

The Singing Unit – a pilot study investigating the efficacy of a music therapy singing intervention in a local neonatal unit to support parent/infant bonding and reduce parental anxiety.

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Abstract

This mixed-methods pilot study involved the parents of premature infants in a neonatal unit. It explored the impact of parental participation in a singing workshop facilitated by an NICU trained music therapist. This was followed by encouragement to hum or sing with their babies while in the unit. The study showed that after the workshop and hospital stay, a statically significant increase in parental wellbeing occurred. The differences for a reduction in parental anxiety and improved parental bonding were not statistically significant, but may suggest trends for improvement in these areas. This low intensity cost-effective intervention then has demonstrated efficacy in the area of parental wellbeing.

Introduction

Contemporary practice in neonatal units may involve the use of arts-based interventions in addition to medical care ensuring that parents and their babies have access to a range of treatments at this difficult time in their lives (Edwards 2011). Music therapy is one such intervention that is gradually gaining ground in this setting as an evidence-base develops (Bielinink *et al.*, 2016). The music therapist is able to work with parents and their babies using live or recorded music to support them in a variety of ways during their hospital stay. This can include singing with parents and babies, supporting parents sing with their babies, providing soft, relaxing live music, or creating playlists of parent-preferred music to provide opportunities for emotional regulation for the family (Haslbeck 2017).

In Wales, music therapy provision for families experiencing inpatient stays in neonatal units is extremely limited or non-existent. This has meant that in these settings, no consensus as to music therapy evidence-based best practice in Wales has been agreed. To add to the evidence base, we proposed a pilot study of a cost-effective intervention to assess whether low-intensity delivery of music therapy could be effective in such settings where music therapy practice is still emerging.

With these factors in mind, a protocol entitled The Singing Unit was devised, and the study undertaken with full ethical approval from the relevant body. The intervention took the form of a one-hour-long singing workshop delivered by a NICU trained Health and Care Professions Council (HCPC)¹ registered music therapist to parents of babies in the neonatal unit at Prince Charles Hospital (PCH), Cwm Taf Morgannwg University Health Board. (CTMUHB).

The aims of this study, were to explore whether low-intensity delivery of music therapy could:

- empower parents and increase confidence and competence in being with their babies
- support the reduction of anxiety and depression resulting from the hospitalisation of their babies and improve wellbeing
- enhance bonding between parents and babies

Literature Review

Infants born before the 37th week of gestation are considered pre-term, with prematurity affecting 11% of world births (WHO, 2010). Premature birth can have multiple impacts on the infants' cognitive ability, language acquisition, motor and socio-emotional development (Huhtala *et al.*, 2012). In addition to impacts on the infant, parental experience of a premature birth with admission to hospital can be traumatic. This can cause parental distress, trauma, depression, anxiety and feelings of being out of control. (Obeidat *et al.*, 2009; Yaman and Altay, 2015). There is significant evidence demonstrating that early intervention during hospitalisation focussing on ameliorating parental trauma is effective (Lillas and Turnbull 2009).

There exists a body of writing and research relating to the use of music for premature and medically at-risk babies during hospital stays and its relevance to newborn and premature

¹ In the UK, the title 'music therapist' is a protected title by law. Only those registered with the

HCPC can use it.

babies (Edwards, 2011; Gratier and Apter-Danon 2009; Malloch et al. 2012). All writings reference the importance of the voice as means of connecting with the infant, with Malloch et al. using the term 'contingent singing' in their work to describe the specific characteristics required in the singing voice to provide the optimal sounds that will promote a quiet relaxed state in premature babies. These characteristics provide underpinning theory to the increasing numbers of contemporary high quality, music therapy studies in neonatal units that demonstrate a range of positive impacts for parents and babies. The studies use qualitative and quantitative methods (Ettenberger, 2017; Ettenberger, Rojas Cardenas & Odell-Miller, 2016; Loewy et al., 2013; Shoemark et al., 2015; Ullsten et al., 2016;). Ghetti, et al (2019) are in the early stages of an international Randomised Control Trial (RCT) using the idea of music therapists supporting parents to sing during in-patient stays with their premature babies and post-discharge. The above research projects demonstrate clear benefits for patients and families, including:

1. Reduction in length of hospital stay
2. Faster weight gain and increased oxygen saturation
3. Lessened distress during painful procedures
4. Improved parental bonding and empowerment in caring for the infant

Although these studies generally revolve around clinical music therapy being provided by music therapists, parents play an important part in many of the interventions (Ettenberger, 2016, 2017; Loewy 2013). With the lack of evidence based music therapy practice in Wales and the UK in general, it seemed, therefore, that there was evidence to suggest that a low-intensity music therapy provision could provide a feasible first step for broadening access to this service.

Method

The study design and procedures (IRAS Project ID 266389) were approved by the Health Research Authority (HRA) and Health and Care Research Wales (HCRW) on July 1 2019 with capacity and capability approval being confirmed shortly thereafter by C T M U H B .

Setting

The study and workshops took place in the neonatal unit at PCH in CTMUHB. The unit provides special and high dependency care for neonates. Most babies over 32 weeks gestation until term birth will usually receive their full care at XXX. The unit has 15 cots: one stabilisation / intensive care cot, four high dependency cots and 10 special care cots.

Design

This was a mixed-methods pilot study using concurrent triangulation so that both qualitative and quantitative data could be used to more clarify relationships amongst variables. (Creswell et al., 2004). It was also a within-subject related measures design. Figure 1 indicates the structure of the study:

Insert Figure 1 here please.

Qualitative data

This was obtained by the completion of two questionnaires, one post-workshop and the other around the time of discharge from the neonatal unit. The questionnaires comprised of a series of open-ended questions which can be seen in Appendix 1. The questionnaires were designed with input from unit staff and parents who had previously used the neonatal unit. The first questionnaire focused on parental perception of the workshops, and the second enquired as to the usefulness of the intervention as perceived by parents. The

data obtained was analysed using thematic analysis as described by Braun and Clarke (2006).

Quantitative data

Three validated measures were used for the quantitative data collection:

- The Hospital Anxiety and Depression Scale - (HADS) (Zigmond and Snaith 1983). While initially validated for patients only, the scale is also used in occupational health contexts (Stern 214) and has also been used in previous music therapy studies in the NICU (Ettenberger 2016, Ettenberger 2018). The scale has two parts, one rating anxiety and the other depression. The higher the score in each the greater the risk of developing a depressive or anxiety disorder. Scores over 8 but less than 11 are classed as 'borderline' by the test, with scores in excess of 11 being considered high risk for developing a depressive or anxiety-related disorder.
- The Mother-to-Infant Bonding Scale - MIBS (Taylor, et al., 2005). This is a short self-evaluating questionnaire validated for mothers and fathers. A high score indicates a greater risk for an impaired bonding. The maximum score is 24. A cut-off points of > 2 has been suggested by Bienfait et al (2011) as indicating impaired bonding.
- The Full Warwick-Edinburgh Mental Well-Being Scale (Stewart-Brown et al 2009) (WEMWBS). This consists of 14 items rated on a 5-point Likert scale with a maximum score of 70. The higher the score the greater the respondent's well-being.

A comparative statistical analysis was performed for the pre- and post-intervention measurements. As the data obtained was not distributed symmetrically around the median, a Wilcoxon signed rank test was used for analysis. P-values < 0.05 were considered statistically significant. P-values ≥ 0.05 and < 0.1 were considered a trend.

Sample

Convenience sampling was used. Families were recruited into the study as they were admitted to the neonatal unit and fitted the inclusion/exclusion criteria. These were that:

- the babies should be no more than 36 weeks gestation at birth
- parents should be able to speak and understand English as the workshop and measures/ questionnaires were delivered in that language.
- babies were to be medically stable and not receiving Intensive Care.

There are approximately 100 babies per year admitted to the neonatal unit who fit these criteria, so for this small pilot we aimed to recruit 10 babies, offering the workshop to both parents. Eleven families were recruited into the study. Of these, one family was unable to attend the workshop due to travel issues and was then discharged before the next workshop could be arranged. The study then proceeded with 10 families. However, in one case the final measures and second questionnaire were not completed, leaving 9 families who completed the entire study. The participants included 9 mothers and 3 fathers. No data from those who did not complete the study was included in the data analysis.

Table 1 shows the pattern of delivery of the workshops and who attended. The workshop was programmed in as soon as possible after recruitment. Due to the small sample size, the workshops were run when a consensus of time was agreed for the attending families. These times varied from mid-afternoon to early-evening. Participants were only invited to one workshop. Staff members were invited in order that they might gain knowledge in how to support parents in singing with their babies in the neonatal unit. Please note each workshop lasted for one hour and took place in the parents room adjacent to the neonatal unit at XXXX.

Table 1 Workshop attendance pattern.

Workshop	Number of attendees	Comments
1	4 (only mothers)	Two nurses and a neonatologist also attended
2	1 (only father as mother at home resting as very stressed)	Two were booked in but one had transport issues and could not attend
3	2 (both parents)	Two families were booked in, but one parent was unwell and so the other parent opted to wait for next workshop
4	4 (2 mothers and one mother and father)	One student nurse also attended.
5	2 (mother and father)	Parents were offered morning workshop, but mother had not eaten so requested to wait until next workshop.

The workshop was designed and delivered by the music therapist. Approximate timings for each section have been provided. It consisted of the following:

1. A brief outline of the content of the workshop and discussion about the participants' experience with music and musical preferences. The stressful situation of having a baby prematurely was acknowledged. This introduction helped parents feel at ease. (10 minutes)
2. A short relaxation exercise using recorded music as a support. Research suggests this may be supportive to parents with hospitalised children (Wolfe and Woolsey 2003) (5 minutes)
3. Information regarding the baby's experience of sound in utero, the development of hearing and other practical matters relating to the optimal way of using a singing/humming voice with the baby was then given by the music therapist. This was to ensure parents understood why the workshop was being offered. (10 minutes)
4. Humming and singing exercises using the idea of contingent singing (Malloch et al 2012)
5. Selection of songs if appropriate and requested by parents drawing on Loewy's ideas of Song of Kin (2015) (sections 4 and 5: 30 minutes in total)
6. Ending of workshop with short recorded music listening experience (5 minutes)

Results and data analysis

Qualitative

The data received from the questionnaires both pre and post intervention showed a high degree of positive responses to the workshop. In the first questionnaire, approximately half

of the parents felt nervous and apprehensive before the workshop. All stated that afterwards they felt very positive about the experience, with the word 'relaxed' featuring often in their responses. The music listening experience was described as being of importance to support a reduction in their anxiety about singing. All respondents said they felt 'confident' and 'encouraged' about singing to their babies. Some parents who have older children referenced that they were already doing this at home but had not thought about doing this with their babies in the neonatal unit.

Parents felt that the information provided by the music therapist about singing techniques to support their babies was very useful with one parent stating, 'It opened my eyes to a different perspective'. The word 'learning' was used to describe aspect of the workshop by several parents. Understanding why and how singing can help parents and their babies was also described as being highly relevant. Several parents reported that they would have liked to try singing with their babies while being supported by the music therapist.

The second questionnaire showed very positive responses to parents singing with their babies. Parents stated they felt it helped them bond with their babies and noticed that the babies relaxed more quickly when being sung to while being changed or bathed. Parents wrote that their babies became more alert and were looking at their parents' faces while they sang to them. They felt this showed the babies were enjoying the experience. Many parents referenced that singing helping them interact with their babies and made them feel happy and relaxed. One father stated, 'Seeing the baby's positive response made me feel useful'. Several parents also used the word 'connected' relating to feelings towards their babies.

Difficulties encountered as described by parents were the open space of the neonatal unit which made people feel self-conscious and the general noise levels. All stated they were looking forward to singing at home to their baby, an important finding when considering the aims of this study.

Quantitative

The quantitative data was analysed using the non-parametric Wilcoxon test. It indicates a statistically significant increase in wellbeing for parents, using the full WEMWBS measures with a p-value of 0.007. The differences in the MIBS and HADs were not statistically significant, but may be indicative of trends towards improvements, specifically in the reduction in anxiety as measured by the HADs.

Table 2 below shows the Wilcoxon test results:

Table2: Wilcoxon test results

Measure: MIBS							<p>The test indicates minor evidence in the data for a significant difference between PRE and POST values (p-value>0.05, but <0.10).</p> <p>The test indicates strong evidence in the data for a significant difference between PRE and POST values (p-value=0.007).</p> <p>The test indicates no evidence in the data for a significant difference between PRE and POST values (p-value>0.10).</p> <p>The test indicates minor evidence in the data for a significant difference between PRE and POST values (p-value>0.05, but <0.10).</p>
	PRE_POST	mean	sd	median	min	max	
1	PRE	1.42	1.68	1	0		
5							
2	POST	0.92	1.24	0	0		
3							
	Wilcox.test	p-value	0.089				
Measure: WEMWBS							
	PRE_POST	mean	sd	median	min	max	
1	PRE	40.83	9.76	41.5	27	61	
2	POST	52.75	7.46	53.0	42	70	
	Wilcox.test	p-value	0.007				
Measure: HADS_D							
	PRE_POST	mean	sd	median	min	max	
1	PRE	6.75	3.49	7	2	13	
2	POST	4.75	3.31	5	0	10	
	Wilcox.test	p-value	0.305				
Measure: HADS_A							
	PRE_POST	mean	sd	median	min	max	
1	PRE	9.67	4.29	10.0	1	17	
2	POST	7.42	3.85	7.5	1	14	
	Wilcox.test	p-value	0.082				

Discussion

The results of this pilot study demonstrated that the intervention aims for the efficacy of this cost-effective intervention were largely met. There was an impact on parental wellbeing with trends being observed in the reduction of parental anxiety and improved parental bonding. Parents felt empowered and up-skilled, and the very positive qualitative comments made by parents showed the intervention had a high degree of acceptability to them.

It should be noted that the study protocol was not set to collect any demographic data, nor was any information regarding medical events during the hospital stay and pre-existing mental health issues obtained. A future study might seek to explore these areas and gather additional data. This could offer the opportunity to mine the data from the measures used to determine which aspects of wellbeing were most impacted by the intervention, as this information may be of use in further tailoring the workshop. This would only be possible with a larger study. Further investigation of the trends in reduced anxiety and increased bonding could also then take place.

It was noted that some parents felt they would have benefited from additional one-to-one time with the music therapist. This was not part of the study. In future studies it may be useful to consider whether a referral to a music therapist might be appropriate for some families. There may have been pre-existing mental health issues for some families that might have meant additional support at this difficult time would have been welcomed. The

evidence relating to admission to a neonatal unit due to a premature birth shows that this is a traumatic experience. A music therapist would be able to work therapeutically with the parents, helping them to manage their own emotions at this time.

Parents with older children fed back that although they were singing at home to them, none had thought to do this with their babies while in the neonatal unit. Perhaps this indicates a gap in parental education that is considered a high priority in Family Integrated Care (FiCare) initiatives (<http://familyintegratedcare.com/> 2017). FiCare is an extension of the principles of Family Centred Care (FCC) and is used in UK neonatal units to inform the involvement of parents in the care of their infants. There exists the potential for information regarding parental singing to babies to be incorporated into these guidelines.

Although some neonatal unit staff attended workshops, the number of those attending was low due to working shifts. Overall, staff were supportive of the workshop, reassuring parents that their babies were being monitored while they were with the music therapist. Consideration in future studies should be given to ensuring neonatal staff were more fully informed of the study and resulting parental singing interactions with their babies. This may have impacted on parental perception of the neonatal unit being too noisy at times for the singing to be effective, as staff would have been more aware of what parents were trying to achieve.

The study had some limitations. As this was a feasibility study, no control group was used. A future scaled-up study could consider this. No demographic or parental health-related information was collected. This latter would have enabled the provision to have been more effectively tailored in some cases and onward referrals for support made as needed.

Conclusion and Recommendations

The singing unit workshops offered a supportive environment for parents of premature babies while in the neonatal unit. The study offered parents new skills in using humming and singing to interact with and soothe their babies. It also involved them in a direct way in the care of their babies.

This study offered a cost-effective, low intensity intervention that demonstrated a statistically significant increase in parental wellbeing. Trends indicating improvement in bonding and reduction in parental anxiety were also observed. This music therapy intervention is suitable for a wide range of families in the neonatal unit. We are confident that the Singing Unit is acceptable to parents and neonatal unit staff, and can successfully meet the stated aims. We recommend that this intervention is scaled-up and a larger study developed.

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APPENDIX 1

Questionnaire 1

1. How did you feel about taking part in the workshop?
2. How did you feel after the workshop?
3. What was the best thing about the workshop?
4. Was there anything you didn't like about the workshop?
5. Was there anything you think you workshop should have covered?
6. How do you feel about singing with your baby now?

Questionnaire 2

1. Can you tell us about your experience of singing with your baby?
2. Was there anything that made it difficult to sing with your baby?
3. Was there anything that would have made it easier to sing with your baby?
4. Describe your baby's reactions to singing
5. How did singing with your baby make you feel?
6. Is there anything else you would like to say about this study?

