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The Impact of Online Educational Talks on Young Equestrians' Knowledge of Breast Health and Breast Issues

Lorna Cameron[1,*], Rachel Smith[2], Natalie Stones[2], Marianne Freeman[2], Victoria Lewis[1], Lucy Dumbell[1], and Jenny Burbage[3]

[1]*Hartpury University, Gloucester, GL19 3BE, United Kingdom*
[2]*University Centre Sparsholt, Winchester, SO21 2NF, United Kingdom*
[3]*University of Portsmouth, Portsmouth, PO1 2UP, United Kingdom*

[*]Author to whom any correspondence should be addressed; email: lorna.cameron@hartpury.ac.uk, Tel: +44 1452 702173

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Abstract

The breasts are a barrier to female participation in physical activity. Breast and bra issues are prevalent in female horse riders. Wearing a sports bra can minimize these issues, but many do not exclusively wear one for horse-riding. This study investigated the impact of live online breast educational talks on subsequent self-perception of knowledge and understanding. Two online surveys (GoogleForms™), one immediately pre-talk and one immediately post-talk, were created to assess perceived impact. The talks consisted of five sections: breast anatomy; types of sports bras; breast issues in relation to exercise; breast issues specifically related to horse riders and the importance of increasing awareness in the horse-riding community. Four educational talks were delivered to different groups of college and university students (n = 67) studying equine courses. Completed pre- and post-talk surveys (40 female, 2 male) were analyzed using a generalized linear model and post hoc Tukey tests. Comfort talking to others about breast health issues increased significantly after the talks, particularly for larger-breasted (≥ D cup) participants ($p = 0.032$). Knowledge of bra fit, breast support, and breast pain significantly increased ($p < 0.01$) post-talk, particularly in those who had not previously experienced breast pain whilst horse-riding ($p \leq 0.001$). The intervention was successful at increasing participant understanding and knowledge of breast health issues, although different educational tools such as access to online resources or in-person talks may prove beneficial to equestrians to further increase comfort in broaching breast health issues with peers and support networks in future.

Keywords

Horse rider; breast issues; stigma; education

1. Introduction

Participation in regular exercise improves both physical and mental wellbeing [1]. Regular physical activity drastically reduces the development of serious diseases, i.e. Type 2 diabetes, heart disease, and osteoarthritis, and reduces the risk of stress and depression [2]. Recently emphasis has been placed on increasing levels of physical activity, with the World Health Organization (WHO) recommending adults participate in at least 150 minutes of moderate intensity exercise per week [3]. Despite this, only 50-60% of adults meet aerobic exercise guidelines, lessening to 30% who meet aerobic and resistance training guidelines [4]. Increasing rates of obesity, a factor known to contribute to health problems, highlight the crucial need for more people to engage in regular exercise. However, Audickas [5] found that 63% of men in the United Kingdom (UK) participate in exercise, and only 58% of women. A popular sport for females is equestrian activities, with 74% of horse riders in the UK being female [6]. For many, it is also the only form of physical activity undertaken [7]. To increase female physical activity and participation in equestrianism, it is important to understand barriers to participation.

1.1. The Breast as a Barrier to Participation

The breast has been identified as a significant barrier to female participation in equestrian activity [8] and Burnett *et al.* [9] found that the breast was the fourth greatest barrier to participation in sport. Breast pain is a common barrier and often increases with exercise intensity [10,11]. Excessive breast motion during exercise is more prevalent in larger-breasted women (≥ D cup) which may prove problematic in equestrianism as Burbage and Cameron [12] found that over 50% of equestrian survey respondents were in this category. This increased breast movement not only causes pain, but also embarrassment [13], and may impact female equestrian participation.

The female breast is a malleable structure, readily deformed by external forces [14]. The breasts contain between 15-20 lobes, adipose tissue filling spaces between, interspersed with nerves and blood vessels [15]. The breast lies over the pectoralis major muscle but the breasts themselves contain no muscle; their main supporting structures are Cooper's Ligaments and covering skin, which if damaged are irreparable [16]. As little as 2cm of relative breast movement can cause pain, however, breasts can move up to 19cm vertically and 4cm in the medial-lateral and anterior-posterior planes during physical activity [13]. Research has shown that wearing suitable breast support can minimize the risk of excessive breast movement and alleviate associated breast pain (mastalgia) [11,17–19].

Activity levels in females have been shown to decline during adolescent years [9] with breast concerns contributing to unwillingness to exercise. Scurr *et al.* [20] found nearly half of over two thousand schoolgirls reported that their breasts contributed to their unwillingness to complete compulsory exercise, and yet, did not wear a sports bra. Horse-riding is popular among adolescent females, but their participation may decline if they experience breast issues when riding, suggesting that breast health and breast support education may have an important role to play in maintaining female equestrian participation.

1.2. Breast Issues in Female Horse Riders

Horse-riding is a moderate-intensity exercise inducing similar breast movements to running and jumping activities [12]. Burbage and Cameron [8] reported that 40% of equestrian survey respondents experienced breast pain with 21% reporting negative riding performance effects. Burbage and Cameron [12] found at least one breast-associated barrier reported by 25% of respondents. Despite breast pain, many women do not wear a sports bra for horse-riding [8]. Studies have shown that wearing appropriate breast support for horse-riding reduces breast movement and exercise-induced breast pain (EIBP) [18,19] and has rider performance implications. Given the positive effects of wearing a sports bra, it is surprising that uptake is low when horse-riding. However, not wearing a sports bra is not limited to female equestrians [21] and greater education on breast health and bra usage across a wide demographic of exercising females is warranted.

1.3. A Need for Breast Health Education

Many females suffer from breast-related issues including incorrect bra fit, excessive breast movement and pain, breast sag (ptosis), and embarrassment, all of which can negatively affect health and well-being. However, knowledge and awareness of these issues are low, especially in adolescent females compared to adult females [22]. McGhee *et al.* [23] identified a need to educate adolescent female athletes about bra knowledge and fit. McGhee and Steele [24] argue that a well-fitted sports bra is essential equipment for those wishing to participate in sports at any level. However, there is a lack of evidence-based guidelines providing information on breast health and bra fit and sporting females may be unwilling to discuss such issues with male coaching staff. Creating resources that male coaches can signpost their clients to, to find useful and correct information, may lessen these difficulties.

These resources are not available within the school curriculum [25] and Omrani *et al.* [22] found that educating adolescent girls improves their breast knowledge making them feel more informed and less embarrassed. For equestrian adolescents, horse-riding may be their only physical activity, and as activity levels decline during the post-adolescent years, improving breast and bra knowledge through specific equestrian-focussed educational interventions may help young females to feel better equipped, more comfortable when horse-riding and more likely to continue this activity into adult life.

The aim of this study was to assess the impact of equestrian-focused educational talks on the topic of female horse rider breast health and related issues on listener knowledge and awareness of the subject. It was hypothesized that talks would significantly increase listener knowledge about breast health and would increase listener comfort in discussing breast health issues with others.

2. Method

2.1. Study Design

Following institutional ethical approval from the Sparsholt Research and Ethics Group, a breast education intervention titled "Breast Health in the Female Equestrian" was offered to a range of equine students in the form of an online short lecture. Four groups of students, and their lecturers, studying equine courses at further education level and undergraduate level were recruited between March and April 2021. All participants were over 18 years of age and confirmed they were current equestrians. To assess the impact of this educational talk, two surveys were created using Google Forms™, completed immediately pre- and post-talk. These surveys were designed to take no more than 10 minutes to complete and included yes/no, multiple-choice, 5-point Likert scales, 10-point Numeric Rating Scales (NRS), and short answer questions.

2.1.1. Pre-talk Survey

The pre-talk survey had two versions, one for participants identifying as female and one for other participants (identifying as male or non-binary or who chose not to declare a self-identification). Part one of the pre-talk survey for those participants identifying as female collected demographic information on age, self-reported bra-band size, bra cup size, and the types of bras worn for horse-riding. Participants were asked to provide a word to allow pre- and post-talk surveys to be matched. Part two identified bra fitting issues (chafing, straps/underwire digging in, muscle ache, poor posture) and whether participants felt that their bra choices met their needs for horse-riding using a multiple-choice grid

and Likert scale. Part three explored breast pain in relation to horse-riding and whether they had spoken to anyone about it using yes/no, multiple-choice, Likert scales, and free text questions. The final part asked how comfortable participants felt talking about the topic of breast health issues to others and to rate their knowledge of bra-fit, breast support, and breast pain using a 10-point NRS (1- not comfortable, 10 - very comfortable). Pre-talk surveys for those participants identifying as male, non-binary, or prefer not to say had similar questions excluding questions relating to bra size, bra comfort, and experience of breast pain. Part one asked for age and their association with horse-riding. Part two identified breast-related issues they were aware of, and their comfort in talking to horse-riding associates about breast issues using a multiple-choice and a 10-point NRS question. The final part asked all participants if they would like access to resources about breast health issues in horse riders. Pre-talk surveys were completed immediately before the educational talks.

2.1.2. Post-talk Survey

Part one of the female post-talk survey asked if participants would now talk to someone about their breast pain if applicable and if yes, who they would talk to, using a multiple-choice question. Part two explored the area of how comfortable they now were talking to others about breast issues and if they would find online resources useful. Part three asked them to again rate their knowledge of bra fit, breast support, and breast pain and whether the information given in the talk had impacted their choice of bra for horse-riding using multiple-choice questions. The final part asked for participant views on how useful the talk had been using a 10-point NRS (1- not useful, 10 - very useful) and for any comments on areas they thought needed more research or should have been discussed in the talk using free text questions. Questions were formatted to be short and clear, leading questions were avoided, Likert scales were utilized and the overall time for completion of the questionnaire was kept short to limit potential bias. For participants identifying as male, non-binary, or prefer not to say post-talk surveys used Likert scales and yes/no questions to ask how comfortable they now felt about discussing breast issues with others, whether they would find online resources useful, and how useful the educational talk had been as for female participants. The post-talk surveys were completed immediately following the educational talks to limit any bias due to recall memory.

2.1.3. Educational Intervention

The educational intervention was presented to four groups of students, and their lecturers, studying equine courses at further education level (over 18 years of age) and undergraduate level where the course leader had agreed to time within timetabled sessions being used for the study and the students had not already experienced a breast health education talk within their syllabus. The lecture was delivered via Microsoft Teams™ and in total, including time for completing the surveys, took 40 minutes to adhere to existing timetabled sessions within the institution. Prior to data collection, the educational talk had been piloted with staff members to ensure it was evidence-based. The talk included five sections: section one explained the anatomy of the female breast; Section two described the common types of sports bras that are available on the market (encapsulation, compression, combination); Section three detailed breast issues in relation to exercise (bra fit, breast pain, performance, embarrassment); section four explained breast issues specifically related to horse riders; section five explained the importance of increasing awareness and knowledge of these issues in the horse-riding community and how individuals can know if their bra is a good fit. The talk finished with the opportunity for any questions to be asked.

In total, 67 pre-talk survey responses (64 females, 3 males), and 49 post-talk survey responses (47 females, 2 males) were downloaded from Google Forms™ into a Microsoft Excel™ spreadsheet. For comparison, there were 40 complete pre- and post-talk female survey responses, and 2 males, that could be matched up for analysis using the word supplied by participants.

2.2. Statistical Analysis

Microsoft Excel™ and Minitab 2021™ were used for data analysis. Descriptive analysis was used to summarize the demographic information of female participants' bra bands, cup sizes, and types of bras worn for horse-riding. Cup sizes A to C were classed as smaller-breasted females and cup sizes D and above were classed as larger-breasted **[8]**. Score data for the comfort of talking to others; knowledge of bra fit, breast support, and breast pain, and overall knowledge when the three categories were combined, were analyzed using a generalized linear model as the residuals were normally distributed. Cup size and survey type (pre/post) and experiencing pain when riding were fixed factors and cup size nested in survey type, respondent was included as a random factor. Post hoc Tukey tests were run to compare the results with an alpha set at 0.05.

3. Results

The modal age of participants was 18 years (70%). Female participant bra (UK sizing) cup size ranged from an A cup to a G cup and under band size ranged from 26 to 48 inches **(Table 1)**. The modal bra size was 34B. Of the 63 female participants, 63% were classed as smaller-breasted (n = 40) and 37% were classed as larger-breasted (n = 23). Only 34% of female participants wore a sports bra during equestrian activities and 63% wore an everyday bra of varying styles **(Table 1)**. Of riders (n = 23) who reported a bra size in the larger-breasted group (cup size > D), 30% exclusively wore a sports bra when riding. Experiencing pain when horse-riding was reported by 17% of female participants (n = 11). Of these, 55% were larger-breasted and 45% were smaller-breasted, and only 18% (n = 2) exclusively selected a sports bra when completing horse-riding activities.

All participants were more comfortable talking to others about breast health after the talk ($F_2 = 4.62$, $p = 0.016$) and this was significantly more for respondents reporting larger breast sizes (T = 2.88, p = 0.032) **(Figure 1)**.

Post-talk knowledge of breast health issues; bra fit, breast support, and breast pain all significantly increased compared to pre-talk knowledge levels ($F_2 = 20.04$, $p < 0.01$; $F_2 = 25.94$, $p < 0.01$; $F_2 = 35.22$, $p < 0.01$, respectively) **(Table 2)**.

Table 1: Distribution of female participants' self-reported UK bra size.

	Cup size							
Underband inches	A	B	C	D	DD	E	G	Total
26		1						1
28	2	1	1		2			6
30	1	1		1				3
32	2	8	6	2	1	1		20
34	1	7	6	1	4	2	2	23
36	1	1	2	3	2			9
38						1		1
40				1				1
Total	7	19	15	8	9	4	2	64

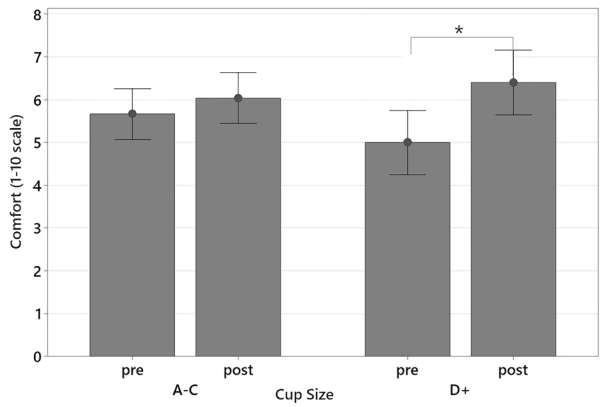

Figure 1: Pre- and post-talk comfort scores when talking to others about breast issues (1- not comfortable, 10 - very comfortable) * indicates a significant difference.

There was no significant difference in knowledge of breast health issues between breast size groups.

When asked whether breast pain was experienced when horse-riding there was no significant difference in pre- and post-talk levels of comfort of talking to others (F_2 = 0.61, p = 0.548), though a significant difference was found for knowledge of breast issues (F_2 = 8.55; 15. 46; 14.04, $p < 0.001$). When further compared by whether pain was experienced when horse-riding, those that said NO had a significant increase in knowledge of breast pain (T = 5.07, $p < 0.001$), breast support (T = 5.41, $p < 0.001$) and bra fit (T = 4.03, p = 0.001) post talk **(Figure 2)**.

Table 2: Mean knowledge of breast issues pre and post talk (1 = very poor, 2 = below average, 3 = average, 4 = above average, 5 = excellent).

Breast Issue	Pre-talk mean (±SD)	Post-talk mean (±SD)
Bra fit	2.7 (0.98)	3.5 (0.79)
Breast support	2.6 (0.97)	3.5 (0.82)
Breast pain	2.3 (1.08)	3.5 (0.79)
Overall knowledge	2.5 (1.01)	3.5 (0.79)

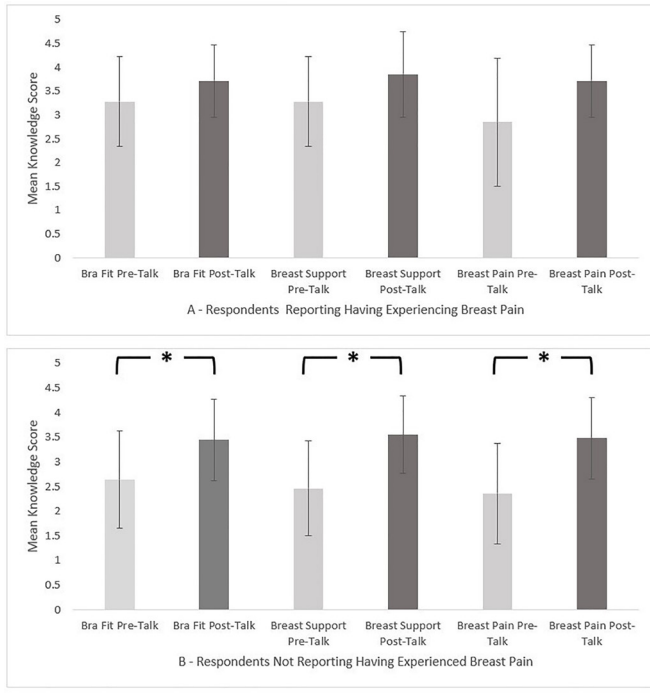

Figure 2: Mean scores of pre- and post-talk knowledge (1 = very poor, 2 = below average, 3 = average, 4 = above average, 5 = excellent) of breast issues for participants that said YES to experiencing breast pain **(a)** and NO to experiencing breast pain **(b)** * indicates $p \leq 0.001$.

The two male participants who completed both the pre- and post-talk surveys felt that access to online resources about breast issues in female horse riders would be useful. Of the 40 females who completed both surveys, 83% (n = 33) felt access to online resources would be useful and 17% (n = 7) felt they would not be useful. The most frequent post-talk response to whether female participants felt they would be able to give advice to others on breast issues was 'yes, but they would like further information' (45%), followed by 'no, but I could advise them where to find information' (35%). Nearly half of female participants (48%) were encouraged to rethink their choice of bra for horse-riding, 23% reported they would change their bra type, while another 23% reported they were happy with their current choice. Of those who would change their bra type choice, all already chose a sports bra for riding, but not exclusively and none had reported experiencing breast pain in the pre-talk survey. The usefulness of the talk was given a score of 6 and above on the Numeric Rating Scale (1 – not useful 10 – very useful) by 78% of all participants.

4. Discussion

The key aim of this study was to assess the impact that giving online educational talks on the topic of breast health issues in female horse riders had on participants' comfort in talking to others about these issues and their knowledge of breast health issues.

Participants felt significantly more comfortable talking to others about breast issues post-talk, particularly those with larger cup sizes. The problems relating to the breast (such as feelings of embarrassment, not being able to find a correctly fitting bra, and breast pain) are very personal subjects to discuss and having an opportunity to discuss these issues

may have helped increase this comfort. There continue to be stigmas surrounding women's health matters [26]. Vrinten *et al.* [27] found that cancer stigma exists, particularly surrounding breast cancer, which can negatively influence behavior toward breast screening. This may mean that it is likely that women are also worried about talking about general breast health issues. Although the current study was specific to breast issues in horse riders, it has highlighted that there is a need for greater education about breast issues to increase confidence and break down social stigmas. If talking about these less serious, but equally important issues of bra fit, breast pain, and breast support, becomes normal, women may then be more willing to raise health concerns or access breast screening services in future.

There seems to be a gap in school curriculums and public health sources for more generalized information about breast health. In this study, the majority of participants were between 18 and 21 years old. This may explain the significant increase in comfort when talking about breast issues post-talk; older females may be less impacted by the educational talk as they are already more comfortable in discussing these issues although further research is warranted. However, these results show that, similarly to Brown *et al.* [25], female adolescents are an ideal target group for promoting breast health awareness.

Participants' knowledge of bra fit, breast support, and breast pain significantly increased after listening to the educational intervention; those classed as larger-breasted increased their knowledge more than those classed as smaller-breasted, but only by 0.1 of a score. Generally, larger-breasted women experience more breast issues such as pain and embarrassment from excessive breast movement [24]. It was therefore assumed that larger-breasted participants would have already had better knowledge of the issues because of personal experience, however, this research highlights that educational interventions are required for female riders of all breast sizes. Those respondents who reported no breast pain when horse-riding increased their knowledge more than those who did report breast pain, suggesting that female riders who had not experienced breast pain may be more in need of educational interventions at a younger age. Of those reporting breast pain when riding, only 18% (n = 2) exclusively wore a sports bra when riding, suggesting that further intervention is warranted in this group as, although they may already have a good knowledge of breast health issues, their bra choices are not necessarily mitigating their breast pain. An enhanced educational intervention would make both groups more aware of the importance of appropriate breast support when horse-riding, and may encourage changes in bra choices.

Of those riders who reported a positive choice to change their bra choice for riding, all reported already choosing a sports bra for horse-riding, but not exclusively, and none had reported experiencing exercise-induced breast pain previously. The educational talk may have made them reconsider their reporting of pain in the pre-talk survey, or it is possible that these participants were influenced by some of the links between breast support and rider position [19] presented within the educational talk, so were prepared to change their bra choice to enhance their horse-riding performance.

There was a strong female bias in this study (95%), which is representative of the sample population of students in equestrian further and higher education programs. Future studies should aim to increase male respondents as, although the vast majority (91%) of British Horse Society Accredited Professional Coaches (BHS APC) are female, at higher levels of equestrianism nearly 40% of coaches are male [28]. Increased awareness of the breast as a potential problem may enable them to direct their clients to online resources for example where they can find the necessary information to be able to help themselves, thus avoiding difficult conversations. The majority of female participants (83%) in this study also thought online resources would be useful. Encouragingly, nearly half the female participants felt that after hearing the educational talk they would be able to advise others on breast issues, but would still like further information and resources. It may be that this educational intervention was too short, the online nature of the talk did not provide the most effective discussion forum. Or it may be that more supporting resources are required for participants to access at a later date, and further research establishing the best method to impart breast health and issues information is warranted for the equestrian community.

The majority of participants wore an everyday bra for horse-riding (63%) with only 34% wearing a sports bra, however, this was an increase on the previously reported figure of 21% of women that exclusively wore a sports bra for horse-riding reported by Burbage and Cameron [8] and maybe reflective of the differences in age within these two studies with younger equestrians being more familiar with sports bras in general. This is despite research showing that a sports bra is the most suitable bra type to wear when horse-riding to reduce relative breast movement and EIBP [18,19]. Nearly three-quarters of the female participants would rethink or definitely change their bra choice following the educational talk, which confirms the talk had an impact, and those who did not want to change their bra were mostly those who already exclusively wear a sports bra when riding. Results suggest that more dissemination of breast health research results within the equestrian community would increase sports bra wear, however, consideration needs to be given to the development of equestrian-specific bras as many feel that the bras currently available on the market do not meet their needs for horse-riding in terms of support, fit and style [12].

A limitation of this study was that the talks were given online, which makes it challenging to interact and connect with the audience fully. It is clear from the optional post-talk surveys that there was a level of disengagement and although online delivery can be utilized to reach a wider audience, in-person presentation might be more effective in increasing listener participation and the efficacy of both methods should be tested in future. Post-talk surveys were also completed immediately after the educational talks. Ongoing recall memory of the information from the educational talks may be negatively impacted by any emotional response to the subjects covered [29], therefore the addition of a follow-up survey after a period of time has elapsed would be beneficial in any future breast issues educational research.

Although on a much smaller scale compared to other similar studies on breast education interventions [22] and tailored specifically to breast health in horse riders, this study has shown that an educational intervention can improve equestrians' knowledge and understanding of breast health issues, however further research is required to then gauge any subsequent changes in bra choices when riding and any resultant reduction in exercise-induced breast pain. This was a short online presentation compared to Omrani *et al.* [22] in-person, longitudinal study, and should also be expanded in future research, with any long-term behavior change monitored. Bra fit and breast support information is rarely included in school health programs [24] and the inclusion of breast health education is recommended by Brown *et al.* [25]. For females engaged in horse-riding, there is further potential to educate young equestrians through Pony Club events, British Horse Society campaigns and their coaching pathways, as well as in college and within University equine courses, once the best method of dissemination is established.

5. Conclusion

There continues to be stigma and feelings of awkwardness surrounding the topic of breast health issues in female horse riders affecting people's willingness to talk to others about the breast-related challenges they may face. This short educational intervention has been shown to be effective in increasing equestrians' knowledge on breast health issues of bra fit, breast support, and breast pain, and increasing their comfort in discussing these issues, although what impact these changes may have on equestrian bra choice is unknown. Further research is needed to assess the best dissemination method for educational interventions to the wider equestrian population to enable equestrians of all ages and disciplines to improve their knowledge of breast issues and health when horse-riding.

Authors' Contributions

L.C. and R.S. planned and designed the study. R.S. collected the data and carried out the study. L.C., R.S., and M.F. carried out the statistical analysis. R.S., L.C., M.F., and V.L. wrote the manuscript. N.S., L.D., and J.B. reviewed it. All authors read and approved the manuscript.

Data Availability

The data supporting the findings of this study are available upon request from the corresponding author.

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No funding was associated with this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Ethical Approval

This study received ethical from the Sparsholt Research and Ethics Group. The study complied with the guidelines of the Declaration of Helsinki.

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