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Responding to women's needs and preferences in an online program to prevent postpartum depression

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ABSTRACT

Purpose: Global access to adequate resources to address postpartum depression (PPD) are limited and, at times, not reflective of the needs of pregnant women and new mothers. Gathering information about the preferences and needs of women when designing and implementing Internet-based programs is warranted, especially given the diversity of experiences related to childbirth. Thus, the aim of this study was to obtain user feedback on the content, structural, and cultural factors associated with a fully automated online PPD prevention intervention that, like similar programs, suffered from poor adherence and engagement.

Methods: Following the completion of the Mothers and Babies Internet Course (eMB), an online prevention of PPD trial, a convenience sampling method was used to invite consenting participants to return to the site. Participants provided anonymous feedback on how to improve and adapt the eMB based on screenshots and video content from the Internet intervention. Demographic information and engagement in the online trial were examined as factors influencing participant responses.

Results: One hundred nineteen English and Spanish speaking women from 27 countries and territories provided feedback about the eMB. Content-based feedback included requesting additional detail in explanations and simplifying recommended exercises. Structure-based feedback included requests for more visual representations of the materials. In general, participants did not explicitly suggest culturally specific feedback that differed by geographic region, but instead reported similar themes related to motherhood and childrearing. An unexpected finding that only emerged among English-speaking participants was the need for the eMB to address perfectionism and introspection as factors that impact motherhood. Relative to those who did not access the eMB in the parent study, women who did thought the intervention content was acceptable (i.e., no suggested changes) and provided feedback that referenced maternal stress and pregnancy experiences. Age, education, pregnancy status and number of children were not significant factors associated with participants' use of the eMB.

Conclusions: Findings from this study offer preliminary information about the needs and preferences of an international sample of childrearing women who access automated Internet interventions to manage mood changes during the perinatal period.

1. Introduction

Women who are pregnant or who have recently given birth are at an increased risk of developing depression (Cristescu et al., 2015). Postpartum depression (PPD) occurs in 10–15% of women worldwide and can affect mothers up to one year after delivery. Unfortunately, many do not access care (O'Hara and Swain, 1996; Robertson et al., 2004), often due to a lack of resource allocation to perinatal mental health or limited trained professionals in their geographical area (World Federation of Mental Health, 2012). Available health systems and financial resources have shown to better predict the probability of an individual seeking treatment than the severity of the disease itself (Simon et al., 2004). In addition, environmental factors, such as poverty (Patel et al., 2009), stressful life events (Norhayati et al., 2015), cultural stigma (Evagorou et al., 2016), or varying help-seeking behaviors may deter individuals from seeking care. These disparities may explain why the median rate of untreated depression worldwide is now reaching 50% (Abramowitz et al., 2008).

It is important to invest in relevant interventions to address the disparities in care among perinatal women. Interventions, particularly

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those focused on PPD, should be made available in low- and middle-income countries, and be financially accessible, relevant, and innovative in design and implementation. Many women around the world are already frequent technology users, making Internet-based PPD interventions viable tools for a global population of women to utilize for their mental health. Recent statistics from the International Telecommunication Union (ITU) demonstrate that 48% of adults worldwide use the Internet with considerable variability across countries (ITU, 2016). The fastest growing Internet use occurs in low- and middle-income countries, with particularly notable increases in Latin American countries (Predo, 2011). Thus, Internet-based programs, which are flexible, highly accessible, and low-cost, can serve as a practical resource for reducing global maternal mental health disparities for countries where resources may be otherwise limited.

Internet interventions for the prevention and treatment of PPD are growing. The *MomMoodBusters/MumMoodBusters* program (Danaher et al., 2012) and the *NetMums* behavioral activation program (O'Mahen et al., 2013) provide evidence that Internet interventions are sustainable options for treating women with PPD. These programs, however, rely on human services, an option that may not be possible in areas of the world where resources, such as mental health professionals, are limited. A small number of Internet interventions for the prevention of PPD have been tested with initial data suggesting some positive impact on emotional distress – such as *Mamma Mia* (Haga et al., 2013), *MoodGYM* (Jones et al., 2013), and the *Mothers and Babies Internet Course* (eMB; Barrera et al., 2015). While these Internet interventions are available to perinatal women, researchers have cited minimal engagement and poor adherence as challenges in designing similar interventions (Im and Chee, 2004). Users of Internet interventions may not be personally motivated to participate or may be deterred from multiple recruitment emails or lengthy interventions (Im and Chee, 2004). Specific to perinatal interventions, the Mamma Mia study reported significant dropout in participants who engaged with the intervention compared to the initial recruitment sample. Comparatively, though participants in the Mothers and Babies Internet Course remained in the study, many only logged in once to the intervention (Barrera et al., 2015).

Little has been published about how to conceptualize intervention content to improve participant experiences and subsequently their engagement and adherence to these programs. It has been suggested that integrating user experiences into a product's design and creation will help create a tool that is specific to the needs, preferences, and potential barriers of the target audience (Norman and Draper, 1986). This technique has been applied with some success to Internet-based public health interventions to improve how users interface with those tools (De Vito Dabbs et al., 2009). As such, it is expected that designing an Internet intervention that incorporates input and feedback from the target audience will improve engagement and adherence to the intervention.

The purpose of the present study was to identify content, structural, and cultural factors associated with a larger study, the Mothers and Babies Internet Course, a prevention of PPD Internet intervention (Barrera et al., 2015). This larger study was a two-condition randomized control trial that compared the Internet adapted version of the Mothers and Babies Course (Muñoz et al., 2007) to an information-only brochure. The Mothers and Babies Course is a face-to-face group prevention intervention based on cognitive behavioral therapy, social-learning theory, and attachment theory (Muñoz et al., 2007). The prevention trial was novel at the time of recruitment as it was the first fully-automated Internet intervention focused on PPD prevention targeting Spanish-speaking pregnant women from culturally diverse geographic locations (Barrera et al., 2014). Like other such programs, however, it suffered from poor adherence and engagement. As such, the aim of the study described in this report was to gather user feedback about the Internet intervention with the goal of designing a more useful and comprehensive tool tailored to the needs of perinatal women from diverse backgrounds.

2. Methods

2.1. Procedures

A convenience sampling method was used to identify and recruit participants for this study. Participants who consented to the original trial between January 2009 and December 2012, regardless of randomization or level of engagement, were eligible to participate in the feedback analysis described in this report. Email invitations were sent to the larger study participants, inviting them to provide anonymous feedback via an online survey about how to improve the Internet intervention materials to better reflect the cultural diversity and experiences of pregnant women worldwide. The Institutional Review Board of Palo Alto University approved all study procedures.

2.2. Measures

Demographics included participant age, language, marital status, education, number of children, and the self-selected displayed language, either English or Spanish, of the study materials.

Feedback about the intervention was gathered using screenshots and brief video clips from the original Internet intervention. Participants were asked to provide feedback on the content (e.g., how useful was this lesson?), structure (e.g., what would be a better way to present this information?), and to specify how the content related to women in their region of the world (e.g., what kinds of activities do kids like to do in your country?). Additional examples of content, structure, and cultural-based questions can be found in Table 1.

2.3. Data analyses

Descriptive statistics were used to analyze demographic variables.

Table 1
Sample questions on the content, structural, and cultural factors of the Mothers and Babies Internet Course feedback survey.

Feedback type	Sample questions
Content	"In this slide, we presented you with how your baby learns to regulate his/her emotions. What other topics would you like to learn about in order to teach your baby about healthy management of his/her emotions?"
	"How helpful did you find the relaxation techniques in the original Mothers and Babies Internet Course?"
	"How could we have improved this part of the lesson?"
	"How might we show this information in a way that would make you more likely to fill out and use the 'Helpful and Harmful Thoughts' skills?"
Structural	"How could we improve this slide to better communicate the information?"
	"How could we make the video better?"
Cultural Factors	"Help us learn what pregnant women from around the world enjoy doing before their baby is born. As a pregnant woman [from your area of the world], what would you enter in each of the boxes?"
	"Try to think of some things you can do alone or things you can do with others after your baby is born. As a woman and mother from your region of the world, what would you enter in each of these boxes?"
	"What kinds of activities do kids like to do in your country?"

The qualitative analysis was guided by Grounded Theory (Strauss and Corbin, 1997), which allowed for prevalent themes to emerge from the data. Qualitative data were first extracted from the online Qualtrics survey into Microsoft Excel™. Thematic codes were determined a priori through consensus prior to data extraction and analysis. Consistent with Grounded Theory, insight about important themes emerged from the data itself (Strauss and Corbin, 1997). Thematic codes primarily served as *flags* to direct coders to categories of the data instead of informing the a priori codes as expected in the original aims of the current study. To ensure data quality and accuracy, bilingual coders independently reviewed Spanish-language text responses in their original language. After the initial coding, coders for each language compared codes until a consensus was reached that the coded content sufficiently represented the prevailing qualitative themes expressed by participant responses.

Fisher's Exact test was used to evaluate the potential statistical significance between frequency of codes and level of engagement. Participants were stratified based on whether or not they engaged with the online intervention at least once or not at all. Statistical analyses were also performed to evaluate whether demographic data differed by level of engagement. The following data were stratified based on use: country (tabulated), age (*t*-test), level of education (chi-squared test), pregnancy status (chi-squared test), and number of children (Wilcoxon Rank Sum).

3. Results

3.1. Participants

Email invitations to participate in this study were sent to 4628 women. Of these, 361 women clicked the survey link and 282 consented to participate (Fig. 1); 119 women from 27 countries and territories provided qualitative feedback in response to the content, structure, and cultural relevance of the Internet intervention (Table 2). Over half (53.7%) confirmed they had access to the original PPD Internet intervention with 17.6% indicating they logged in and engaged with the intervention materials. Participants who provided demographic information (n = 62; 52%) were, on average, 32.8 years old (SD = 5.9), completed the survey in Spanish (67.8%), were in a relationship (82.3%), and achieved some university level education (43.5%) or higher (40.3%). See Table 3 for additional demographic details.

3.2. Feedback on the intervention content

Content related questions focused on gathering participant input on the information provided as part of the intervention materials. The majority of themes reflected a need for additional detail and simplification of materials.

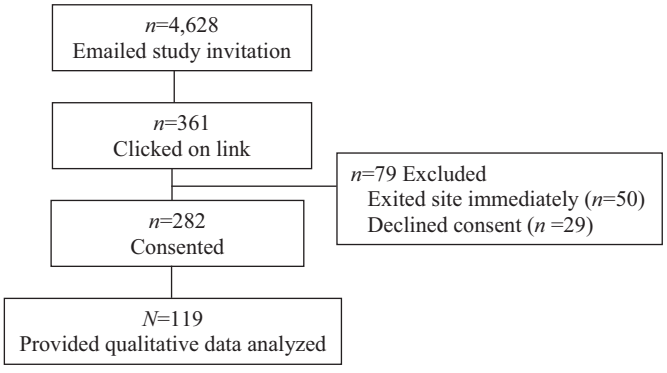

Fig. 1. Participant recruitment flow chart.

Table 2
Countries and territories represented by all participants (N = 119).

Spanish-speaking (n = 97)		English-speaking (n = 22)	
n	Country	*n*	Country
20	Chile	8	India
13, each	Colombia, Venezuela	3	United States of America
11	Argentina	2, each	Pakistan, Uganda
9, each	Mexico, Spain	1, each	Chile, Ireland, Israel, Nigeria,
7	Peru		
3	Bolivia		Sri Lanka, Trinidad and
2, each	Ecuador, Paraguay, Uruguay		Tobago
1, each	Belgium, Costa Rica,		United Kingdom of Great
	Dominican Republic, El		Britain/Northern Ireland
	Salvador, Guatemala, Puerto		
	Rico		

Table 3
Demographic characteristics of n = 62 participants.

	Percent (%)
Mean age (SD)	32.8 (5.9)
Language	
Spanish	67.8
English	32.2
Relationship status	
Partnered	82.3
Other (e.g., widowed, divorced, separated)	17.7
Education	
0-12 years	11.3
12-16 years	43.5
16+ years	40.3
Other training (e.g., trade, professional)	4.8
Number of children	
0	3.2
1	59.7
2	29.0
3	3.2
4	4.8

3.2.1. Request for additional detail

Participants indicated there was insufficient detail to complete the intervention exercises and activities. Detailed case examples of how to apply the skills being taught, explanations of what is considered a "normal" experience for a mother, and real-life experiences from other mothers were all components that participants noted were lacking.

> "*Profundizando temas que ayuden a una mejor auto comprensión de los estados anímicos de la madre.*"
>
> (More depth on themes that help a mother understand her own moods.) – 42 years old, Peru

> "If the goal is mastery, give me several 'or' goals. This or that or the other thing. Try to get at least one done by the date of..." – 36 years old, USA

3.2.2. Requests for simplification

Participants expressed a desire for simplification of the intervention tasks themselves, due to limited time in their daily schedules. For example, in an exercise where participants identified goals for mood-elevating activities, some participants noted these types of activities were not beneficial for new mothers given the limited structure of their day, while others were unable to visualize how such a task was related to the daily needs of their babies or their role as mothers in their community.

"*Es difícil ponerse metas cortas pues uno está muy ocupado con el recién nacido pero en el embarazo me sirvió*." (It is difficult to make short-term goals because I am very occupied with my newborn, but during my pregnancy it was useful.) –

24 years old, Colombia

"*Después de tener a mi bebe estaba tan cansada que realmente no habría tenido energía para pensar en una actividad personal.*" (After having my baby I was so tired that I really didn't have enough energy to think of a personal activity). –

32 years old, Argentina

3.3. Feedback on the intervention structure

Participants provided minimal feedback to address the intervention structure, which focused mostly on ways to improve the presentation of materials in the Internet intervention. Participants suggested more images and other visual representations for the intervention content. To assist with the delivery of theoretical principles, participants also suggested the addition of videos.

3.4. Personal experience and culture-related feedback

In addition to specific feedback on the intervention content and structure, participants provided a variety of comments relevant to their personal experience as a mother from their part of the world. Despite our efforts to elicit culturally-specific feedback, few themes emerged from this inquiry.

3.4.1. Baby-related feedback

Notable themes pertaining to the baby included emotional and cognitive stimulation, child development, food/nutrition, and general comments on parenting. The stimulation themes referred to play-like activities such as playing with their new baby, speaking to the baby, drawing together, touching various textures, reviewing colors together, encouraging "tummy time", and smiling at the baby. Many mothers indicated that stimulation was very important to them when considering activities to do with their babies. Child development themes such as crawling, learning to walk, and learning new words were also cited.

3.4.2. Mother's well-being

Participants expressed interest in additional general themes related to being a new mother such as their own well-being, resting, and self-care. References to physical health were described as activities to assist with a mother's well-being. Participants often stated they enjoyed exercising, particularly by walking or running. This theme appeared frequently, in multiple variations, indicating an overarching interest in being physically active in the outdoors as a method to help manage mood changes. Behaviors descriptive of a mother's self-care included going to the hair salon, painting nails, and other similar beauty treatments, taking pride in one's appearance, and taking relaxing baths.

Being social was identified as a contributor to well-being. Social activities to improve mood included going out to dinner with friends, going to the movies, bonding with other new mothers, playing sports, and people visiting the baby. As an example, one respondent's feedback highlighted the inter-dependency during pregnancy and child-rearing and the importance of a social support:

"*Sugerir más actividades que pueda realizar en compañía ya que el embarazo crea mucha dependencia emocional con las demás personas de nuestro entorno si es en pareja mejor pero si no tiene pareja con algún familiar o amistad cercana.*"
(Suggest more activities that we can accomplish in the company of others because during pregnancy there is a lot of emotional dependency on other people [,] if it is with a partner/in pairs then better [,] but if you do not have a partner, then having someone familiar or a close friend [is preferable]) –27 years old, Venezuela

3.5. Other themes of interest

3.5.1. Music

Music emerged often as an activity that participants mentioned across contexts such as listening to music both before and after the baby was born as an activity to stimulate the baby.

3.5.2. Education

The education theme included studying or reading about pregnancy and childrearing and modeling developmental milestones such as crawling and walking.

3.6. Feedback codes specific to the English-speaking sample

The following themes emerged only among English-speaking participants. There were no unique themes that emerged among the Spanish-speaking sample.

3.6.1. Perfectionism

English-speaking participants described perfectionistic thought patterns in relation to goal setting, self-help, and their self-perceived competencies as parents. For the goal-setting activity, participants were asked if the following statement was adequately covered in the exercise: "with pleasurable activities we often feel better, have more helpful thoughts and get along better with others." When asked to provide what was missing, respondents directly suggested that perfectionism should be considered in the activity.

"Thoughts are as important as activities. Taking a walk might make me feel better, but also remembering that I don't need to be perfect may make me feel just as good. That idea was missing." –

36 year old, USA

"… I would like to see things that say that not only is it okay to ask for help, but it can be imperative and it's 100000000% okay to ask for help even for things that seem silly or for things that you 'should' be able to do on our own. Saying to yourself 'oh, but I ONLY have one kid' or 'I ONLY…" Does not help any. Also to stress that women should NOT compare themselves to other women when trying to decide whether or not to ask for help. Just because Jennifer down the [street] seems to manage her five kids with ease doesn't mean that you can't ask for help because you're struggling with just one." –

25 years old, Israel

3.6.2. Introspection

In addition to perfectionism, another common theme was related to thought patterns and introspection. English-speaking participants seemed particularly interested in exercises relating to managing thought patterns: how to improve communication of the intended messages, possible daily methods for controlling thought patterns, and ways to engage with the self were all cited as potential insights or suggestions.

"…maybe you can give them suggestions of how to actually get away from the harmful thoughts because when [you] are depressed you sometimes don't stop to think of getting out of the harmful thoughts. You can give them suggestions of how to recognize that the harmful thoughts are coming on." -

33 years old, Trinidad and Tobago

"The presentation is very concise & informative. However, it is not leading the viewer to look within. A more direct method to "make" the concern[ed] Mom "look within" is the questionnaire method, used in the "people who support me" topic. It forces a person [to]

think, as well as builds interest as it “involves” the answerer herself. “Improving and managing your mood begins with identifying and expressing your own thoughts, feelings, and behaviors.” Is a very important concept, & it deserve to be emphasized “drilled into” moms.” –

31 years old, India

3.7. Statistical testing

There were no differences in the frequency of coded themes between those who accessed the Internet intervention in the larger study and those who did not. Significance was found only for the following coded themes between non-users and users, respectively: “content items - no suggestions provided” (i.e., content was acceptable as presented; 0% vs. 6.8%, respectively; $p = 0.05$), “stress” (i.e., themes that elicited feedback that referenced maternal-related stress; 0% vs. 6.8%, respectively; $p = 0.05$), and “pregnancy-related” (i.e., themes that elicited feedback that referenced the experience of being pregnant; 1.39%, vs. 13.64%, respectively; $p = 0.05$). There were no statistical differences in age ($t = -0.03$, df = 81, $p = 0.97$), education level ($x^2 = 7.46$, $p = 0.28$), pregnancy status ($x^2 = 0.29$, $p = 0.58$), number of children ($z = -1.208$, $p = 0.43$) and use of the larger study Internet intervention.

4. Discussion

The purpose of this study was to gather qualitative feedback from a global community of English- and Spanish-speaking women who were interested or participated in one of the first prevention of PPD Internet intervention trials. Specifically, the aims of this intervention feedback analysis study emerged from the hope to improve engagement and adherence in future iterations of this and other online PPD interventions by addressing the expressed needs and preferences of perinatal women and new mothers. Using design principles as a guide, this study sought to gather information from the target population of users (i.e., perinatal women and new mothers) on how to improve the content, structure, and cultural relevance of the Internet intervention. Data from this study has the potential to add to the collective utility of technology-based mental health tools in reducing the global burden of mental health issues, specifically among diverse communities of perinatal women in the context of this work.

The most notable feedback from both the Spanish and English-speaking women was the request to simplify the online exercises described in the various intervention lessons. This recommendation suggests that mothers require time-efficient and effective exercises to improve their behavioral health. It also highlights the need to provide clear, detailed instructions and demonstrations of techniques that can be easily implemented to manage changes in mood and transition to motherhood. Additionally, mobile applications or text messages could aid in the integration of the intervention content into the daily lives of perinatal women, as has been accomplished in similar studies (Watts et al., 2013). The use of these technologies allows perinatal women to engage with tools to improve their behavioral health in an accessible and convenient way. This is a feasible option for delivery of health information, as perinatal women are already engaged with mobile phones and are open to seeking health information via technology (Osma et al., 2016).

Feedback from this study suggests a global sample of women found self-care activities, such as accessing music, to be a valuable activity to manage their mood and connect with their children. Since music therapy is considered an effective method for treating depression (Maratos et al., 2008), it may be beneficial to consider the integration of this activity into future versions of our course and other PPD Internet interventions. Music is an accessible tool that is part of every community and can be used as a low-cost component of a PPD Internet intervention seeking to meet the needs of women across the world. Furthermore, mothers worldwide conveyed interest in learning about parenting practices, encouraging child development, and cognitively stimulating their child through play.

The organic presentation of perfectionism references by the English-speaking sample was a unique finding. Given the association between high-perfectionism and the development of PPD (Gelabert et al., 2012), future studies should also consider the impact of culture on the concept of perfectionism and other personality-related constructs. It may be valuable to consider quality of life in relation to adaptive perfectionism, maladaptive perfectionism, and non-perfectionism in cross-cultural studies (Gilman et al., 2005).

When comparing those who engaged in the Internet intervention and those who did not, we found limited evidence for differences in the type of feedback provided. Those who had accessed the parent study Internet intervention indicated they would not change the content of the intervention and tended to provide qualitative comments that included maternal stress and pregnancy related feedback. A possible explanation of these findings is that these women the perhaps had a greater need or motivation when enrolling in the original trial. In fact, outcome data from the larger prevention trial indicated that participants at greatest risk who accessed the Internet intervention benefited the most (i.e., longer period of time before endorsing elevated depressive symptoms) relative to those at lower risk for depression (Barrera et al., 2015).

There are several limitations to consider when interpreting the findings from this study. First, the included sample is limited in size. Though we invited 4628 women from the parent prevention trial to participate, only 282 consented with 119 providing qualitative data for analysis. Given that this follow-up study was anonymous, we were not able to confirm the actual level of engagement of each participant. The extent of a participant's engagement with the course likely impacted the quality and content of their feedback, and as such, is a limitation of the present study that future studies should account for.

Second, approximately 60% of participants had at least one child at the time of their participation in this study. As such, it is important to consider that the women in this study may hold a unique perspective regarding the intervention materials presented to them which may not reflect the perspective of pregnant women who were the target audience for the Mothers and Babies Course Internet Course.

Third, the feedback received in this study is most relevant to Spanish-speaking women, as Spanish-speakers accounted for the majority of the sample. As such, the results provide a perspective of mostly women residing in Latin American countries. However, this may be due to the fact that these women may have specifically been drawn to this study because of its consideration of Spanish-speaking populations and the limited available online resources on this topic. While English-speaking women have options for other similar technology-based programs, online PPD resources tailored to Spanish-speaking women are limited.

Fourth, data collection was retrospective and may not be reflective of their perspectives at the time of their participation in the parent study. Finally, neither the parent study nor this feedback analysis assessed participants' previous experience with or exposure to Internet interventions which may have influenced outcomes of the study. Related, although the parent study did assess for current and prior experiences with PPD, we were unable to connect those data to the feedback data given the anonymous nature of this study.

Finally, despite the international representation, participant feedback is not reflective of all women in each given country, culture, or community. Similarly, we cannot assume that feedback patterns that emerged are reflective of the languages spoken by those who participated, nor among all women who access or rely on technology as a means to obtain perinatal health resources. Though we initially expected culturally-specific themes to emerge from the data, we did not find that geographically specific feedback varied across participants.

Instead, our findings suggest there were more similarities than differences in the experiences of mothers across geographical regions. It is possible that the interests and concerns of perinatal women are universal. However, we might also hypothesize that participants were perhaps unable to verbalize the experience of their culture due to its familiarity. Hartley and Ruth (1955) cites that it is only during transitional experiences, where an individual is immersed in a culture beyond their own, that individuals can become aware of their inherent cultural differences (Hartley and Ruth, 1955).

5. Conclusions

Users have valuable input to provide those who are designing and disseminating PPD Internet interventions and should be invited to contribute to the development and adaptation of Internet-based maternal mental health resources. Furthermore, the ability to update, tailor, and adapt interventions is a strength of Internet interventions and should be done with great frequency and speed while also accounting for the input and perspectives of the target population.

6. Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed Consent was obtained from all participants.

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Declaration of competing interest

The authors do not declare any competing interests regarding this manuscript.

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