income levels of < or = $30,000, $30,001 to $60,000, and >$60,000, respectively[15]. Furthermore, cancer diagnosis exposes individuals to job loss[16], which has been correlated with short- and long-term financial distress in cancer survivors[17, 18]. On the other hand, religion and spirituality can provide survivors with meaning in their illness[19], and they can be essential and beneficial resources for coping with the physical, mental, and social challenges induced by the cancer experience. Furthermore, everyday spirituality is associated with greater self-confidence and less fear of cancer recurrence[20, 21].

This article compares the impact of breast and lung cancers on the quality of life among the cancer survivors followed at the National Institute of Oncology (NIO) in Rabat. The obtained results will support us understand the basic situation regarding breast cancer and lung cancer in this region, and lead to further research.

Materials and Methods

Study Design

This cross-sectional study aims to compare the impact of breast and lung cancers on the variables associated with quality of life among cancer survivors. Cancer survivors in the present study were defined as the patients with breast cancer diagnosed two years earlier, and the patients with lung cancer diagnosed between 2 years and 18 months earlier. The present study only included the survivors receiving treatment at the NIO in Rabat.

Three hundred and four breast cancer survivors and seventy-seven lung cancer survivors were recruited during their follow-up consultation at NIO Rabat between May 2019 and September 2020. This study is part of a thesis entitled "The social cost of cancer: Impact of breast and lung cancer on the quality of life of survivors and their spouses after two years of their diagnosis".

Inclusion criteria

The participants in this study were all survivors of breast or lung cancer diagnosed two years earlier for breast and between two years and eighteen months for lung, followed at NIO Rabat, married with children, and at all stages. They had no physical or mental illness.

Exclusion criteria

The study excluded all survivors with a history of physical or mental disorders, deaths, or dropouts.

Data collection

Potentially eligible participants were identified by the designated nurse investigator at each recruitment site. She verified the inclusion criteria, re-solicited consent to participate in the study, and clarified information about the study and its purpose.

Ethical considerations

Approval for the conduct of this study was obtained from the Ethics Committee for Biomedical Research of Mohammed V University (Faculty of Medicine and Pharmacy of Rabat, Faculty of Dentistry of Rabat) (N/R: Folder Number 63/19).

Instruments

Data are gathered using the EORTC QLQ-30 quality of life questionnaire to achieve the above goal. It includes thirty items divided into five functional scales (physical, role, cognitive, emotional, and social), three symptomatic scales (fatigue, pain, nausea, and vomiting), and a global health and quality of life scale. Moreover, another questionnaire inspired by the living conditions questionnaire[22, 23] was used. It is composed of several items and explores the following areas: level of education, place of living, marital life, family life, social life, income, employment status, and health.

Statistical analysis

Sociodemographic status was described by percentages and compared using the Chi-square test. The EORTC QLQ-C30 scores were described by means and compared using the Mann-Whitney test. Then, the categorical variables were described by percentages and compared using the Chi-square test. Statistical analysis was performed using SPSS version software.

Results

Comparison between breast and lung cancer survivors sociodemographic

Characteristics

The study population comprised 304 patients with breast cancer and 77 patients with lung cancer. The mean age at the time of the study for breast cases was 53.5±12.1 years, and for lung cancer cases was 60.6±15.4 years. Indeed, a statistical difference is observed for the age range [26 to 45 years]; breast cancer survivors are more represented than lung cancer survivors (30.4% vs. 5.1%, P = 0.000). In addition, lung cancer survivors are more professionally active than survivors of breast cancer (65.4% vs. 25.2%, P = 0.000). Furthermore, breast

Table 1 Sociodemographic characteristics of breast and lung cancer survivors

Characteristics	Breast		Lung		*P*
	Frequency	Percentage	Frequency	Percentage	
Age	mean age (53.5±12.1)		mean age (60.6±15.4)		***.000***
- Less than 25 years old	4	1.3	0	0.0	
- 26 to 45 years old	90	30.4	4	5.1	
- 46 to 65 years old	188	62.2	58	75.3	
- Over 65 years old	22	7.1	15	20.4	
Residential area					
- Urban	212	70.0	58	75.0	.302
- Rural	91	30.0	19	25.0	
Marital status					
- Married	255	84.0	69	90.4	.222
- Widowed	30	10.5	5	6.2	
- Divorced	19	6.4	3	4.3	
Level of education					
- Illiterate	158	52.2	28	36.1	***.003***
- Primary	82	27.2	23	30.2	
- Secondary school	46	15.4	22	29.3	
- Higher education	17	6.0	4	5.4	
Professional activity					
- Yes	76	25.2	50	65.4	***.000***
- No	228	75.1	27	35.2	
Medical coverage					
- Medical assistance regime	208	69.3	43	56.2	***.027***
- The National Fund of Social Welfare Organizations	62	20.1	23	30.2	
- The National Social Security Fund	31	10.2	8	10.4	
- Insurance	1	0.3	3	4.3	

Chi-square test

cancer survivors have more medical assistance regimes than lung cancer survivors (69.3% vs. 56.2%, P = 0.027). Furthermore, breast cancer survivors are frequently more illiterate than lung cancer survivors (52.2% vs. 36.1%, P = 0.003). On the other hand, there was no statistically significant difference for both cancers regarding the characteristics of residential area and marital status. These data are shown in detail in Table 1.

The EORTC QLQ- C30 for breast and lung cancer survivors

The data in Table 2 demonstrates that the mean global health score of the breast cancer participants was better than that of the lung cancer survivors (57.2±25.4 vs. 23.9±23.9). In addition, the mean physical, role, emotional, cognitive, and social function scores of the breast cancer survivors are better than the mean function scores of their lung cancer survivors, respectively [(72.6±28.0 vs. 31.7±35.2); (71.7±31.2 vs. 27.7±36.9); (51.2±31.23 vs. 45.3±34.3); (78.4±30.4 vs. 70.3±32.9); (84.5±29.3 vs. 72.1±32.8)].

Regarding the mean scores of the symptoms of fatigue, nausea, pain, dyspnea, insomnia, loss of appetite, constipation, diarrhea, and financial hardship, breast cancer population scores are better than those of lung cancer participants respectively ((33.3±30.1 vs. 71.7±33.7); (11.7±26.5 vs. 29.0±37.0); (34.3±32.6 vs. 61.9±38.4); (32.0±38.6 vs. 58.4±42.6); (27.9±37.1 vs. 62.8±37.4); (19.3±32.6 vs. 54.5±41.1); (12.9±28.8 vs. 30.7±40.4); (12.1±25.6 vs. 22.5±35.6); (54.0±39.9 vs. 75.3±35.2).

Table 2 EORTC QLQ- C30 of breast and lung cancer survivors

EORTC-QLQ-C30	Mean		*P*
	Breast	Lung	
Global health status/QoL	57.2±25.4	23.9±23.9	***.000***
Physical functioning	72.6±28.0	31.7±35.2	***.000***
Role Functioning	71.7±31.2	27.7±36.9	***.000***
Emotional functioning	51.2±31.3	45.3±34.3	.194
Cognitive functioning	78.4±30.4	70.3±32.9	***.012***
Social functioning	84.5±29.3	72.1±32.8	***.000***
Fatigue	33.3±30.1	71.7±33.6	***.000***
Nausea and vomiting	11.7±26.5	29.0±37.0	***.000***
Pain	34.3±32.6	61.9±38.4	***.000***
Dyspnoea	32.0±38.6	58.4±42.6	***.000***
Insomnia	27.9±37.1	62.8±37.4	***.000***
Appetite loss	19.3±32.6	54.5±41.1	***.000***
Constipation	12.9±28.8	30.7±40.4	***.000***
Diarrhoea	12.1±25.6	22.5±35.6	***.031***
Financial difficulties	54.0±39.9	75.3±35.2	***.000***

Mann–Whitney test

The impact of breast and lung cancer on survivors

Health status

Table 3 revealed a statistically significant difference in the evolution of the state of health between the two cancers. The relapse status was more represented among lung cancer survivors than breast cancer survivors (53.1% vs. 9.2%; P = 0.000). Breast cancer survivors more frequently reported that their evolution of the state of health over the past year was much better than lung cancer survivors (40.0% vs. 15.3%; P = 0.000). Overall, the health outcomes of the breast cancer participants were signifi-

Table 3 The impact of breast and lung cancer on survivors

	Breast		**Lung**		***P***
	Frequency	**Percentage**	**Frequency**	**Percentage**	
Health status					
- Stabilized	14	5.1	10	13.4	***.000***
- Remission	173	57.3	25	33.2	
- Cured	88	29.1	1	1.1	
- Relapse	29	9.2	41	53.1	
Changes in health status compared to last year					
- Much better	122	40.0	12	15.3	***.000***
- Somewhat better	134	44.2	10	13.3	
- The same	13	4.1	26	34.2	
- Less good	35	12.2	29	38.1	
Daily Life					
Support for Daily Living					
- Yes, a lot	55	18.2	45	58.1	***.000***
- Yes, a little	130	43.0	21	27.2	
- No, not at all	119	39.2	11	14.1	
Affective and marital life					
Status of the couple's relationship at the time of the study					
- Deteriorated	138	56.1	14	18.2	***.004***
- Remained the same	48	20.4	51	66.1	
- Strengthened	58	24.2	12	16.1	
Negative effects of the disease on the sexual relationship					
- Yes, a lot	137	55.0	30	70.3	***.050***
- Yes, some of the time	54	22.2	8	19.4	
- No, not at all	58	23.3	5	11.0	
Reason attributed to the change					
- Change in the quality of your relationship with your partner	58	30.3	4	11.2	***.000***
- Change in your attitude toward sex	137	70.2	7	18.1	
- Reason related to your health	00	00.0	27	71.1	
Social life					
Change in the relationship of friends					
- It is not changed	215	74.1	47	61.2	.114
- It has become closer	22	7.3	10	13.3	
- It has become more superficial	55	19.2	20	26.2	
Moral support of the entourage					
- Yes, it has	176	59.2	62	81.4	***.023***
- No	122	41.1	15	19.2	
Disruption of sports and leisure activities					
- No	59	20.3	6	8.3	.078
- Yes, by increasing the frequency	8	3.2	8	10.1	
- Yes, by decreasing the frequency	220	77.0	63	82.1	
Resources and expenses					
Reason attributed to the change in monthly income					
- Health condition	149	49.2	53	69.3	***.045***
- To an independent reason	26	9.1	5	6.0	
- No reason	129	42.0	19	25.2	
Change in monthly income after the illness					
- Very difficult	202	66.3	62	80.2	***.006***
- With difficulty	45	15.2	10	13.1	
- Adequately	57	19.3	5	7.3	
Religious and spiritual life					
Changes in religious or spiritual practices					
- Yes, by increasing the frequency	233	79.3	23	30.3	***.000***
- Yes, by decreasing frequency	44	15.2	41	54.0	
- No, by decreasing frequency	17	6.0	12	16.2	
Effects of illness on religious beliefs					
- Strengthened my beliefs	255	86.2	56	74.3	***.004***
- Weakened my beliefs	10	3.1	3	4.1	
- No influence	30	10.1	17	22.4	

Chi-square test

cantly better than those of the lung cancer survivors.

Daily life

Breast cancer survivors used less practical help (housework, shopping, transport, etc.) in their daily lives than lung cancer survivors (18.2% vs. 58.1%; P = 0.000).

Affective and marital life

The deterioration of the couple's relationship status at the time of the study was observed more frequently in breast cancer survivors than in lung cancer survivors (56.1% vs. 18.2%; P = 0.004). In addition, the adverse effects of the disease on the sexual relationship were more often reported by lung cancer survivors than breast cancer survivors (70.3% vs. 55.0%; P = 0.050).

30.3% of breast cancer participants and 11.2% of lung cancer survivors indicated that the reason for the change in the sexual relationship was the change in the quality of the relationship with the spouse. On the other hand, lung cancer survivor often answered that the reason affecting their affective and marital life was their health status (71.1% vs. 00.0%; P = 0.000).

Social life

Table 3 illustrates that moral support from friends was observed more often in lung cancer survivors than in breast cancer survivors (81.4% vs. 59.2%; P = 0.023).

Resources and expenses

Regarding financial status, lung cancer survivors frequently reported a change in their monthly income after the disease than breast cancer survivors. However, they frequently blamed health status as a reason for the change in monthly income more than breast cancer survivors (69.3% vs. 49.2%; P = 0.045). On the other hand, they found it more challenging to live with monthly income after the disease than breast cancer survivors (80.2% vs. 66.3%; P = 0.006).

Religious and spiritual life

In terms of spirituality and religiosity, breast cancer survivors frequently reported an increase in the frequency of religious or spiritual practices compared to lung cancer survivors (79.3% vs. 30.3%; P = 0.000). Additionally, breast cancer survivors indicated that their health condition reinforced their religious beliefs compared to lung cancer survivors (86.2% vs. 74.3%; P = 0.004).

Discussion

EORTC QLQ- C30 for breast and lung cancers

To our knowledge, this is the first study to compare the impact of breast and lung cancer on the different aspects of survivors' lives and their quality of life. The study unveiled that lung cancer survivors are predominantly male. They are older and better educated than breast cancer survivors. These results converge with data from the High Commission for Planning report in 2019, which indicates that the illiteracy rate in Morocco is higher among women (46.1%) than men (35.9%)[24). Compared to the general population, most cancer survivors have a poorer psychological and physical quality of life after cancer diagnosis and treatment[25, 26). Cross-sectional studies have indicated that the HRQoL of cancer survivors approaches the general population level of cancer-free controls after about five years[27, 28). Indeed, the data from the present study are consistent with previous findings showing that living with cancer and its treatments is a challenging experience that affects many important aspects of health-related quality of life. The study results showed that overall quality of life, physical functioning, and all symptoms in lung cancer survivors were worse than in breast cancer survivors. Compared with the available literature, Furong et al. reported that the physical functioning of lung cancer survivors was worse than that of gynecologic or colorectal cancer survivors. Moreover, they suffered more severe dyspnea than gynecologic, colorectal, and liver cancer survivors[29). Dagnelie et al. showed that lung cancer patients had more impairment of overall health/QoL, physical, role, emotional function, and symptoms of fatigue, dyspnea, pain, insomnia, and loss of appetite than breast cancer survivors. In addition, fatigue was more significant in lung cancer patients than in breast cancer patients[30). A previous study conducted on the association of disease progression with quality of life domains revealed that the loss of appetite, physical functioning, and fatigue scales were most associated with worsening by the first progression, and survivors of pancreatic or lung cancers reported significantly more impairment of HRQoL than survivors of breast or colorectal cancers[31).

Impact of cancer on breast and lung cancer survivors

Cancer survivors often experience multiple symptoms related to the disease and its treatment simultaneously. Indeed, symptoms and adjuvant hormonal treatments affect breast cancer survivors' engagement in their usual activities. In other words, pain, fatigue, lack of sleep, poor concentration and motivation, hot flashes, anxiety, depression, and low self-esteem sometimes require women to report difficulty maintaining their interests and social commitments. However, resuming survivors' usual routines, including household chores, employment, child care, and leisure activities, was disrupted[32). Similarly, for lung cancer survivors, the disease was a factor of irritation and distress, and a third complained about the alteration of family and social life. The limitations of the social life of lung cancer survivors are due to a feeling of intense fatigue, which is regarded as the most serious side effect of treatment[33). The study results are consistent with previously reported literature regarding limitations in activities of daily living and social activities. Lung cancer survivors were more likely than breast cancer survivors to require assistance with daily activities. In contrast, breast cancer survivors often felt they had shallow relationships and less moral support from those around them than lung cancer survivors. Indeed, a previous study found that the breast cancer survival period is the most challenging time. Survivors needed privacy, avoided social situations, and did not maintain contact with family and friends as a way of coping with their lives after treatment[34)]. Several studies have shown that the effects of cancer can bring a couple closer together. In contrast, for others, it can disrupt the functioning of the relationship through communication problems, less intimacy, and decreased relationship satisfaction[35)]. In addition, cancer frequently leads to maladaptive patterns of interaction between the breast cancer survivor and her partner that negatively impact the couple's relationship functioning[36)]. Similarly, a previous study found that lung cancer survivors had more problems communicating and interacting with their spouses than colon and prostate cancer survivors[37)]. The statistics of the present study also reported that the relationship status of the survivors' couple is frequently worse in breast cancer survivors than in their lung cancer survivors, which may be explained by the beliefs and culture of Moroccan society, which gives priority and power to men, and that the majority of women are financially dependent on men. Thus, breast cancer and its physical side effects affect the survivor's body image and may contribute to decreased sexual activity[38)], and Reese, J. B et al. found that 52% of lung cancer survivors report at least mild sexual problems, and sexual concerns were significantly associated with physical symptoms, shortness of breath, and emotional distress[39)]. Our current study aligns with these findings, suggesting that participants also faced sexual issues. Furthermore, the study revealed that lung cancer survivors were more likely than breast cancer survivors to articulate the adverse impact of the disease on their sexual relationships. The deterioration of their health status frequently induces these problems. Recent developments in immunotherapy and targeted therapeutic approaches to cancer treatment are becoming very expensive[40)]; even with health insurance, cancer survivors suffer financial toxicity because they contribute a lot to their care[41)]. A quarter of people with newly diagnosed cancer had out-of-pocket expenses that exceeded 20% of their income[42)]. Survivors and caregivers in the United States spent between $180 and $2,600 per month, compared with $15 to $400 in Canada, $4 to $609 in Western Europe, and $58 to $438 in Australia. Specifically, breast cancer survivors spent about $200 per month[43)]. Similarly, lung cancer has been associated with an economic impact ranging from 15 to 23% of total cancer-related losses[44, 45)]. A variety of research has reported direct patient/caregiver costs (between US$17 and US$506/month) and income loss ranging from 17.6 to 67.3%[46)]. These findings align with the current work regarding financial hardship where survivors experienced the financial burden of their disease. Indeed, suffering related to the decrease in monthly income and the difficulty of living on that monthly income was often felt more by lung cancer survivors than breast cancer survivors.

In addition, spirituality and religiosity are crucial resources for patients suffering from chronic diseases, such as cancer. Mesquita, A. C et al. reported that people who positively accepted the cancer diagnosis reduced stress and depression, whereas those who approached it with a negative outlook encountered the opposite effect[47)]. In other words, 68% of lung cancer and chronic obstructive pulmonary disease survivors who said they had some belief in God and/or a spiritual power had a better quality of life than their peers who said they believed only in a spiritual power[48)]. Leão, D. et al. conveyed that spirituality was a source of support and well-being for women diagnosed with breast cancer that allowed them to find themselves and make their diagnosis less painful. However, they felt particularly close to God and full of hope, which led to fewer negative feelings[49)]. These data corroborate those suggested in the present research, that breast cancer survivors often articulated increased frequency of spiritual/religious practices and that their health status reinforced their spiritual/religious beliefs more than lung cancer survivors.

This research has several limitations that must be considered. First, the breast cancer population is homogeneous, whereas the lung cancer population is heterogeneous. Second, breast cancer survivors were recruited after two years of diagnosis. In contrast, lung cancer survivors were included between two years and 18 months of diagnosis because lung cancer survival is mediocre in Morocco. Furthermore, the cross-sectional design does not directly consider individual QOL changes that may have occurred over time. It is not possible to generalize the results to the entire Moroccan population because the data were collected from a single tertiary cancer center.

Conclusion

This study showed that the sociodemographic characteristics of breast and lung cancer survivors had a statistically significant difference, except for residential area and marital status. Thus, the quality of life, physical functioning, and all symptoms in lung cancer survivors were worse than in breast cancer survivors. The results of the present study suggest that our society needs to start lung cancer screening and provide the opportunity to assess comprehensive health problems of lung cancer survivors.

Data Availability:

All data generated or analyzed during this study are included in this published article.

Ethics approval and consent to participate:

The study has been approved by the ethics committee for biomedical research of the MOHAMED V Faculty of Medicine and Pharmacy in RABAT (N/R: Folder Number 63/19).

Conflicts of Interest:

The authors declare that they have no competing interests.

Authors' contribution:

All authors have made intellectual contributions to this study. R I contributed to the design, acquisition, analysis, and interpretation of data and manuscript writing. A N and RB provided comments concerning data and design and revised the manuscript. LL provided comments regarding the data and analysis and revised the manuscript for important intellectual content. A H and BHR and H M and IE and SE helped to revise the manuscript.

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