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## Experiences of pregnant women attending a lullaby program in Ireland: a qualitative study; Experiences of pregnant women attending a lullaby programme in Limerick, Ireland: A qualitative study

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## **Experiences of pregnant women attending a lullaby program in Ireland: a qualitative study**

### **Objective;**

The aim of the study was to explore women's experiences of learning to sing lullabies during pregnancy.

### **Design and participants,**

Over 4 group sessions with musicians, six pregnant women, all expecting their first baby, learnt to sing 3 lullabies. Qualitative in depth interviews were conducted approximately three months after the birth to capture the women's experiences. Participants were recruited at antenatal classes at a metropolitan maternity hospital in Ireland.

### **Results**

The women enjoyed participation in the lullaby project and all felt it benefited them and their babies. Themes uncovered included: (1) beyond words: music and the articulation of deep emotion; (2) a balm for the soul: the power and pleasure of beautiful music; (3) music and the facilitation of infant development.

### **Key conclusions and implications for practice**

Singing lullabies in pregnancy had a soothing and calming effect and was a pleasant experience for participants. It was also an emotional experience and appeared to facilitate the expression of difficult emotion such as fear and anxiety. This effect is likely to have a significant and positive impact on wellbeing for pregnant women and as such warrants further exploration.

### **Keywords:**

Pregnancy, midwives, lullabies, music, emotion

## Introduction

Music is important to all cultures and music-making is intrinsic to the oldest human rituals (Hormigos-Ruiz, 2010; Meymandi, 2009). This is because music has the capacity to communicate feelings and experiences that are not easily expressed in words. Thus, music has been traditionally used to invoke the Gods, to rally men to battle, to celebrate marriage and birth and to deal with sadness and grief (Hormigos-Ruiz, 2010; Meymandi, 2009). In addition to its use as a means of communication, music is associated with health benefits such as restoring the body's harmony and to soothing the troubled psyche (Meymandi, 2009; Sidorenko, 2000; Tabarro et al., 2010; Zhu et al., 2006). As early as the 4<sup>th</sup> century BCE, for example, Aristotle wrote that flute music had a purifying and soothing effect on the soul (Hicks, 1907) and Greek mathematician and scholar, Pythagoras (569 – 475 BCE), discussed a resonance between the harmony of music and human biorhythms (Guthrie, 1988). Within this view, music had the power to heal and to restore balance in the body. Such beliefs pervade most ancient cultures and recently a physiological basis for these beliefs has been posited. Studies now indicate that specific music has a positive effect on cardio-respiratory function, including: a reduction in blood pressure: a stabilisation of heart and respiratory rates: and an increase in oxygen saturation (Bradt and Dileo, 2009; Trappe, 2009). Nonetheless, although the therapeutic and soothing properties of music are well recognised, and there is mounting evidence of measurable physiological benefits, the mechanisms by which changes occur are not fully understood. This situation, and a growing interest in the therapeutic qualities of music, have together prompted research endeavour in the area of music and health. To date, most of this research indicates that music intervention may have an effect on the release of specific neurohormones. Kumar, et al., (1999), for example, studied the use of music to soothe the agitation of dementia sufferers. These authors found that music had a relaxing effect on participants and they attributed this finding to the release of the neurohormone melatonin. Other researchers found that levels of stress hormones, such as cortisol, were reduced in response to music and this factor led to a reduction of anxiety and improved immune system functioning (Avers et al., 2007; Kreutz et al., 2004).

Most people enjoy listening to music and are aware of music's mood enhancing properties. This feature suggests the existence of a social and emotional response mechanism and recent evidence may provide us with the key to understanding this element. Salimpoor et al., (2009), for example, found that pleasurable music was experienced emotionally, while Koelsch (2010) and Zatorre (2003) suggested that music impacts on the region of the brain involved in reward and pleasure. There is also evidence that music is capable of evoking strong emotion (Koelsch, 2010; Sidorenko, 2000; Zhu et al., 2006) and also facilitating the expression of complex feelings such as fear and longing (Ready, 2010). Together, these characteristics may contribute positively to health and wellbeing by facilitating relaxation and allowing individuals to deal with their deep concerns.

In pregnant women, music and maternal singing have an emotional quality and are understood to contribute positively to maternal infant attachment (Cevasco, 2008) and to a reduction in maternal stress and anxiety (Chang et al., 2008; Sidorenko, 2000). Music may also have an effect on reducing pain relief requirements in labour and in the postpartum period (Sidorenko, 2000; Tabarro et al., 2010). For the fetus, music and the maternal voice are believed to positively impact on the developing auditory system, by providing support as the fetus learns to filter out background sound, such as maternal bowel sounds (Graven and Brown, 2008). Other evidence suggests that music in pregnancy gives rise to a form of 'fetal learning' as the fetus recognises music heard in utero and is soothed by the same melodies in the postpartum (James et al., 2002, p. 431; Tabarro et al., 2010).

Finally, different types of music have different impacts on humans. Bernardi et al., (2009), for example, found that the body's autonomic functions such as heart rate were matched to the rhythms of music, resulting in increased heart rate when the music increased in volume and beat (p.3171). Music with a flowing soft melody, such as lullabies or classical music, is considered to be particularly relaxing and soothing (Kreutz et al., 2008; Labbe et al., 2007).

For this reason, such music is generally favoured for use during illness, post surgery, during pregnancy and for infants (Amtmann, 1997; Farhat et al., 2010; Labbe et al., 2007). Although research into the benefits of musical intervention in pregnancy and the newborn period is sparse, music is generally believed to impact positively on the pregnant woman and fetus. Thus, in a bid to further explore this relationship, the current study investigated the possible benefits of singing lullabies in pregnancy.

## **Methods**

Over four group sessions with musicians, participants learnt to sing three lullabies. Lullaby sessions were conducted immediately prior to routine antenatal classes. In-depth interviews were conducted at approximately three months postpartum and were focussed on the experience and value of learning to sing lullabies in pregnancy (Box 1). On completion of the project, participants were given a CD of the study lullabies. The study was approved by Hospital and University Ethics Committees.

### **Insert Box 1 here**

## **Recruitment**

Participants were recruited at antenatal classes at a metropolitan hospital in Ireland. All were 32 or more weeks gestation. Women were recruited on the basis of: (1) age over 18 years; (2) uncomplicated singleton pregnancy; (3) a wish to participate. Six women participated.

## **Data collection and Analysis**

Data were collected using in-depth interviews which were audio recorded. Participants were offered a choice of venue and all but one interview took place at the participants' homes. The final interview took place in the researcher's office. Data were analysed using thematic content analysis informed by Burnard's (1991) method. The following steps were employed:

- All interview data was transcribed
- Transcripts were read and re-read several times to allow researchers to become familiar with the content.
- Themes and values were sought
- Data was classified under broad headings,
- Reliability of analysis was addressed by asking co-researchers and a colleague to independently generate a theme list
- Headings were amended and collapsed as data analysis progressed
- Themes/ sub-themes were moved to central categories
- Emergent understandings were tested against the data
- Alternate explanations were sought

## **Results**

Participants were generally well educated and older than average for primiparous women in Ireland, where the average age for first birth is 29.7 years (CSO, 2009). All but one of the women were employed in professional occupations. Five participants had normal vaginal births and the final participant had an elective caesarean for breech presentation. The infants were born around term (37-41 weeks gestation). All six women gave birth to male infants and one infant required special care admission for one week for prematurity (37 weeks) (see table 1).

### **Insert Table 1 here**

## **Themes**

Findings indicated that the women experienced singing the lullabies on an emotional level primarily. Three themes were found: (1) beyond words: music and the articulation of deep

emotion; (2) a balm for the soul: the power and pleasure of beautiful music; and (3) music and the facilitation of infant development. Pseudonyms are used to protect the women's and infants' confidentiality in all data excerpts.

### **Beyond words: music and the articulation of deep emotion**

Women were motivated to participate in the lullaby project based on their pre-existing beliefs that music, and particularly lullabies, were beneficial for the developing fetus and would also help calm both mother and baby. They expected participation to be a pleasant experience, shared with other pregnant women. However, for some women, participation evoked profound and unexpected emotional responses and resulted in the expression and examination of deep emotions such as the mother's fear, love and hope for her unborn child. This depth of emotion was both unexpected and very moving. Catriona and Donna explain:

On the last day we were singing to the infant that was to be and it was an incredible experience. It was just so beautiful. We were singing ... "Why is the baby crying" and "Close your eyes". We'd sung them so many times and... suddenly I felt way more comfortable... he [musician] said, okay now I want you to imagine that you're going to sing it to your child. And I don't know what happened, but it went from a melody with some nice words into a vocalisation of some of the love of the relationship between us and the children we were due to have. ... it was something so direct and immediate and personal ..it was like the notes that were vibrating were more than a melody, they were the relationship. It really was very emotional. I was overwhelmed by the beauty of the situation. It opened up, it was like it bypasses the need to articulate... It was extremely intimate and it is that intimacy, it's the closest you'll ever get to another human being

Catriona

After I gave birth I was told you're going to get blue and sad and it's perfectly normal, so I was expecting that. I didn't expect [what happened]... At first I'd start crying was when I was singing that song... as soon as I actually listened to the words, about the breath making, that just, it just demolished [overwhelmed] me. I was tired and I was emotional, but I'm not a weepy person and as I was singing I was crying at the same time. It was so strong ... And you are very open (as a new mother), you are very open to...(emotion)

Donna

This emotional response was most prevalent in the women who expressed the greatest level of antenatal concern and, for them, singing the study lullabies was relaxing and helped allay anxiety. Through their participation, women seemed to be able to face their often sub-conscious pregnancy fears and come to some resolution. Although the women had difficulty explaining exactly how this resolution of anxiety came about, their responses were positive:

It was definitely relaxing...I suppose what I had to overcome was that fear that if things weren't okay, that I'd be able to deal with it...What the singing and the bonding did there was it connected me to him so it didn't matter... it didn't matter [to] how I was going to cope with it.

Catriona

I suppose it helped me focus on the baby... I just had to think about him when I was singing to him.. I had been putting it off [thinking about the baby] because I suppose I was worried...

Clara

Meanwhile, Donna described having a profound emotional response that was triggered, in a time of stress, by visual imagery associated with one of the lullabies she had learnt. This imagery and the associated memory of singing the lullabies with the group, had the effect of inducing feelings of safety and security and calming her anxieties. The subsequent relaxation helped her to get through her caesarean section:

We were planning a home birth ...but in the last few weeks, of course, the baby decided not to turn and was in the breech position so we had to have a caesarean section... that was something that I really didn't want ... .but yeah, when I was in the operating theatre... at a point where you know, I could have gone one way or another... I could have become very fearful...I was hugely surprised at how I saw the tree, linked to the song, I saw all the other

girls and yourself there... I looked down to the window and there were these two trees swaying in the distance and honestly I thought, oh see the birch in the meadow (one of the lullabies) and I got goose bumps down me and I just relaxed and I breathed and I thought, well I am like the trees, grounded and everything is good...

### **A balm for the soul: the power and pleasure of beautiful music;**

Participation in the lullaby project was an enjoyable and rewarding experience for all women and allowed them some time out from everyday concerns. It was also a relaxing experience and this feeling of relaxation contributed to the women's enjoyment of their pregnancies.

it's just great because it does relax you and the baby... I would say that it's a lovely opportunity to bond  
Catriona

I think it's a lovely thing for an expectant mum to be doing, because it's an opportunity to just switch off and think of the music... they were lovely songs ...  
Kate

The aesthetic beauty of the music and lyrics acted as a balm and participants spoke of feeling *peaceful* and relaxed as the music soothed their concerns. The lyrics also had meaning for the women and this aspect was experienced emotionally and pleasurably. During interviews, participants struggled to find the right words to convey these deep feelings:

It's hard to explain...it sort of made me feel warm inside... and like goose-bumps...  
Margaret

Close your eyes sweet love, I love that one, I think it's very kind of spiritual and not in a religions sense...  
Beverley

...The words, you know, the lyrics, so beautiful... I make your breath, the sound of my song, you know...it tugs at your soul... I used to sway to the music .. it was just so lovely...  
Donna

Somehow, singing made me feel peaceful and forget all the things that had been annoying me  
Catriona

I learnt some beautiful lullabies, it was a lovely experience...It helped me stay calm,  
Kate

Participants particularly valued the opportunity to meet and interact with other pregnant women.

So the singing was wonderful... it was just lovely... I found it very relaxing and a lovely way to meet people  
Donna

I had a really great experience, I met some lovely women,  
Kate

### **Music and the facilitation of infant development:**

Prior to participation, the women felt that music was good for the baby and would have a relaxing effect on both mother and infant, both during pregnancy and in the early newborn period. Later, following participation, this belief was extended to include developmental benefits for the infant: such as language development which manifested as early vocalisation; greater infant appreciation of music; and advanced infant cognitive development. At interview, all participants believed that their involvement in the lullaby project had advantaged their infant. Beverley explains:

I always believed music was good for babies and everything I read pointed to that, but the experience was better than what I thought ... now I think it is fabulous... I am encouraging my sister who is pregnant to join a program [singing]...

Beverley

Catriona, Donna and Beverley describe their infants' early vocalisation:

In the last week or so he's become extremely vocal 'cause he's not three months yet...

Catriona

Well, at the health clinic she was saying as well, she couldn't get over him just the different sounds he was making

Donna

Sometimes I think he is going to sing back, he is really chatty...

Beverley

There was a general understanding that the infant's early exposure to music would foster an appreciation of music that would remain with him for life:

People say children are sponges, it instils from a really young age, before they're even out, a love of music and an appreciation for it, so it's really important (to start early)...

Kate

He seems to like music, he's started almost giving the impression that he likes music to dance So obviously that's something that's paid off [the lullaby project] ...

Catriona

Some participants believed that participation in the lullaby project encouraged fetal development in utero, such as hearing and later responding and interacting with the mother.

He could hear in the womb...quite early... I knew for sure he could hear... he responded to different sounds ...

Catriona

He loves it when I sing... he responds to me... he doesn't necessarily come over all sleepy...

Clara

For Catriona, this recognition and response to musical exposure commenced during pregnancy and she gives a clear account of her unborn baby's response to a particular musical exposure:

He could hear in the womb...we went to the opera and there was a soprano there and he really didn't like the soprano. Every time she started to sing, he'd sort of, he was jerking inside, it wasn't just like kicking, it was like he was trying to back into my spine or something. It was the first time I felt him jump, like jump as if he got a fright

Catriona

Some of the women expressed a belief that participation in the lullaby project and especially singing to the baby in the postpartum period encouraged the infant's cognitive development. For Beverley and Donna, this included the baby's recognition and memory of the lullabies heard in utero:

I think it helped him come on (develop)...He definitely recognised a tune, I'm sure he did by his response...

Donna

So the fact that he is responding to the lullaby when I start singing (is evidence of his advancement), he turns and looks and listens...

Beverley

Participants believed that their baby communicated a preference for a particular lullaby and also considered this feature to constitute further evidence of the baby's cognitive advancement. Kate and Beverley explain:

The Kookaburra one... he likes that one and remembers it all the time... He does look and kind of starts smiling...

Beverley

... he definitely reacts...the one (lullaby) that really stuck in my mind was the Kookaburra and I sing that a lot to him and he seems to like it...

Kate

## **Insert Figure 1 here**

### **Discussion**

There were some limitations to this study and in addition to the small sample size, all but one of the participants were tertiary educated and employed. Most were older than is usual for first childbearing in Ireland (CSO 2009). Additionally, although the socio economic demographics of the area were mixed, participation among women from less advantaged backgrounds was limited to a single participant. This was despite concerted recruitment effort and although not desirable, this feature is consistent with the literature where women of advanced maternal age and higher educational status are more likely to participate in health promoting activities (Carolan, 2005). Future follow up studies will need to address this issue.

The aim of this study was to explore the possible benefits, for women, of learning to sing lullabies during pregnancy. Although participation was limited to 6 women, the findings nonetheless indicate that such a program offers several benefits. Such benefits include firstly, the opportunity for women to express complex emotion and to address concerns about the unborn baby. Secondly, participation was a relaxing and enjoyable experience and contributed to the women's enjoyment of pregnancy. Thirdly, the aesthetics of both music and lyrics intensified the women's pleasure and emotional response. Finally, the women believed that participation in the lullaby project was good for babies and encouraged infant development. These findings are discussed below.

### **The expression of deep emotion**

Participants experienced deep emotional responses when singing the lullabies and this experience was largely unexpected. On reflection however, women were glad of the opportunity it afforded them to express and resolve concerns. These concerns were often sub-conscious and recognised only retrospectively. Most related to an anxiety that the infant might suffer some defect or harm or concerns are that the new mother might have difficulty coping with her new role. Participation in the lullaby project seemed to act as a medium for women to deal with their concerns in a safe way. It also permitted a depth of emotional expression and release that words alone could not facilitate. These findings, although not exactly replicated in the literature, are consistent with general understandings of music as capable of evoking intense emotion (Koelsch, 2010; Sidorenko, 2000; Zhu et al., 2006) and facilitating expression of deep feeling such as fear of the unknown (Ready, 2010). Koelsch (2010), for example, found that music could induce strong emotion and also act as a mood enhancer. These findings may be partially explained by the fact that pleasurable music has an impact on the part of the brain that regulates feelings and is involved in reward and pleasure (Koelsch, 2010; Zatorre, 2003). Intense emotional pleasure induced by listening to music sometimes produces 'chills' or 'shivers down the spine' (Koelsch, 2010; Salimpoor et al., 2009) and this feature has been described by two of the study participants.

Neuroscientific studies investigating this phenomena found that musically induced 'chills' produced similar biological reward responses as those produced by food and sexual stimulation (Koelsch, 2010; Zatorre, 2003) and this feature may account for the depth of feeling described by participants.

In the current study, women found participation allowed the expression of deep emotion that was both difficult to communicate and beyond articulation in words. This notion of 'beyond words' is also found in the literature and there is a general understanding that complex

emotions are difficult to express (Ready, 2010; Thurmann, 1988). Singing meaningful songs seems to provide one avenue for articulation and Thurman suggests that 'singing provides a level of feelingful expression which language alone cannot provide' (1988, p. 278). Listening to music may have a similar effect and Ready (2010), who considered the role of music in helping individuals to address complex emotions that they experienced during illness, palliative care or bereavement, found that music could provide a supportive structure, which she termed a 'scaffold'. This scaffold, in turn, helped the individual to contain and to express difficult emotion such as lamentation and fear.

### **Relaxation and stress reduction**

All women in the current study found participation to be effective at reducing stress and promoting relaxation. This aspect was variously described as *soothing*, *relaxing* and as providing *time out* and was valued by the women and contributed to their enjoyment of pregnancy. Similar findings resonate through the literature where a variety of authors have found that exposure to a music intervention during pregnancy benefits women in terms of stress reduction. This effect is seen antenatally (Chang et al., 2008), during hospitalisation (Sidorenko, 2000), during caesarean section (Chang and Cheng, 2005) and during labour (Tabarro et al., 2010). Chang et al., (2008), for example, trialled a music intervention where pregnant women listened to pre-recorded lullabies and classical music over a 2 week period. They found that this intervention resulted in significant psychological benefits for the women. Meanwhile, Tabarro et al., (2010), conducted a study where participants attended classical music sessions during pregnancy and then continued to listen to the melodies at home. During labour, participants listened to the same music and this intervention was found to minimise the distress of labour and also to induce feelings of safety in the women. This notion of safety also presents in the current study and Donna gives a moving account of her experience of caesarean section where trees blowing in the wind outside the operating room window triggered a visual image associated with one of the study lullabies. This image had the effect of reproducing feelings of relaxation and safety linked with singing the lullabies and Donna recalls feeling safe and confident that all would be well. A possible explanation of this phenomenon presents in the work of Juslin and Västfjäll (2008). These authors discussed a process whereby a particular emotion, such as pleasure or relaxation, is evoked in response to visual imagery, (like the ocean), while listening to music. The resulting emotional response is postulated to be the result of a 'close interaction' between specific music and the subjective images it evokes for individuals (Juslin and Västfjäll, 2008, p.566). Together these features of emotional expression and relaxation may contribute positively to health and wellbeing in pregnancy by allowing pregnant women to process deep fears. Unaddressed, such fears can impact negatively on maternal depression rates (Britton, 2008) and similar findings present in the literature. Labbe et al., (2007), for example, found that listening to classical music was effective at reducing negative emotional states. Meanwhile, Bongard et al., (2008), found that the suppression of negative emotions led to increased physiological stress and increased the risk of cardiovascular disease. These authors found that an activity such as singing in a choir, reduced the risk of heart disease at the same time as increasing specific immunoglobulins which led to improved immune functioning (Bongard et al., 2008).

### **The pleasure of music**

The aesthetics of the music and lyrics in the current study intensified the women's pleasure and emotional response. Participants described both the words and the music as *moving* and *touching* and similar expressions have been used elsewhere to express the beauty of music (Istók, et al., 2009). However, the concept of beauty remains contested and poorly understood and a range of authors have tried to capture, define and judge how beauty in music is constituted (Fukumoto and Matsuo, 2010; Huss, 2008; Muller et al., 2010). Huss (2008), for example, suggested that beauty in music is a combination of rhythm, melody and harmony, but also stressed that beauty is a highly subjective and individual concept which can be affected by many variables. These variables include the listener's mood, the emotion

the individual feels is contained within the music (such as sad music) and the social context in which the music is played. Müller et al., (2010) found that perceptions of beauty in music differed between music professionals and laypersons while Fukumoto and Matsuo (2010) extend the discussion and postulate that an unconscious physiological effect underpins impressions of beauty in music. These authors found that musical tempo closest to the subject's heart rate was significantly related to impressions of relaxation and beauty. Perhaps a similar effect was at play in the current study as each of the lullabies had a tempo similar to human heartbeat (60-80 bpm) and women discussed their pleasure in the music in terms of both aesthetic value and relaxation.

The notion of meaningful lyrics or words is more difficult to locate in the literature where the greatest emphasis is on musical type such as classical or popular music. However, the impact of the lullaby lyrics may be explained by drawing on the work of Juslin and Västfjäll (2008) as above. These authors discussed the capacity of music to evoke visual imagery and it may be that the visual images of sleeping babies, angels, trees and landscapes conjured up by the words of the lullabies were pleasing and emotional for the women.

### **Facilitation of infant development**

In the final theme, the notion of music as good for the baby was endorsed by all participants and women considered that music that was relaxing for the mother also had benefits for the fetus. They additionally believed that lullabies could assist with settling the newborn infant. Following participation, the women's understanding of infant benefits was extended to include cognitive and language skills development and also musical appreciation. In respect to language skills, similar notions are found in the literature of early infant development where music and language are strongly linked. Koelsch and Siebel (2005), for example, found that infant exposure to music aided the development of rhythm, stress, and intonation in speech. According to these authors, the infant brain does not distinguish between music and language but instead treats language as a 'special case of music' (Koelsch and Siebel, 2005, p.582). Others such as Trehub (2003) and Longhi (2008) suggest that exposure to maternal music and singing in infancy and early childhood may play an important role in the cognitive and emotional development of the child.

In terms of music appreciation, all but one of the participants felt that the infant recognised and responded to the lullabies in the newborn period. Most felt their infant could hear well in the later stages of pregnancy and this suggestion corresponds well with the established literature where fetal hearing has been shown to be functional from approximately 25 weeks gestation (Graven and Brown, 2008). Similarly, a number of studies have suggested that the infant later recognises and is soothed by music heard in utero (James et al., 2002; Tabarro et al., 2010). James et al., (2002) go so far to describe this event as a form of fetal learning or programming while women, in Tabarro et al's., (2010) study, felt that in addition to recognising the music heard in utero, the baby expected the music and looked at the radio or tape recorder when the music was turned off. Similar findings of infant expectancy are found in the current study. The notion of fostering musical appreciation in the infant is more difficult to locate in the literature and studies are more concerned with infant music perception skills (Ilari and Polka, 2006; Trehub, 2003) rather than establishing if prenatal exposure to music changes this relationship. Trehub (2003) for example, found that the music perception skills of infants as young as 6 months were well advanced and showed little difference to those of individuals who had many years of exposure to music. Infants recognised changes in tempo and pitch and demonstrated long-term memory of musical pieces. Although infants are clearly attracted to and responsive to maternal singing (Trehub and Nakata, 2001), it seems likely that this response may relate to social and emotional interaction (Trehub, 2003) as much as music appreciation.

### **Conclusions and implications**

This study has provided some useful insights into the benefits of music and singing in pregnancy. In addition to being a pleasant and relaxing experience, findings indicate that participation was unexpectedly emotional for some study participants, at the same time as

enabling them to face and to resolve their pregnancy concerns. This finding is important as pregnant women with unresolved concerns often suffer negative emotions in the postpartum period. In allowing the pregnant woman to work through her concerns, such an intervention is likely to have a significant and positive impact on wellbeing. This intervention is also of low cost and easy to implement and could be successfully facilitated by midwives in a variety of settings. Such low cost, non interventionist approaches to stress reduction in pregnancy are likely to be acceptable to both childbearing women and healthcare providers. This study could be used as a foundation for future research in this area, which warrants further exploration in larger scale studies.

## References

- Amtmann, I.M. 1997. Music for the unborn child. *International Journal of Music Education*, 29, 1, 66-72.
- Avers, L., Mathur, A., Kamat, D., 2007. Music therapy in pediatrics. *Clinical Pediatrics*, 46, 7, 575-579.
- Bernardi, L., Porta, C., Casucci, G., et al., 2009. Dynamic interactions between musical, cardiovascular, and cerebral rhythms in humans. *Circulation*, 119, 25, 3171-3180.
- Bongard, S., Hodapp, V., Rohrmann, S., 2008. Emotions and health: The impact of emotions, emotions regulation, music, and acculturation on health. *Zeitschrift fur Gesundheitspsychologie*, 16, 3, 112-115.
- Bradt, J., Dileo, C., 2009. Music for stress and anxiety reduction in coronary heart disease patients. *Cochrane Database of Systematic Reviews* (2).
- Britton, J.R. 2008. Maternal anxiety: Course and antecedents during the early postpartum period. *Depression and Anxiety*, 25, 9, 793-800.
- Burnard, M.P. 1991. A method of analysing interview transcripts in qualitative research. *Nurse Education Today*, 11, 4, 461-466.
- Carolan, M.C. 2005. 'Doing It Properly': The Experience Of First Mothering Over 35 Years. *Health Care for Women International*, 26, 9, 764 - 787.
- Cevasco, A.M. 2008. The effects of mothers' singing on fullterm and preterm infants and maternal emotional responses. *Journal of Music Therapy*, 45, 3, 273-306.
- Chang, M.Y., Chen, C.H., Huang, K.F., 2008. Effects of music therapy on psychological health of women during pregnancy. *Journal of Clinical Nursing*, 17, 19, 2580-2587.
- Chang, S.C., Chen, C.H., 2005. Effects of music therapy on women's physiologic measures, anxiety, and satisfaction during cesarean delivery. *Research in Nursing and Health*, 28, 6, 453-461.
- CSO: Central Statistics Office, I. 2009. Vital statistics: fourth quarter and year summary Cork,: Central Statistics Office, An Phríomh-Oifig Staidrimh.
- Farhat, A., Amiri, R., Karbandi, S., Esmaily, H., Mohammadzadeh, A., 2010. The effect of listening to lullaby music on physiologic response and weight gain of premature infants. *Journal of Neonatal-Perinatal Medicine*, 3, 2, 103-107.
- Fukumoto, M., Matsuo, K. 2010. Effects of musical tempo on multiple subjective impressions. *International Journal of Biometrics*, 2, 2, 124-133.
- Graven, S.N., Browne, J.V. 2008. Auditory Development in the Fetus and Infant. *Newborn and Infant Nursing Reviews*, 8, 4, 187-193.
- Guthrie, K.S., 1988. *The Pythagorean Sourcebook and Library: An Anthology of Ancient Writings Which Relate to Pythagoras and Pythagorean Philosophy*. Grand Rapids, Michigan: Phanes Press.
- Hicks, R.D., 1907. *Aristotle De Anima*. Cambridge: Cambridge University Press.

- Hormigos-Ruiz, J., 2010. Music distribution in the consumer society: The creation of cultural identities through sound. *Comunicar* 17, 34, 91-98.
- Huss, F.G., 2008. On the beautiful in music, or the emotional fly in the musical ointment. *Musical Times*, 149, 1902, 39-46.
- Ilari, B., Polka, L., 2006. Music cognition in early infancy: Infants' preferences and long-term memory for Ravel. *International Journal of Music Education*, 24, 1, 7-20.
- Istók, E., Brattico, E., Jacobsen, T., Krohn, K., Müller, M., Tervaniemi, M., 2009. Aesthetic responses to music: A questionnaire study. *Musicae Scientiae*, 13, 2, 183-206.
- James, D.K., Spencer, C.J., Stepsis, B.W., 2002. Fetal learning: A prospective randomized controlled study. *Ultrasound in Obstetrics and Gynecology*, 20, 5, 431-438.
- Juslin, P.N., Västfjäll, D., 2008. Emotional responses to music: The need to consider underlying mechanisms. *Behavioral and Brain Sciences*, 31, 5, 559-575, 612-621
- Koelsch, S., 2010. Towards a neural basis of music-evoked emotions. *Trends in Cognitive Sciences*, 14, 3, 131-137.
- Koelsch, S., Siebel, W.A., 2005. Towards a neural basis of music perception. *Trends in Cognitive Sciences*, 9, 12, 578-584.
- Kreutz, G., Bongard, S., Rohmann, S., Hodapp, V., Grebe, D., 2004. Effects of choir singing or listening on secretory immunoglobulin A, cortisol, and emotional state. *Journal of Behavioral Medicine*, 27, 6, 623-635.
- Kreutz, G., Ott, U., Teichmann, D., Osawa, P., Vaitl, D., 2008. Using music to induce emotions: Influences of musical preference and absorption. *Psychology of Music*, 36, 1, 101-126.
- Kumar, A. M., Tims, F., Cruess, D.G., Mintzer, M.J., Ironson, G., Loewenstein, D. et al., . , 1999 . Music Therapy Increases Serum Melatonin Levels in Patients with Alzheimer's Disease. *Alternative Therapies in Health and Medicine*, 5, 6 , 49-57.
- Labbe, E., Schmidt, N., Babin, J., Pharr, M., 2007. Coping with stress: The effectiveness of different types of music. *Applied Psychophysiology Biofeedback*, 32, 3-4 , 163-168.
- Longhi, E., 2008. Emotional responses in mother-infant musical interactions: A developmental perspective. *Behavioral and Brain Sciences*, 31, 5, 586-587.
- Meymandi, A., 2009. Music, medicine, healing, and the Genome project. *Psychiatry*, 6, 9, 43-45.
- Müller, M., Höfel, L., Brattico, E., Jacobsen, T., 2010. Aesthetic judgments of music in experts and laypersons - An ERP study. *International Journal of Psychophysiology*, 76, 1, 40-51.
- Ready, T., 2010. Music as language. *American Journal of Hospice and Palliative Medicine*, 27, 1, 7-15.
- Salimpoor, V. N., Benovoy, M., Longo, G., Cooperstock, J.R., Zatorre, R.J., 2009. The rewarding aspects of music listening are related to degree of emotional arousal. *PLoS ONE*, 4, 10 .

- Sidorenko, V.N., 2000. Clinical application of medical resonance therapy music in high-risk pregnancies *Integrative Physiological and Behavioural Science* , 35, 199-207.
- Tabarro, C.S., de Campos, L.B., Galli, N.O., Novo, N.F., Pereira, V.M., 2010. Effect of the music in labor and newborn. *Revista da Escola de Enfermagem* 44, 2 , 445-452.
- Thurmann, L., 1988. Prenatal singing during pregnancy and infancy can assist in cultivating positive bonding and later development. In P. Fedor-Freybergh, Ed , *Prenatal and perinatal psychology and medicine*. Lanns: Parthenon.
- Trappe, H.J., 2009. Music and health-Music and health-What kind of music is helpful for whom? What music not. *Musik und Gesundheit Welche Musik hilft welchem Patienten-welche eher nicht?*, 134, 51-52, 2601-2606.
- Trehub, S. E., 2003 . The developmental origins of musicality. *Nature Neuroscience*, 6, 7 , 669-673.
- Trehub, S. E., Nakata, T., 2001. Emotion and music in infancy. *Musicae Scientiae*, special issue , 37-61.
- Zatorre, R. J., 2003. Music and the Brain, *Annals of the New York Academy of Sciences* , Vol. 999, pp. 4-14 .
- Zhu, J., Shi, Y.C., Fan, Z.H., 2006. Great charm brings a joyful heart and elegant music results in peace of mind: Theoretical restructuring of basic theory on music therapy of traditional Chinese medicine. *Chinese Journal of Clinical Rehabilitation*, 10, 23 , 160-162.