

Music as a health resource in pregnancy: A cross-sectional survey study of women and partners in Ireland

Pui Sze Cheung^{a,*}, Triona McCaffrey^a, Sylvia Murphy Tighe^b, Mas Mahady Mohamad^c

^a Irish World Academy of Music and Dance, University of Limerick, Limerick V94DK18, Ireland

^b Department of Nursing and Midwifery, University of Limerick, Limerick V94DK18, Ireland

^c Specialist Perinatal Mental Health Team, University Maternity Hospital Limerick, Limerick, V94 C566, Ireland, School of Medicine, University of Limerick, V94DK18, Ireland

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ABSTRACT

Background: Wellbeing in pregnancy can have long term effects for women, infants, and families. Research has shown that music can promote maternal health, infant development, and parent-infant bonding. This study aimed to explore women's and their partners' experiences of using music during pregnancy while also considering their perspectives on the potential role of music in maternity care.

Methods: A cross-sectional online survey was conducted from June to October 2020 in Ireland. 265 respondents including 254 women and 11 partners who were pregnant or had given birth in the past 12 months participated. Descriptive statistics and content analysis were used to analyse the results.

Results: Findings indicated that, during pregnancy, 75% of respondents sang to their unborn baby, 47% created playlists for childbirth, 46% intentionally used music to support their wellbeing, over one-third were not aware of supporting evidence on music for perinatal wellbeing, 88% thought there was not enough guidance, and 70% supported the idea of establishing music therapy in maternity care. Qualitative analysis revealed three themes: 'Positive impacts of music', 'Facilitators and barriers to the use of music during pregnancy', and 'Future visions on implementing music in maternity care'.

Conclusion: This study is the first to explore the experience and perspectives of women and partners in Ireland on using music during pregnancy. The findings highlight the need for more music-based resources and education on this topic and suggests an openness amongst women and partners towards the implementation of music therapy in maternity care to promote perinatal health and wellbeing.

Introduction

During pregnancy, women undergo intense transformation including changes in the body, upheaval of hormones, redefining self-identity, changing roles in relationship and careers, and preparing for parenthood (Miller, 2016). For some, it can be "a time of crisis" when one feels vulnerable to effects of adversity or finds the transition challenging (Slade et al., 2018). Prevalence of depression and anxiety is higher during pregnancy, and it is estimated that globally up to 25% of pregnant women can experience symptoms of anxiety (Dennis et al., 2017) and 17% symptoms of depression (Underwood et al., 2016). Prenatal anxiety and depression have been associated with higher rates of obstetric complications during pregnancy and adverse birth outcomes

(Yonkers et al., 2017). The effects continue beyond birth with long-term impacts on the mother and the biopsychosocial development of their infant(s) (Field, 2017).

Wadephul et al. (2020) highlight that perinatal wellbeing is a subjective experience and depends on how an individual draws on internal skills and external resources to cope with change and challenging situations. Hence, it is crucial for expectant parents to have access to substantial resources, tools, and support during pregnancy to augment maternal, paternal, and neonatal wellbeing and development.

Music engagement during pregnancy has been found to be beneficial for women and the fetuses (Fancourt and Finn, 2019). Listening to relaxing music during pregnancy is shown to reduce symptoms of anxiety and depression, decrease cortisol and increase the oxytocin level,

* Corresponding author.

E-mail address: PuiSze.Cheung@ul.ie (P.S. Cheung).

[@CheungPuiSze](https://twitter.com/CheungPuiSze) (P.S. Cheung), [@McCaffreyTriona](https://twitter.com/McCaffreyTriona) (T. McCaffrey), [@sylviamurphyt](https://twitter.com/sylviamurphyt) (S.M. Tighe), [@MahadyMas](https://twitter.com/MahadyMas) (M.M. Mohamad)

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improve sleep quality in women with disturbed sleep, promote maternal foetal attachment, and reduce anxiety in women waiting for amniocentesis and during transvaginal ultrasound (Fancourt and Finn, 2019; Sanfilippo et al., 2021; Ventura et al., 2012; Wulff et al., 2021).

Evidence also suggests that the positive effect of prenatal music engagement can continue beyond pregnancy. A randomised controlled trial shows that prenatal music listening is associated with a more positive birth experience with shorter labour, higher chances of delivery beginning naturally, less need for medication (García González et al., 2018), higher levels of postnatal maternal wellbeing and reduced symptoms of postnatal depression in the first three months after birth (Fancourt and Perkins, 2018). Singing lullabies during pregnancy has also been associated with stronger postnatal attachment, lower incidence of neonatal crying episodes, infantile colic, and neonatal nightly awakening (Persico et al., 2017). Infants of women listening to music during pregnancy have scored significantly better on the Neonatal Behavioural Assessment scale (Arya et al., 2012) and showed long-term neural effects than those with no prenatal exposure to music (Partanen et al., 2013).

There is an emerging body of literature that describes music therapy as a specialist clinical practice during pregnancy. These include music therapy for vulnerable first-time parents (Lander, 2017), expecting parents with mental health illness (Friedman et al., 2010), women who were hospitalised during antepartum (Corey et al., 2019; Horn et al., 2022), and pregnant women whose foetuses have an incurable diagnosis (Schreck and Economos, 2018). A distinct difference between music therapy and other music interventions is that music therapy involves a process developed between a music therapist and the client(s) to achieve health and therapeutic goals through tailored music experiences (Bonde, 2011). Different music therapy techniques such as music listening, singing, song discussion, song-writing, music-making, and music-assisted relaxation were found to reduce distress (Corey et al., 2019; Horn et al., 2022), normalise the hospital experience (Horn et al., 2022), promote positive parenting (Lander, 2017), increase mother-foetal bonding (Friedman et al., 2010; Horn et al., 2022; Schreck and Economos, 2018), connect the family (Horn et al., 2022; Schreck and Economos, 2018), celebrate life, and create legacy and memories (Schreck and Economos, 2018).

The notion that music can be a personal and public health resource (Clift, 2012; Daykin and Bunt, 2015; Stige, 2005) is gaining wider recognition internationally (Fancourt and Finn, 2019). This applies not only to pregnant women as some studies have suggested that partners can also benefit from perinatal music intervention (Bollard-Marcovitz et al., 2021; Cheung and McCaffrey, 2022). This is reflected in information booklets provided to all parents-to-be by the Health Executive Service in Ireland who describe the use of music as a self-care strategy (Health Executive Service, 2020). Therein it is recommended that parents-to-be listen to enjoyable music to support their mental wellbeing (p.9, 11), use relaxing music as a means of distraction and self-care (p.166), prepare and use music to support labour (p.110, 119), sing songs and lullabies to “bond with the bump” (p.8), and playing calm and soft music to soothe their baby (p. 8, 165). Nevertheless, there is a knowledge gap on how parents-to-be in Ireland view and use music during pregnancy. Particularly, the experiences of partners were rarely investigated in previous studies on perinatal music intervention although the inclusion of paternal role is beginning to be recognised in perinatal studies (Fisher et al., 2021). Hence, this study aimed to gain an understanding of the experiences of both women and partners in using music to support wellbeing during pregnancy and their perspectives on music-based initiatives in perinatal care so that future resources and programmes can be developed according to their needs and preferences.

Method

Study design and participants

This descriptive study used data collected in a larger Music and Perinatal Wellbeing cross-sectional study in Ireland with a sample of 331 conducted by the same research team from June 26, 2020, to October 26, 2020. The Music and Perinatal Wellbeing cross-sectional survey aimed to investigate the experiences and perspectives of women, partners, and healthcare practitioners on using music to support perinatal wellbeing. Criteria for inclusion were: (1) over 18 years, (2) fluent in English, (3) living in Ireland, and (4) were either

- women who were pregnant or in their first year postpartum
- the partners of pregnant or postpartum women
- healthcare practitioners who worked in perinatal care in Ireland.

The study received ethical approval (2020–05–04-AHSS) on 4th June 2020. Women, partners, and healthcare practitioners in Ireland were recruited using convenience sampling and snowball sampling. The survey, hosted on survey software Qualtrics (<https://www.qualtrics.com/>) with an institutional licence, was advertised on social media channels, national and regional parenting and perinatal healthcare practitioners emailing lists, and online parenting fora based in Ireland. Posters consisting of the link and the QR code to the survey were also displayed in the waiting area of one regional maternity hospital. Interested respondents were invited to follow a link to provide consents and to take the anonymous survey. This study focused on the subsample of women (N = 254) and partners (N = 11). The findings of the healthcare practitioners sub-sample (N = 46) are published separately (Cheung et al., 2023).

Questionnaire

Survey development was informed by previous studies with similar research aims or design (Choi, 1997; Fancourt and Perkins, 2017; Fitzpatrick et al., 2019). The survey, with both fixed choice and open-ended questions, was piloted with 10 people with multiple backgrounds including four mothers, two partners, two midwives, and four other healthcare practitioners. The final survey for women and partners consisted of four sections: demographics (10Qs), obstetric and health information (7Qs), experiences of using music during pregnancy (16Qs), and perspectives on music therapy in perinatal care (5Qs). One question was open-ended where respondents were asked to comment freely on whether they felt music had supported their wellbeing during pregnancy. Other open-ended questions were follow-ups on certain responses given to some close-ended questions. A free comment box was provided at the end for additional opinions. The survey can be found in Appendix A. Responses to the questions were not mandatory, but respondents were reminded if any question was not answered. Before submission, respondents could review and change their responses through the “Back” button. Multiple submissions were disabled on the survey software to avoid multiple participations.

Data analysis

Quantitative and qualitative data from the survey were analysed separately and then triangulated using the convergent parallel design to demonstrate whether findings from each method agree, offer complementary information, or appear to contradict each other (O’Cathain et al., 2010). Descriptive analyses were conducted for quantitative data using SPSS (version 28). Results were presented in frequencies and percentages for categorical variables and mean with standard deviation (SD) for continuous variables. The dataset contained missing values concerning barrier in using music (n = 3, 1.4%), negative impact (n = 1, 0.5%), using playlist during childbirth (n = 1, 0.5%), and experience of

music therapy session (n = 2, 0.9%). Missing values were considered missing at random and were excluded from calculations of percentages (Table 2).

Conventional content analysis (Hsieh and Shannon, 2005) was used to analyse the qualitative data from 141 women and 6 partners in seven open-ended questions (see Appendix B). The primary researcher read all the responses several times to achieve immersion and obtain a sense of the whole, then read the data word-by-word again to develop codes. Codes were then categorised into clusters according to how they were related. This process continued until the emerging categories and sub-categories surfaced. The relationship between categories and

subcategories were then identified into themes and subthemes based on their concurrence, antecedents, or consequences. The themes and sub-themes were cross-checked and reviewed by the other researchers before finalised. All coding was undertaken using the qualitative data analysis programme NVIVO. This study was reported in line with the Consensus-Based Checklist for Reporting of Survey Studies – CROSS (Sharma et al., 2021) (Appendix C).

Table 1
Respondents' characteristics.

		Women n = 210		Partners n = 9		Total n = 219		
		n	%	n	%	n	%	
Age	20–29	17	8%	0	0%	17	8%	
	30–39	173	82%	7	78%	180	82%	
	40–49	19	9%	2	22%	21	10%	
	50 or above	0	0%	0	0%	0	0%	
Gender	Female	208	99%	1	11%	209	95%	
	Male	2	1%	8	89%	10	5%	
Ethnicity	White Irish	192	91%	8	89%	200	91%	
	Other white background	11	5%	1	11%	12	5%	
	Asian or Asian Irish	2	1%	0	0%	2	1%	
	Black or Black Irish	1	0%	0	0%	1	0%	
	Other, including mixed background	4	2%	0	0%	4	2%	
Region	Dublin	63	30%	2	22%	65	30%	
	Mid-West (Clare, Limerick, Tipperary)	51	24%	4	44%	55	25%	
	Mid-East (Kildare, Louth, Meath, Wicklow)	28	13%	3	33%	31	14%	
	South-West (Cork, Kerry)	24	11%	0	0%	24	11%	
	Midland (Laois, Longford, Offaly, Westmeath)	14	7%	0	0%	14	6%	
	West (Galway, Mayo, Roscommon)	13	6%	0	0%	13	6%	
	South-East (Carlow, Kilkenny, Waterford, Wexford)	11	5%	0	0%	11	5%	
	Border (Cavan, Donegal, Leitrim, Monaghan, Sligo)	6	3%	0	0%	6	3%	
	Relationship status	In a domestic partnership	49	23%	3	33%	52	23%
	Married/re-married	152	72%	6	67%	158	72%	
	Partnered but not living together	2	1%	0	0%	2	1%	
	Single (never married)	7	3%	0	0%	7	3%	
Education level	Upper secondary school - to Leaving Certificate	11	5%	0	0%	11	5%	
	Bachelor's degree or diploma	80	38%	2	22%	82	38%	
	Postgraduate studies	114	54%	7	78%	121	54%	
	Other (please specify)	5	2%	0	0%	5	2%	
Employment status	Employed full-time	160	76%	8	89%	168	76%	
	Employed part-time	18	9%	0	0%	18	9%	
	Not currently employed, looking for work	4	2%	0	0%	4	2%	
	Not currently employed, not looking for work	12	6%	0	0%	12	6%	
	Student	2	1%	1	11%	3	1%	
	Self-employed	13	6%	0	0%	13	6%	
	Unable to work	1	0%	0	0%	1	1%	
Weekly household income	< €250	1	0%	0	0%	1	1%	
	€250-€450	15	7%	1	11%	16	7%	
	€451-€650	18	9%	0	0%	18	9%	
	€651-€850	47	22%	2	22%	49	22%	
	> €850	109	52%	2	22%	111	52%	
	Prefer not to say	20	10%	4	44%	24	10%	
No. of children	No children	26	12%	1	11%	27	12%	
	1 child	121	58%	5	56%	126	58%	
	2–4 children	63	30%	3	33%	66	30%	
	Consider themselves religious/spiritual	106	50%	3	33%	109	50%	
Obstetric and health information	Pregnancy status	3 months after childbirth	43	20%	1	11%	44	20%
		4–6 months after childbirth	39	19%	2	22%	41	19%
		6–12 months after childbirth	69	33%	4	44%	73	33%
		The first trimester (week 1–12 of pregnancy)	9	4%	1	11%	10	4%
		The second trimester (week 13–28 of pregnancy)	23	11%	1	11%	24	11%
		The third trimester (week 29–40 of pregnancy)	27	13%	0	0%	27	13%
First pregnancy	113	54%	5	56%	118	54%		
Hospitalisation during pregnancy (themselves or partner)	58	28%	3	33%	61	28%		
Previous pregnancy loss (themselves or partner)	66	31%	4	44%	70	31%		
Pre-existing mental health conditions	70	33%	3	33%	73	33%		
		M	SD	M	SD	M	SD	
Self-rated health (1–5)		4.09	0.76	4.11	0.78	4.09	0.76	
WHO-5 Wellbeing Index (0–100)		56.2	15.92	56	18	56.2	15.96	

Findings

Sample

The sample in this study included 254 women who were pregnant or had given birth in the past 12 months and 11 partners. Considering the total number of births in Ireland in 2020 was 55,799 (McMahon et al., 2022), the maximum margin of error (MOE) for proportions derived from the women subsample was $\pm 6.14\%$ at a 95% level of confidence. The MOE of partners and total response rate were unobtainable due to the nature of the nonprobability sample and the recruitment method. As not every pregnant or birthing woman had a partner thus it was impossible to estimate the number of partners during the study. To ensure quality, 46 surveys which had less than 50% completion and did not contain any responses to the research questions were excluded from subsequent analysis. This resulted in the analysed sample in this study consisting of 219 respondents.

Demographics

The mean age was 34.46 (SD = 3.85) with the majority between 30 and 40 years old (82%, $n = 180$), being White Irish (91%, $n = 200$), had received postgraduate education (54%, $n = 121$), in full-time employment (76%, $n = 168$), in the highest income group (52%, $n = 111$), married (72%, $n = 158$), and had one or more children (88%, $n = 192$). Respondents were from all regions of Ireland, with the biggest group (30%, $n = 65$) from Dublin, followed by 25% ($n = 55$) from the Mid-West region and 14% ($n = 31$) from the Mid-East region.

Obstetric and health information

In total, 28% ($n = 61$) of respondents completed the survey during pregnancy and 72% ($n = 158$) in the postnatal period. Over half (54%, $n = 118$) were first-time pregnancies. 28% ($n = 61$) of the respondents experienced hospitalisation during pregnancy, 31% ($n = 70$) experienced previous pregnancy loss, and 33% ($n = 73$) had a pre-existing mental health condition. The mean score of self-rated health was 4.09 out of 5 (SD = 0.76) and WHO-5 Wellbeing index was 56.2 out of 100 (SD = 15.96, ranged from 12 to 100), slightly higher than the mean score (52 ± 23) of the Irish population recorded at the similar period (Guzman et al., 2020). However, more than one-third (38%) scored below the cut-off score of ≤ 50 , indicating poor wellbeing and the risk of mild to severe depression (Mortazavi et al., 2013; Topp et al., 2015). Characteristics of the respondents and obstetric and health background can be found in Table 1.

Experiences and perspectives on using music during pregnancy (Table 2)

General music engagement

Most respondents (35%, $n = 77$) considered music as “extremely important” and reported being involved in music “between 1 and 4 h a day” or more (32%, $n = 70$). Listening to music was the most common type of music involvement (91%, $n = 199$), followed by singing on their own (42%, $n = 92$). In terms of music listening, respondents usually listened to music through the speaker of an electronic device (40%, $n = 88$) or on a home stereo system (28%, $n = 61$), 24% ($n = 53$) through the car stereo, and very few (8%, $n = 17$) used headphones. More than half of the respondents (53%, $n = 116$) used a paid music streaming subscription, 25% ($n = 54$) listened to music on the radio and 18% ($n = 39$) through free streaming over the internet.

Using music for wellbeing during pregnancy and childbirth

Respondents were asked to select “never”, “rarely”, “about half of the time”, or “all the time” on the 10 reasons suggested for music involvement during pregnancy. Scoring of 1 to 4 with 1 being “never” and 4 being “all the time” was assigned to calculate the mean rating for each reason. The top five reasons rated by respondents, beginning with the most common reason was “to enjoy music”, “to cheer up when feeling low”, “to relieve tension and feel relaxed”, “to get motivated”, and “to

connect with baby”. Comparing the ratings between women and partners, the most notable difference was found on the reason “to connect with my baby”.

Almost half of the respondents (46%, $n = 100$) used music intentionally to support their wellbeing during pregnancy. Pop music was used most to support wellbeing (63%, $n = 137$), followed by classical music (38%, $n = 83$) and folk/country music (35%, $n = 77$) and the mood of the music, as compared to the lyrics, melody, and rhythm was considered by most respondents (36%, $n = 78$) to significantly impact one’s wellbeing the most (Fig. 1).

The majority (72%, $n = 157$) of respondents did not change their music involvement during pregnancy, with 50 (23%) reporting more and 12 (5%) less engagement. 94% ($n = 203$) did not think there was any barrier using music for wellbeing, and very few (6%, $n = 14$) experienced negative impacts when using music. Almost half of the respondents (47%, $n = 102$) indicated they had used or planned to use playlists during childbirth.

Singing to unborn baby

75% ($n = 163$) of respondents (including 158 women and 5 partners) sang to their unborn baby during pregnancy including 14% ($n = 30$) who sang daily, and pop/folk songs were most frequently sung amongst various types of music (39%, $n = 84$) (Fig. 2). 11% ($n = 24$) sang nursery rhymes, 9% ($n = 20$) lullabies, and 7% ($n = 15$) their own songs. Other music types mentioned which were not on the list included gospel, blues, R&B, classical, traditional tunes, anything from the radio, religious music, and Irish ballads.

Prospective role of music therapy in perinatal care in Ireland

88% of respondents ($n = 193$) including 184 women and all partners ($n = 9$) thought that there was not enough guidance available on the use of music in maternity care. When asked about their knowledge on possible positive effects of music on perinatal wellbeing, the majority responded “not well at all” (38%, $n = 84$) or “slightly well” (23%, $n = 51$). Regarding their understanding of music therapy, 94% of respondents ($n = 204$) had no experience of music therapy. However, 70% of respondents foresaw a role for music therapy in standard maternity care in Ireland. The most preferred music-based interventions were music-facilitated relaxation (66%) parent-infant music groups (66%), music therapy assisted childbirth (54%), along with pregnancy and childbirth music consultation (51%).

Qualitative analysis

Three overarching themes and subthemes were identified from the content analysis of the open-ended questions: The positive impact of music, barriers and facilitators, and future vision for the implementation of music in maternity care. Table 3 listed the themes and subthemes supported with quotes.

Theme one: the positive impact of music

A wide range of positive impacts from using music during pregnancy were reported by the respondents. Four subthemes are identified, and they are psychological impacts, relational impacts, physical impacts, and environmental impacts.

Psychological impacts

Relaxation and relief from distress were the most reported benefits, followed by mood improvement and emotions expression. Other positive feelings reported include joy, empowerment, and sense of self.

“(Music) creates positive feelings when I think about birth. It makes me feel powerful.” #162, woman, second trimester

“Music has helped me to feel like myself and that I’m giving of myself to my twins when I don’t feel my best.” #197, woman, 4–6 months postpartum

Table 2
Descriptive statistics: use of music during pregnancy.

	Women (N = 210) N (%)	Partners (N = 9) N (%)	Total (N = 219) N (%)
How important is music to you?			
Not at all important	4 (2)	0 (0)	4 (2)
Slightly important	11 (5)	0 (0)	11 (5)
Moderately important	61 (29)	4 (44)	65 (30)
Very important	60 (29)	2 (22)	62 (28)
Extremely important	74 (35)	3 (33)	77 (35)
How often are you involved in music?			
I might hear a few songs here and there...	39 (19)	2 (22)	41 (19)
Several times a week	41 (20)	0 (0)	41 (19)
Between 30 min to 1 hour a day	47 (22)	4 (44)	51 (23)
Between 1–4 h a day	67 (32)	3 (33)	70 (32)
More than 4 h a day	16 (8)	0 (0)	16 (7)
What is the main platform you use to listen to music?			
On the radio	54 (26)	0 (0)	54 (25)
Free streaming over the Internet	34 (16)	5 (56)	39 (18)
Purchase music online	7 (3)	0 (0)	7 (3)
Paid subscription to music streaming service	112 (53)	4 (44)	116 (53)
CD, tapes, vinyl, etc	3 (1)	0 (0)	3 (1)
How do you normally listen to music?			
Through the car stereo system	53 (25)	0 (0)	53 (24)
Through the speaker of the computer, laptop, tablet, or phone	82 (39)	6 (67)	88 (40)
Using headphones	14 (7)	3 (33)	17 (8)
On a home stereo system	61 (29)	0 (0)	61 (28)
In which way are you involved in music during pregnancy?			
Listening to music	191 (91)	8 (89)	199 (91)
Singing on my own	89 (42)	3 (33)	92 (42)
Playing a musical instrument	36 (17)	3 (33)	39 (18)
Singing/Making music with other people	35 (17)	1 (11)	36 (16)
Attending a music/creative arts therapy session	1 (0)	0 (0)	1 (0)
Other	15 (7)	0 (0)	15 (7)
Has this pregnancy changed the way you are involved in music?			
No change at all	151 (72)	6 (67)	157 (72)
This pregnancy has made me MORE involved in music	48 (23)	2 (22)	50 (23)
This pregnancy has made me LESS involved in music	11 (5)	1 (11)	12 (5)
Do you think you have used music INTENTIONALLY to support your wellbeing during pregnancy?			
Yes	96 (46)	4 (44)	100 (46)
No	92 (44)	4 (44)	96 (44)
Unsure	20 (10)	1 (11)	21 (10)
Is there any barrier that may stop you from using music to support wellbeing during pregnancy? (missing n = 3)			
Yes	12 (6)	1 (11)	13 (6)
I don't think so	195 (94)	8 (89)	203 (94)
Have you experienced any negative impact of using music? (missing n = 1)			
Yes	12 (6)	2 (22)	14 (6)
No	180 (86)	3 (33)	183 (84)
Unsure	17 (8)	4 (44)	21 (10)
Have you planned to, or did you use a music playlist during childbirth? (missing n = 1)			
Yes	101 (48)	1 (11)	102 (47)
No	95 (45)	7 (78)	102 (47)
Unsure	13 (6)	1 (11)	14 (6)
Do you think there is enough guidance available for parents on using music to support pregnancy and childbirth?			
Not enough	144 (69)	8 (89)	152 (69)
Somewhat not enough	40 (19)	1 (11)	41 (19)
Somewhat enough	21 (10)	0 (0)	21 (10)
Enough	5 (2)	0 (0)	5 (2)
Have you ever experienced a music therapy session? (missing n = 2)			
Yes	12 (6)	1 (11)	13 (6)
No	196 (94)	8 (89)	204 (94)
Do you see a role for music therapy in standard maternity care in Ireland?			
Yes	147 (70)	6 (67)	153 (70)
No	16 (8)	0 (0)	16 (7)
Unsure	47 (22)	3 (33)	50 (23)
How well do you know about these positive effects music may have in perinatal wellbeing?			
Not well at all	81 (39)	3 (33)	84 (38)
Slightly well	47 (22)	4 (44)	51 (23)
Moderately well	46 (22)	1 (11)	47 (21)
Very well	26 (12)	1 (11)	27 (12)
Extremely well	10 (5)	0 (0)	10 (5)
If a music-based programme is offered as part of perinatal care for mothers and their partners, which of the following way of using music will you be interested in?			
Music-facilitated relaxation	140 (67)	5 (56)	145 (66)
Having live music at the hospital/waiting area	42 (20)	3 (33)	45 (21)
Individual mental health support with music therapy	67 (32)	3 (33)	70 (32)
Group singing/music-making	24 (11)	2 (22)	26 (12)
Music therapy-assisted childbirth	116 (55)	2 (22)	118 (54)

(continued on next page)

Table 2 (continued)

	Women (N = 210) N (%)	Partners (N = 9) N (%)	Total (N = 219) N (%)
Pregnancy and childbirth music playlists consultation	109 (52)	3 (33)	112 (51)
Creating or choosing lullabies for the baby	75 (36)	1 (11)	76 (35)
Music-supported bonding	88 (42)	4 (44)	92 (42)
Parent and baby music groups	138 (66)	6 (67)	144 (66)

	Mean (SD)	Mean (SD)	Mean (SD)
Please rate the following reasons on why you involve in music during pregnancy.			
To enjoy music	3.68 (0.69)	3.44 (0.73)	3.67 (0.69)
To get motivated	2.85 (0.84)	2.56 (1.13)	2.83 (0.86)
To cheer up when feeling low	2.98 (0.92)	2.78 (0.67)	2.97 (0.91)
To relieve tension and feel relaxed	2.97 (0.90)	2.78 (0.97)	2.96 (0.90)
To help with physical discomfort	1.94 (0.87)	1.44 (0.73)	1.92 (0.87)
To express my feelings/emotions	2.60 (0.95)	2.89 (1.05)	2.61 (0.95)
To reduce loneliness	2.27 (1.01)	2.22 (1.20)	2.27 (1.02)
To connect with my partner or other people	2.36 (1.01)	2.00 (0.71)	2.35 (1.00)
To connect with my baby	2.71 (1.06)	1.89 (0.78)	2.68 (1.06)
To stimulate my baby	2.67 (1.07)	2.22 (0.67)	2.65 (1.06)

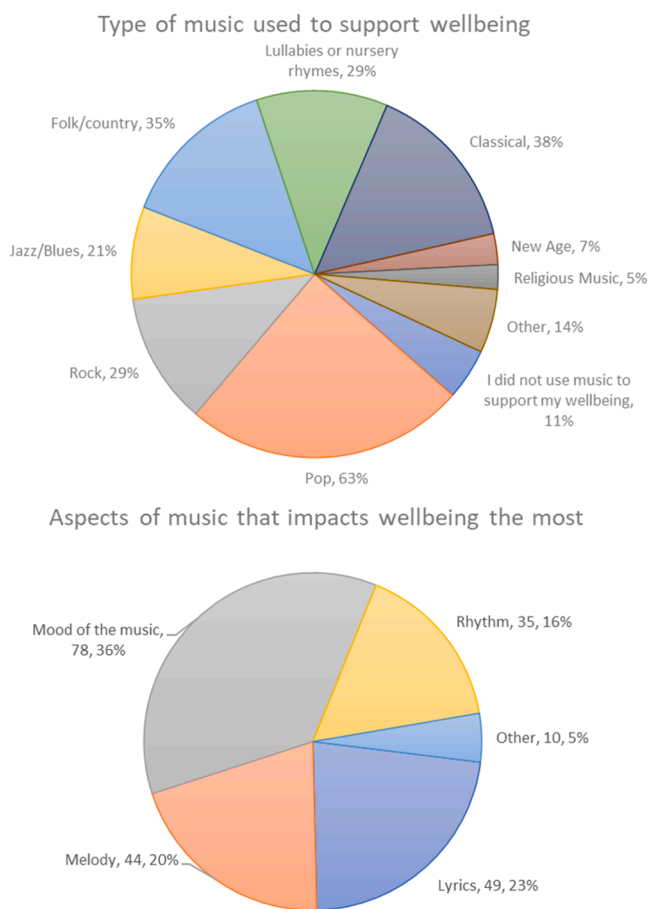


Fig. 1. Type of music used to support wellbeing & aspects of music that impacts wellbeing the most.

Relational impacts

Music was reported to support the parent-foetal and family communication and bonding during pregnancy.

“Music helped to connect with my partner and our baby, to communicate without words, to communicate with words put into songs which felt less awkward than talking.” #40, partner, 4–6 month postpartum

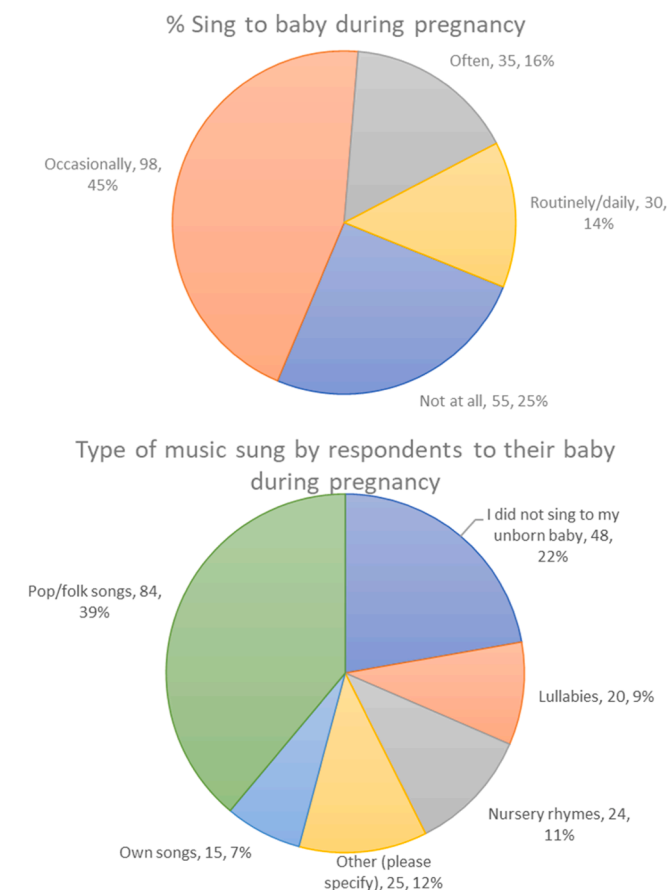


Fig. 2. Singing to baby during pregnancy & type of music sung by respondents to their baby during pregnancy.

Physical impacts

Impacts of music on physical wellbeing including boosting energy, motivation for physical activity (movement), improvement in sleep, and relief from physical discomfort such as nausea and pain.

“Listening to relaxation music while pregnant and definitely helped relax and sleep better.” #143, women, 4–6 months postpartum

Environmental impacts

Music was reported to set a relaxing atmosphere and normalise the

Table 3
Themes and subthemes with quotes from respondents.

Themes	Subthemes
Positive impacts of music	Psychological impacts “I think music is so important for wellbeing. I like listening to many different types of genres, depending on what mood I’m in. It can help motivate me or relax me. It can help me become reflective and mindful of the present.” “Music has definitely helped to distract me when I’m feeling worried/frightened.” “(Music) creates positive feelings when I think about birth. It makes me feel powerful.” “Music has helped me to feel like myself and that I’m giving of myself to my twins when I don’t feel my best.” “As a way of clearing my head from other more distracting thoughts.”
	Relational impacts “Liked to sing lullabies to my baby in the womb - made me feel connected to the baby” “Music helped to connect with my partner and our baby, to communicate without words, to communicate with words put into songs which felt less awkward than talking.”
	Physical impacts “Helped distract from nausea on the commute to work.” “Motivated me to get moving more.” “Listening to relaxation music while pregnant and definitely helped relax and sleep better.” “Help distract me from the pain.” “I used it to help me focus during exercises for PGP.” “Relieves tiredness”
	Environmental impacts “Music playing added a nice cosy atmosphere making it feel like a treat away from what was going on outside.” “Music undoubtedly helped in hospital where I feel it connected me to my own identity in the ward, a place that can be very dehumanising.” “(Music) creates a nice ambience in the home.”
	Pregnancy or birth related factors
	Facilitators “Music is much more important to me now that I have had my baby... During pregnancy I mainly used it to bond with my baby with my partner. It was magical feeling kicks to the music and sharing that together.” “I want to pass on the joy of music to my daughter and use it to bring my eldest daughter closer to her unborn/ baby sister through song and dance. “ “Creating playlists for the baby made me feel excited and helped me prepare for the birth. I used these playlists regularly throughout my pregnancy and once the baby was born.” “Music has stopped me having to resort to medication to control my mood and anxiety.” “...Regularly used music when suffering with extreme morning sickness and practiced meditation (with music) to ease nausea.” “More time resting and listening to music.”
	Barriers “I had hyperemesis, and some music would make me nauseous “ “Getting to choir rehearsals with a baby is difficult, as most rehearse in evenings.” “I can’t attend choir rehearsals anymore.” “Spending more time in the house, have tv on more than radio.”
	Lockdown situation during COVID-19 pandemic
	Facilitators “Especially in COVID times, when group singing has really not been an option, I feel
	Barriers and facilitators

Table 3 (continued)

Themes	Subthemes
Future vision on implementing music in maternity care	singing traditional melodies to my baby gives me a sense of connection to the past and to loved ones.” “It’s calming and nice to listen to music all the time, working at home means I can play through phone without earphones.” “Specifically, it has helped with working from home and remaining motivated.”
	Barriers “It (music) did (support my wellbeing) until COVID then I wasn’t driving anymore so no music really.” “COVID 19 has had massive implications for how we operate as musicians in the community and huge person implications for those of us for whom music is part of how we are social beings.”
	Knowledge and access to resources
	Facilitators “I have found that music can help me get to a deep state of relaxation. I used hypnobirthing tracks as well as an upbeat playlist of songs that myself and my partner loved to give birth naturally.” “I found out on my last pregnancy that music is the key to calming my anxiety.”
	Barriers “Don’t know how to use it properly.” “Just don’t know what to start with.” “Personally, didn’t realise the power music had in maintaining my sense of calm until now.” “I’d never thought of using music as part of pregnancy but will be researching this now.”
	Previous associations with music
	Facilitators “Music can be so evocative, and can transport to cherished memories, sad times and joyful times.”
	Barriers “After our baby died by miscarriage, I found some music very difficult to deal with. Christmas carols were very upsetting... I found playing music that we were rehearsal for around the time of our 1st miscarriage very triggering as well as our TY show.” “Emotional when reminding me of people or events from my past”
	Attitudes of family and hospital staff
	Facilitators “Partner plays guitar, we sing around the house and with baby”
Future vision on implementing music in maternity care	Barriers “My older child wanting me to shush.” “I had a playlist for labour the last time, but I think they switched it off on me...” “All music in childbirth seems to be at the discretion of the hospital or person ‘in charge’. My son was born during lockdown, so husband wasn’t allowed in, nobody stood up and fought for music to try and ease my fears. Left traumatised.” “I had play lists prepared but when I was wheeled into the labour room, I wasn’t in a position to advocate for myself. It would’ve helped enormously with quite a traumatic birth, without pain relief.”
	More resources on using music for perinatal wellbeing “I would like to receive some suggestions about the music that I should listen to during the pregnancy.” “I have really enjoyed singing to my baby, it would be great to have resource with nursery rhymes and other songs that are ideal for baby’s bedtime and for learning and development.”

(continued on next page)

Table 3 (continued)

Themes	Subthemes
	<p>“It is great to introduce some programs based on music during the pregnancy. Music is relaxing the mind, the soul, the body. Combined with exercises is relaxing the new mom.”</p> <p>“I think music therapy can have a very positive effect for pregnant women & partners.”</p> <p>A music friendly hospital environment</p> <p>“I think the delivery room should be a music friendly place throughout the whole birth.”</p> <p>“If this was made an option in the hospital, it would be easier to facilitate and vastly aid the confidence and ease of mothers.”</p>

clinical environment.

“Music undoubtedly helped in hospital where I feel it connected me to my own identity in the ward, a place that can be very dehumanising.” #119, woman, 4–6 months postpartum

Theme two: barriers and facilitators

Different barriers and facilitators to using music during pregnancy were identified and five subthemes emerge including pregnancy or birth related reasons, previous associations with music, knowledge, and guidance on music for perinatal wellbeing, lockdown situation during the COVID-19 pandemic, and the attitudes of family and hospital staff. From these subthemes, it was not uncommon that many factors facilitated the use of music acted as barriers for others.

Pregnancy or birth related factors

Different from other times in life, pregnancy contributed to some unique facilitators and barriers to the use of music. These facilitators were invoking reactions from baby, preparing music for birth, avoiding use of medications to cope with sickness, and having more time during maternity leave.

“Music is much more important to me now that I have had my baby... During pregnancy I mainly used it to bond with my baby with my partner. It was magical feeling kicks to the music and sharing that together.” #168, woman, 3 months postpartum

Pregnancy also creates some barriers to engage in music, mainly due to the physical challenges that come with the pregnancy and the changing of lifestyle during maternity leave.

“I had hyperemesis, and some music would make me nauseous” #91, woman, 3 months postpartum

“Spending more time in the house, have tv on more than radio.” #45, 3 months postpartum

Previous associations with music

Another subtheme was previous associations with music. Music was found to be associated with many positive feelings such as relaxation, happiness, and connectedness, which encouraged respondents to use music to support their wellbeing and build internal resilience. However, few respondents also indicated that certain music was associated with difficult memories and could inhibit them from engaging in music.

“Music can be so evocative, and can transport to cherished memories, sad times and joyful times.” #191, woman, 3 months postpartum

“After our baby died by miscarriage, I found some music very difficult to deal with... I found playing music that we used in rehearsal around the time of our 1st miscarriage very triggering...” #106, woman, second trimester

Knowledge and access to resources

Some respondents indicated that they were not aware of the benefits of music for them and their babies and some expressed that they did not know how to use it.

“Just don’t know what to start with.” #178, woman, second trimester

“I’d never thought of using music as part of pregnancy but will be researching this now.” #89, woman, second trimester

Lockdown situation during COVID-19 pandemic

The lockdown situation during the COVID-19 pandemic was reported to be a barrier for some respondents, but a facilitator for others. Some respondents reported that COVID stopped them from attending music events and the lockdown changed their music listening habit which led to less music listening in the car or listening more when working from home. Others reported that music was an important resource to help cope with lockdown.

“It (music) did (support my wellbeing) until COVID then I wasn’t driving anymore so no music really.” #81, woman, 3 months postpartum

“Specifically, it has helped with working from home and remaining motivated.” #79, woman, second trimester

Attitudes of family and hospital staff

Both women and partners indicated that their wishes to play or sing their preferred music were not accommodated due to the opinions or actions of other family members or unsupportive attitudes of hospital staff.

“My older child wanting me to shush.” #119, woman, 4–6 months postpartum

“I had a playlist for labour the last time, but I think they switched it off on me...” #257, woman, second trimester

Theme three: future vision on implementation of music in maternity care

Two subthemes are identified for their future visions: more resources on using music for perinatal wellbeing and a more music friendly hospital environment.

More resources on using music for perinatal wellbeing

The analysis revealed an appetite for more guidance on using music for maternal and infant wellbeing and information on its benefits. Some respondents also expressed their wishes to avail of perinatal music-based programmes.

“It is great to introduce some programs based on music during the pregnancy. Music is relaxing the mind, the soul, the body. Combined with exercises is relaxing the new mom.” #17, woman, 4–6 months postpartum

A more music friendly hospital environment

Respondents also expressed their wishes for the hospital environment to be more music-friendly and to have music as an alternative coping measure.

“I think the delivery room should be a music friendly place throughout the whole birth.” #257, woman, second trimester

“If this (music) was made an option in the hospital, it would be easier to facilitate and vastly aid the confidence and ease of mothers.” #119, woman, 4–6 months postpartum

The relationship between qualitative and quantitative findings

Table 4 listed the relationships between the quantitative and

Table 4
Relationship between the qualitative and quantitative data.

	Qualitative themes	Quantitative data	Relationship
Music for the infant	Positive relational impacts/ Pregnancy -related facilitators	74% of respondents sang to their babies. The reasons “to connect with my baby” and “to stimulate my baby” have a mean score of 2.7 out of 4 23% of respondents engaged music more during pregnancy.	The potential benefits for the baby and baby’s reaction to music encouraged the use of music during pregnancy.
Music for self-care	Positive psychological and physical impacts/ Facilitators – pregnancy and birth-relation factors/previous association of music/ coping with the lockdown	46% of respondents used music intentionally to support wellbeing during pregnancy. The five highest rated reasons for music engagement were “to enjoy music”, “to cheer up when feeling low”, “to relieve tension and feel relaxed”, “to get motivated”, and “to connect with the baby”. 23% of respondents engaged music more during pregnancy.	The psychological and physical positive impacts from music engagement are the main drivers for using music for wellbeing and to cope with discomfort and difficult situation
Music for childbirth	Positive psychological and physical impacts /Birth-related facilitator Future vision - to have more guidance on using music for perinatal wellbeing and a more music-friendly hospital/ delivery environment	47% of respondents used or planned to use playlists during childbirth. 54% of respondents were interested in music-assisted childbirth and 51% in pregnancy/ childbirth playlist music consultation.	Respondents found music beneficial for their psychological and physical wellbeing during birth, hence, to prepare birth playlists is one of the reasons the respondents engaged in music more during pregnancy. The need for more guidance on music selection is indicated in both quantitative and qualitative findings.
Music engagement during pregnancy	Facilitators and barriers – pregnancy related factors	23% of respondents engaged in music more during pregnancy and 5% engaged less during pregnancy.	The pregnancy related facilitators and barriers offer explanation to the increased and reduced music engagement during pregnancy.
Music listening habit	Barriers – Attitudes of family and hospital staff Barriers – Lockdown (Some reported they listened to music less because they	Many respondents listened to music through the speaker of electronic device (40%) or on a home stereo system (28%) and	The music listening habits regarding the selection of music (playlists vs radio) and listening device (using headphones vs openly in a

Table 4 (continued)

	Qualitative themes	Quantitative data	Relationship
	no longer drove to work during the lockdown.) Barriers – Previous association (certain music triggered sad memories or sickness.)	8% used headphones. 24% of respondents usually listened to music on a car stereo system. 25% listened to music on the radio.	shared space) offer explanation on the barriers to use music.
Knowledge on music for perinatal wellbeing	Barriers - Lack of knowledge and guidance to use music for wellbeing.	61% of respondents knew the evidence on music for perinatal wellbeing only slightly well or not well at all. 88% of respondents thought there were not enough guidance available.	Respondents’ lack of knowledge and insufficient available guidance were indicated in both quantitative and qualitative findings.
Music therapy in maternity care	Future vision - to have more resources on using music for perinatal wellbeing and a more music-friendly hospital/ delivery environment	70% of respondents see a role for music therapy in standard maternity care in Ireland. 66% were interested in music-assisted relaxation and parent-infant programme, 54% in music-assisted childbirth, 51% in pregnancy/ childbirth playlist music consultation.	Both quantitative and qualitative findings supported a positive attitude towards more music-based initiatives in maternity care. Findings related to respondents’ preferences and needs were aligned in both types of data.

qualitative findings in seven areas: 1) music for the infant; 2) music for self-care; 3) music for childbirth; 4) music engagement during pregnancy; 5) music listening habit; 6) knowledge on music for perinatal wellbeing; and 7) music therapy in maternity care. All themes from the qualitative analysis are supported by the quantitative findings. The quantitative and qualitative findings offer further insights and complementary information to each other. For example, the music listening behaviours (whether music is listened openly, or if music selection is controlled by the listener) might offer insights on the barriers experienced by some respondents on using music for wellbeing. The theme “facilitators and barriers” and its sub-themes can provide further understanding on why some respondents change their music engagement behaviour during pregnancy.

Discussion

This study is the first to explore the experience of women and partners in Ireland of using music during pregnancy and their perspectives of perinatal music therapy. Whilst the findings reveal differences or association between the variables, this study is descriptive in nature and does not aim to draw any statistical conclusion. Overall, the quantitative and qualitative data are congruent and inform each other. The results highlight the positive role of music in everyday life, in difficult times, and in clinical settings. It features the women’s and partners’ uses of music during pregnancy and supports the notion that music can be a personal health resource (Saarikallio, 2017) during pregnancy to

promote maternal health, support family bonding, and to cope with psychological and physical distress, hospitalisation, the labour process, and other life challenges such as stress and crises, e.g., miscarriage and the pandemic. The reported positive benefits of using music during pregnancy are consistent with the growing body of evidence forementioned in the introduction. The findings provide insight into music engagement behaviours and preferences of women and partners which can inform the design of music programmes for perinatal wellbeing.

The findings on the music engagement behaviours lends support to a study on maternal engagement during the first nine months post-birth in England, where the majority of respondents reported listening to music regularly and pop music mostly (Fancourt and Perkins, 2017). However, in this study a much smaller percentage of respondents sang to their babies daily (14%) and sang nursery rhymes (11%) as compared to the study by Fancourt and Perkins (59% and 83% respectively) (2017). This suggests the maternal singing behaviours and purpose during pregnancy might be different from during the postnatal period when mothers sang to soothe or entertain the infants.

Although only a proportion (6%) of participants experienced negative effects and barriers in using music during pregnancy, their experiences offer important insights in considering the most effective ways of using music for wellbeing and the future directions of the development of music-based resources and interventions. The few but important cases of negative experiences highlight music is not always beneficial and can be undesirable if used inappropriately (Moss, 2021). Music is shown to evoke memories and can trigger the sensation and feelings of a specific event (Belfi et al., 2016). This explains why it can be a powerful tool to evoke positive memories and a sense of connectedness with loved ones, but also has the potential to trigger sadness and traumatic memories (Samson et al., 2009). It also explains why the key factors which facilitated the use of music for some respondents could be barriers for to some others. This suggests a need for guidance on choosing appropriate music and adjusting listening behaviours to maximise the benefits and to minimise any negative impact. For example, creating playlists containing familiar music that evokes positive feelings or induces relaxation responses for vulnerable situations; listening to preselected playlists, as compared to listening to music through the radio or allowing music applications to select tunes randomly, can give the listener more control over the music so that undesirable impact can be avoided; listening to music through headphones to accommodate personal music choices in shared listening space; and negotiating the need to play music with one's maternity care team in advance of childbirth (Grocke and Wigram, 2006; McCaffrey et al., 2020).

Given the overwhelmingly high percentage of respondents who felt that there was not enough guidance for parents on using music to support pregnancy and childbirth, there is an urgent need to develop more accessible evidence-based guidance, resources, and music-based perinatal programmes. Programmes that can support relaxation, parent-infant bonding, and childbirth would assist parents to use music safely and effectively to promote maternal, infant, and family wellbeing during the perinatal period. The findings indicate that, with enough knowledge, music can be used personally in everyday life to achieve health benefits (Ansdell, 2014). These resources and programmes can offer non-pharmaceutical, alternative strategies for parents to manage the challenges come with pregnancy and birth and promote the wellbeing of both parents and infants on psychological, physical, relational, and environmental levels.

The findings suggest that implementing music and music therapy in standard maternity care might improve the overall maternal experiences of women and tackle some key issues in the Irish maternity service raised by women in a recent study (Hannon et al., 2022). These issues include depersonalised care, lack of pain management options, low regards of women's preferences, and medicalised, chaotic, and noisy environment. The reported benefits in this study, in line with the evidence in the literature, support that appropriate use of music can enhance and normalise the hospital experience, distract women from the noise in the

ward, reinforce personal identity and control, manage pain and anxiety during labour, and transform the overall birth experience (Cheung and McCaffrey, 2022; Corey et al., 2019; Horn et al., 2022; McCaffrey et al., 2020).

Limitations and recommendations

The authors were mindful that people who were motivated to take part in a music-related study were likely to have greater interest in music and thus the results might not represent the general population. Moreover, the demographics characteristics of the respondents were predominantly white, with postgraduate or higher education level, and in the higher household incomes group, although this is in line with previous studies which observed that white backgrounds, more educated, and more affluent people were more likely to respond to internet survey than people from minority background and lower levels of education (Couper et al., 2007). For future research to provide an unbiased representation of the national population and a more even distribution of different socioeconomic backgrounds, a mixture of both digital and paper forms of survey and a probability sampling instead of convenience sampling are recommended. This study intended to include the perspectives of partners which was under-investigated, however, the number of partner respondents were far lower than the women and it was not plausible to offer any comparison. The low participation of partners might be due to the lack of fora for partners/fathers in Ireland resulting in an imbalance in the recruitment for women and partners. Although snowball sampling was applied in the advertisement in this study, it might have bigger effectiveness if the invitation to share the survey with their partners were embedded in the end of survey message.

Conclusion

The findings of this study offer an insight into how music has been used as an accessible resource to support perinatal health and wellbeing in everyday life, in clinical environments, and in challenging times such as miscarriage and pandemic. The uses of music for self-care, interaction with baby and labour preparation during pregnancy are highlighted. Three themes are identified from the findings: 1) music can have positive impacts on psychological, physical, relational and environmental aspects; 2) many factors such as birth-related conditions, the knowledge and access to resources, previous associations of music, the lockdown situations, and the attitudes of family and medical staff can be facilitators for some and barriers for others to the use of music during pregnancy; and 3) respondents envision a more music-friendly hospital environment and more music-related resources can be available. Overall, the findings suggest the need for guidance on using music for maximising the benefits and to avoid certain barriers. It is recommended that implementing music therapy in maternity care might improve the existing Irish maternity service and parents' experiences of antenatal, intrapartum, and postnatal care. These findings will be of relevance to music therapists, music and health researchers, and perinatal healthcare practitioners seeking to develop evidence-based guidelines and programmes for music use in perinatal care in Ireland, ultimately improving the quality of care provided to expectant parents and their infants.

Ethical approval acknowledgement

Ethical approval (2020-05-04-AHSS) to conduct the survey was sought and granted by the University of Limerick on 4th June 2020.

CRediT authorship contribution statement

Pui Sze Cheung: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Visualization, Writing – original draft, Writing – review & editing.
Triona McCaffrey: Conceptualization, Investigation, Supervision,

Validation, Methodology, Writing – review & editing. **Sylvia Murphy Tighe**: Conceptualization, Investigation, Supervision, Validation, Methodology, Writing – review & editing. **Mas Mahady Mohamad**: Conceptualization, Investigation, Resources.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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