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Associations between singing to babies and symptoms of postnatal depression, wellbeing, self-esteem and mother-infant bond

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Abstract

Introduction: There is growing research documenting the psychological benefits of singing. However, it remains unknown whether singing to new babies is associated with enhanced maternal mental health. This study had two aims: (i) to explore whether these associations exist, and (ii) to compare the effects of singing to babies with listening to music in order to explore whether the sound of music alone or the physical act of singing might be responsible for effects.

Methods: Multiple linear and logistic regression models were used to analyse cross-sectional data from 391 new mothers, exploring associations between both singing to babies and listening to music, and symptoms of postnatal depression, wellbeing, self-esteem and self-rated mother-infant bond.

Results: Singing to babies on a daily basis was associated with lower symptoms of postnatal depression and enhanced wellbeing, self-esteem and self-reported mother-infant bond. Listening to music was associated with lower depression and enhanced wellbeing but effects were attenuated by confounding variables involving other arts engagement.

Discussion: These data suggest that the specific act of singing could support the mental health of new mothers. The correlations found in this study raise questions as to whether maternal singing to babies can causally improve maternal mental health and wellbeing and as such whether singing could be recommended to new mothers as a positive parenting practice, or whether supportive community singing interventions could be developed.

Text

Singing is widely practised by mothers to their babies in societies around the world. Lullabies have, across many cultures, had the dual aims of passing on cultural traditions and helping mothers to express their own feelings. However, evolutionary theories have also suggested that singing to babies evolved from motherese (a style of speech frequently used by mothers with babies involving exaggerated speech melodies and frequent repetition) as a mechanism of reassuring infants and promoting mother-infant bonding.[1] A number of research studies have explored the impact of maternal singing on babies, finding changes in arousal and responsiveness.[2] However, to date there is little research about whether singing has any benefit for new mothers themselves.

In the past decade, a number of studies, both epidemiological and interventional, have found associations between singing and enhanced mental health, wellbeing and quality of life in different populations. [3] Mental health in new mothers is a topic of significant importance, with meta-analysis highlighting the relatively high prevalence of conditions such as postnatal depression,[4] as well as its detrimental effects on mother-infant interaction, child development and infant temperament.[5]

Research has suggested, however, that pharmacological and psychotherapeutic intervention models do not provide a complete solution for mothers suffering from postnatal mental health problems.(6) Consequently, identifying psychosocial interventions and positive parenting practices that can be encouraged among new mothers is of importance.

This study therefore aimed to explore whether there is an association between singing to babies on a daily basis and symptoms of postnatal depression, wellbeing, self-esteem and self-reported mother-infant bond. In order to examine the wider context of musical engagement and to differentiate singing from other musical activities, associations between the same psychosocial variables and listening to music were also investigated.

Participants were drawn from a larger sample of 2,306 adult women living in England in the last trimester of pregnancy (28 weeks or more) and the first nine months post birth (up to 40 weeks). Participants were recruited from hospitals, General Practices, mother and baby charities and through social media in England across October 2015 to March 2016, and completed an anonymous online questionnaire. The study received ethical approval from the UK NHS Research Ethics Service and all participants gave informed consent prior to involvement in the research. For this study, we focused on cross-sectional data from women in the sample who were 1-9 months postpartum and provided complete data across all the variables included in this analysis: a total of 391 new mothers.

Demographic and background information (age of mother, age of baby, years in education, household income, previous children, marital status, and whether women had been involved in creative activities including participating in an arts activity or visiting a cultural site in the past 3 months) was collected via self report. Symptoms of postnatal depression were measured using the Edinburgh Postnatal Depression Scale (EPDS), a 10-item scale scored from 0 to 30 with higher scores indicating potential symptoms of postnatal depression; wellbeing with the short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS), a 7-item scale with raw scores logit-transformed prior to analysis; and self-esteem with the Rosenberg Self-esteem Scale (RSES), a 10-item scale scored from 0 to 30, with higher scores indicating higher self-esteem. Self-reported mother-infant bond was assessed using a five-point Likert Scale and subsequently recoded as 'fully bonded' (scale item 5) vs 'other' (scale items 1-4); this resulted in 75.7% of mothers reporting full bonding. Frequency of singing to the baby was originally categorised as 'not at all; occasionally; often; daily' but this yielded a strong negative skew so for the purposes of analyses this was binarised to 'daily vs non daily'. Listening to music was originally categorised as 'rarely; a couple of times a week; every day <1hr; every day 1-2hrs; every day 3-5hrs; every day 5+hrs'. This yielded a normal distribution so was maintained as a linear variable.

Data were analysed using SPSS version 23.0 (IBM, Chicago). We used multiple linear regression models to explore associations between both singing and listening to music and symptoms of postnatal depression, wellbeing and self-esteem. In addition, we used multiple logistic regression models to explore associations between both singing and listening to music and self-reported mother-infant bond. All models met regression assumptions. Model 1 was unadjusted; Model 2 was adjusted for potential confounding demographic variables (age of mother, age of baby, years in education, household income, whether the mother had any previous children and marital status); and Model 3 was additionally adjusted for potential confounding creative activities mothers might be participating in (arts participation and cultural engagement in the last three months and either daily singing or listening to music respectively).

Participants had an average age of 31.8 years (SD=4.8) and their babies had an average age of 20.1 weeks (SD=10.6). For the majority of women in the study (56.3%) this was their first baby. 69.1% of women were married. Regarding musical engagement, 59.6% of women reported singing to their baby on a daily basis and 72.1% reported listening to music on a daily basis, with 33.8% women listening for more than 1 hour per day.

Singing was significantly associated with fewer symptoms of postnatal depression and enhanced wellbeing, self-esteem and self-reported mother-infant bond, with neither demographic variables nor other types of creative engagement attenuating the effects (see Table 1). The fully-adjusted model (model 3) explained 13.2% of the variance in depression ($F_{10,390}$=5.782, p<.001), 10.7%

of the variance in wellbeing ($F_{10,390}$=4.572, p<.001), 7.1% of the variation in self-esteem ($F_{10,390}$=2.884, p=.002), and 8.2% of the variation (Nagelkerke R^2) in self-rated mother-infant bond ($\chi^2(10)$=22.146, p=.014).

Listening was also associated with fewer symptoms of postnatal depression, accounting for 8.3% of the variance ($F_{7,390}$=4.966, p<.001), and enhanced wellbeing, accounting for 6.6% of the variance ($F_{7,390}$=3.854, p<.001) when using model 2 and adjusting for potential confounding demographic variables (see Table 1). However, these effects were attenuated by the inclusion of other creative activities (model 3), suggesting that listening to music itself was not directly responsible for the variations in effect and could not be separated out from these other creative activities. Furthermore, there was no evidence of an association between listening to music and either self-esteem or perceived mother-infant bond.

This study demonstrated for the first time that daily singing to babies is associated with fewer symptoms of postnatal depression and higher levels of wellbeing, self-esteem and perceived mother-infant bond. While causality cannot be assumed from these analyses, they do raise the question of whether maternal singing to babies can causally reduce instances or symptoms of postnatal depression and enhance postnatal psychological wellbeing, and previous studies have suggested that there may be a causal link. For example, a 5-week singing programme for mothers with postnatal depression was found to increase maternal-infant intersubjectivity and maternal self-efficacy.[8] In addition, a qualitative study exploring the effects of engaging new mothers in a lullaby programme for six weeks suggested that women felt enhanced maternal sensations, increased self-assurance in the capacity to be a good mother and calmer mood after taking part.[7] Individual mother-infant singing sessions have also been found to reduce maternal anxiety.[9] As such, it is possible that singing might have benefits not just for babies (as previously researched) but also for mothers as a positive parenting practice, but further intervention studies are required to explore this more.

A secondary finding from the study was that although listening to music was also associated with enhanced mental health and wellbeing, these effects were attenuated when adding other types of creative engagement into the model. This suggests that the physical act of mothers singing daily to their baby, more than the sound of listening to music alone, could be linked with postnatal mental health and wellbeing. This finding has parallels with research indicating that singing but not listening to music among healthy adults led to increases in positive affect and decreases in negative affect.[10] Moving beyond just these two factors, Fancourt et al. (2014) have suggested that it may in fact be a combination of four factors that account for the benefits of musical engagement such as singing: the music itself, the social engagement, the physical act of singing and personal responses to what is sung.[11] This study certainly points to a combination of the social and physical factors being important, as the distinguishers between singing and listening to music. However, it remains to be explored further which factor is most important for mothers in the act of singing to babies and the mechanisms behind whether and how social or physical engagement in music could lead to enhanced mental health and wellbeing.

There were several limitations to this study. Data exclusively involved women living in England, UK and, although participants displayed a range of demographic characteristics such as varied educational and socio-economic status, the population is not nationally representative. We also only looked at mothers with babies aged 1-9 months old, so it remains unknown whether associations are found outside this timeframe or whether any benefits for mothers are long lasting. As this study was cross-sectional, it is also not possible to confirm causality. Assumptions of the direction of effect have been made following intervention studies that have demonstrated that singing can causally lead to improvements in mental health and wellbeing. And as an additional point, correlational analyses using this data set revealed no association between singing to babies or listening to music and past histories of anxiety or depression, which could suggest that mental health itself does not alter music habits. However, these analyses are exploratory in nature.

Overall, this study provides the first statistical data demonstrating that daily singing to babies is associated with the mental health of mothers and supports suggestions that it can have a positive

impact on wellbeing and mother-infant bond. Future longitudinal or interventional studies could confirm whether maternal singing to babies can causally reduce instances or symptoms of postnatal depression and/or enhance postnatal psychological wellbeing. Such research could be of importance in determing whether specific advice encouraging singing can be given to new mothers as a way of enhancing their wellbeing, or in exploring whether maternal singing resources online or via physical workshops might be effective therapeutic programmes.

	Daily singing to baby				Listening to music			
	Beta	SE	t	p	Beta	SE	t	p
Depression								
Model 1	-.185	.05	-3.711	**<.001**	-.118	.05	-2.351	**.019**
Model 2	-.193	.05	-3.854	**<.001**	-.112	.049	-2.284	**.023**
Model 3	-.167	.051	-3.294	**.001**	-.066	.05	-1.324	.186
Wellbeing								
Model 1	.156	.05	3.122	**.002**	.134	.05	2.669	**.008**
Model 2	.170	.051	3.331	**.001**	.132	.05	2.664	**.008**
Model 3	.137	.051	2.671	**.008**	.085	.05	1.695	.091
Self-esteem								
Model 1	.136	.05	2.717	**.007**	.073	.051	1.435	.152
Model 2	.129	.051	2.513	**.012**	.066	.05	1.315	.189
Model 3	.112	.052	2.135	**.033**	.029	.051	0.568	.570
	B	SE	Wald	OR	B	SE	Wald	OR
Bond								
Model 1	.802	.239	11.306	**2.230****	.036	.101	0.125	1.037
Model 2	.830	.252	10.882	**2.294****	.040	.102	0.153	1.041
Model 3	.808	.258	9.807	**2.243****	-.060	.108	0.306	.942

*p<.05; **p<.01; ***p<.001.
Model 1: unadjusted; Model 2: adjusted for potential confounding demographic variables (age of mother, age of baby, years in educational, household income, previous children and marital status); Model 3: additionally adjusted for potential confounding arts engagement (arts participation and cultural engagement in the past 3 months and either daily singing or frequency of listening to music respectively.)

Table 1: Linear and logistic regressions of the impact of daily singing and listening to music on depression, wellbeing, self-esteem and self-reported mother-infant bond.

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