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Alivio del dolor neonatal mediante alimentos nutricionales combinados con musicoterapia

Relief of Neonatal Pain by Nutritional Food Combined with Music Therapy

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Resumen
El contenido de proteínas de la leche es de aproximadamente 4%. La proteína de suero es la proteína más importante en la leche porque contiene aminoácidos y péptidos esenciales de cadena ramificada con actividad fisiológica. En este artículo, el autor analiza el alivio del dolor neonatal mediante alimentos nutricionales combinados con musicoterapia. La musicoterapia es una disciplina aplicada, que sigue principalmente el principio de la psicoterapia y considera la terapia como un proceso sistemático de participación. En este proceso, la música juega un papel catalítico único, y la experiencia psicológica de la música produce los cambios emocionales, conductuales e ideológicos de los tratados. En este estudio, la intervención no farmacológica ha desempeñado un mejor papel de comodidad, puede reducir significativamente el dolor del recién nacido, distraer la atención, MT tiene el papel más importante, las NN también tienen un papel muy importante, la combinación de los dos es más significativa.

Palabras clave: comida nutritiva; Terapia musical; Bebés; Composición de aminoácidos

Abstract
The protein content of milk is about 4%. Whey protein is the most important protein in milk because it contains essential branched chain amino acids and peptides with physiological activity.In this paper, the author analyse the relief of neonatal pain by nutritional food combined with music therapy. Music therapy is an applied discipline, which mainly follows the principle of psychotherapy, and regards therapy as a systematic process of participation. In this process, music plays a unique catalytic role, and the music psychological experience makes the emotional, behavioral and ideological changes of the treated.In this study, non drug intervention has played a better role of comfort, can significantly reduce the pain of newborn, distract the attention, MT has the strongest role, NNs also has a very important role, the combination of the two is more significant.

Key words: Nutritious food; Music therapy; Babies; Amino acid composition

1. Introduction

At present, there is no single concept for music therapy. Well-known music therapists believe that music therapy is a systematic intervention process[1]. In this process, the therapist uses the various forms of music experience and the therapeutic relationships developed during the treatment process to help be helped To achieve health goals[2-3]. In summary, most countries are clear about the relationship between music therapy and psychotherapy, and attach importance to the establishment of the relationship between TCM and patient. After systematic comparison, the author highly respects the definition of music therapy by Professor Zhang Hongchen of China Central Conservatory of Music. Music therapy is an emerging marginal subject[4]. It is based on the theory and methods of psychotherapy, and uses the unique physiological and psychological effects of music to enable the seeker to experience the musical experience through the various specially designed musical behaviors with the joint participation of music therapists[5-6]. The purpose of restoring or promoting physical and mental health. Music therapy is a subject that focuses on application.It mainly follows the principles of psychotherapy and treats therapy as a systematic participatory process. In this process, it is vital that a professionally trained music therapist establish a relationship with the person being treated. Yes, a good doctor-patient relationship is the basic driving force to improve the condition. Among them, music plays a unique catalytic role[7].The purpose of music therapy is not to increase the person's ability in music, but to change the psychological experience of the person's emotions, behaviors, and ideas. Change, he can have a stronger adaptability to the environment, and get psychological growth and a successful life experience, thereby improving the quality of life[8].

During hospitalization, newborns often experience operational pain during examination and treatment, such as heel blood collection, arteriovenous puncture, various injections, tracheal intubation and suction, indwelling

gastric tube and lumbar puncture. It is generally believed that the newborn's nervous system is not well developed and its sensitivity to pain is poor, so it has not been taken seriously and handled properly. Recent studies have confirmed that whether it is full-term or premature infants, they have the ability to feel pain after birth, and all kinds of painful operations can cause discomfort; in addition, local infection and surgery can also cause pain[9-10]. For premature infants, operations such as changing diapers and temperature measurement are also painful stimuli. Studies abroad have shown that long-term exposure of newborns to bright light and sound levels> 45 decibels (dB) is also an adverse stimulus and is closely related to pain. The International Pain Research Association defines pain as "an unpleasant feeling and an emotional experience with actual or potential tissue damage, which are subjective feelings." Anand et al. Believe that pain is a potential trait and a signal of tissue damage in the early stages of individual development. Newborns have no subjective self-report of pain, and often respond with physiological behaviors. Pain can have adverse effects on newborns, especially premature and critically ill infants who undergo a large number of painful procedures, and the negative effects are more serious[11]. For critically ill NICU children, biological behavior changes caused by operational pain may aggravate the condition. Invasive operations can cause intracranial pressure fluctuations, induce intraventricular hemorrhage and periventricular white matter dysplasia, and affect sleep-wake state, appetite and Mother-infant communication can also cause abnormal pain; pain can cause abnormal hormone secretion, cause high metabolic status, make blood sugar too high or too low, decrease immunity, metabolic acidosis and electrolyte imbalance, causing complications And the mortality rate has risen[12-14]. If the pain is persistent or repetitive, the spinal cord and above parts associated with pain can be permanently reconstructed, and cognitive and behavioral dysfunctions such as inattention and learning difficulties can occur during childhood.

In this study, NNS, MT and NNS + MT were used for comfort, and the non-intervention group was used as a blank control.By observing the heart rate, percutaneous oxygen saturation (SpO2), and pain behavior scores of the newborns before and after blood collection, blood collection To explore the effect of different comfort measures on the relief of neonatal pain.

2 Materials and methods

2.1 Inclusion criteria

(1)From January to October 2018, neonates admitted to the general neonatal ward of the neonatal medical center with age> 3d and birth weight> 2.5kg meet the criteria for inclusion in this study; (2) The neonatal neurological score is normal (newborn (Children's neurobehavioral measurement score> 35 points), at the same time 1min and 5min Apgar score> 7 points, gestational age> 28 weeks; (3)newborns who have not received analgesia or sedation within 72h, and their primary disease and treatment are not enough to affect the newborn Children's response to pain and assessment of pain.

2.2 Exclusion criteria

Severe infections, sepsis (in line with SIRS standards) and shock [systolic blood pressure <40mmHg and / or diastolic blood pressure <20mmHg], intracranial hemorrhage and hypoxic-ischemic encephalopathy (diagnosed by skull B ultrasound) and other neurological diseases.

2.3 Grouping method

Newborns who met the inclusion and exclusion criteria were divided into intervention group (NNS subgroup, MT subgroup, NNS + MT subgroup) and blank control group in ascending order of hospitalization numbers. There were 20 cases in each subgroup and blank control group.

2.4 Interventions

Each intervention subgroup implemented NNS, MT, and NNS + MT interventions; the blank control group did not use any interventions. NNS subgroup intervention: Researchers gave each newborn a uniform standard (small, short, and hollow) latex teat and placed it into the newborn's mouth using gentle pressure. MT subgroup intervention: The researchers used the sound of arterial fluctuations in the womb of pregnant women as background, and added light music, and kept the volume at 20-30dB, and played it at a position of 15-20cm near the newborn's head through a cassette recorder. NNS + MT subgroup: receiving interventions from both NNS and MT subgroups. The intervention lasted from 2 minutes before the heel and blood collection of the newborn to the end of the study, for a total of 15 minutes.

2.5 observation indicators

(1) Heart rate was measured with an electrocardiograph; (2) SpO2 was measured with an arterial oximeter; (3) Neonatal pain was assessed using a neonatalinfantpainscale (NIPS) score. NIPS is mainly used to evaluate the operational pain of premature and term infants, such as venipuncture. The specific content and scoring

standards of NIPS are shown in Table 1. The total score is 6 points, with a minimum of 0 points and a maximum of 7 points. The higher the score, the greater the pain.

Table 1 NIPS pain assessment scale

Items	0	1	2
Facial expression	Relaxed	Grimace	
Cry	Nocry	Whimper	Vigorous
Reathingpatterns	Relaxed	Changed	
Arms	Relaxed	Flexed/extended	
Legs	Relaxed	Flexed/extended	
Stateofarousal	Sleeping/awake	Fussy	

Data were collected in 3 stages: (1) 1 min before the blood collection acupuncture; (2) heel lancet acupuncture (0min); (3) every minute after the blood collection acupuncture until 13 min. Each of the three observation indicators produces 15 groups of data, and the average value is used for analysis.

All newborns were included without clothes to facilitate observation. The temperature of the newborn incubator was maintained at 32 °C. Keep the environment stable (mainly temperature and sound), and set all alarm devices to mute, and close the doors and windows of the ward to prevent external sound interference. Digital facial cameras were used to record dynamic facial images, limb movements, and crying sounds of newborns at 15 observation points in 3 stages. Two nurses who had received NIPS professional training adopted the double-blind method (not understanding the grouping principles of this study, and independently performed NIPS scoring). The scores were viewed by watching the camera records, and the time interval of 15 observation points was controlled by a stopwatch. Take the average of 2 nurses' scores.

Figure 1.music therapy

Prior to this study, the two nurses completed multiple NIPS scores for each of the neonates through pre-tests, with little difference in NIPS scores.

2.6 Statistical Methods

The measurement data is expressed by. SPSS11.0 software was used for multivariate analysis of variance, ANOVA test of variance, and PostHoc for comparison between groups.

3.Results

3.1 General situation

According to the inclusion and exclusion criteria, a total of 80 newborns were included, 54 males and 26 females. The gestational week: 31 to 41 (37.2 ±3.51) weeks, and the birth weight was 2.4 to 3.9 (2.8 ±0. 62) kg, 1min Apgar score 7 ～ 10 (8.52 ±1.10) points, 5minApgar score 7 ～ 10 (9.6 ±0.7) points. There were 16 cases of respiratory distress syndrome, 24 cases of pneumonia, 22 cases of neonatal jaundice, 12 cases of meconium aspiration syndrome, and 6 cases of abdominal distension.

3.2 Month-age composition of cases in each group

See Table 2.

Table 2 Moon age composition of newborns in each group

Group	Preterm infants(n)	Term infants(n)	Averageage/months
Intervention			
NNS(n= 20)	5	15	2.5
MT(n= 20)	6	14	2.6
NNS+MT(n= 20)	4	16	2.0
Control(n= 20)	4	16	1.5

3.3 heart rate

Before the intervention, there was no significant difference in the basic level of heart rate (P > 0.05). After pain stimulation, the heart rate of newborns in each group increased significantly, peaked at 0-2 minutes after stimulation, and then slowed down gradually. There was no significant difference in heart rate between NNs subgroup and blank control group (P > 0.05). There was significant difference in heart rate between MT, NNs + MT subgroup and blank control group (P < 0.05). There was no significant difference in heart rate between MT subgroup and NNs + MT subgroup (P > 0.05) (Table 3).

Table 3 Effect of different interventions on heart rate (• min-1)

Group	Time/min															$\bar{x} \pm S$	Dunnet′t (2sided)	P
	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13			
Intervention																		
NNS	128	158	156	154	152	150	148	148	146	146	144	142	140	140	138	146.0± 7.78	- 11.33	0.07
MT	128	156	154	153	150	149	147	145	140	138	136	134	132	132	130	141.6± 9.51	- 15.73	0.00
NNS+M	128	154	152	150	148	146	146	142	136	132	130	130	129	128	128	138.5± 9.85	18.87	0.00
Control	128	168	170	172	168	166	166	160	158	155	154	152	150	147	147	157.3± 12.0		

3.4SpO2

Before the intervention, there was no significant difference in the basic level of SpO2. After pain stimulation, the SpO2 of the newborns in each subgroup decreased significantly. 2-3 minutes after blood collection in the heel of the foot, SpO2 decreased to the lowest value, and then began to recover gradually. The recovery speed of the newborns in NNs + MT subgroup was the fastest, and returned to normal in 9 minutes. There was no significant difference in SpO2 between NNs subgroup and control group (P > 0.05). There was significant difference in SpO2 between MT, NNs + MT subgroup and blank control group (P < 0.05). There was no significant difference in SpO2 between MT subgroup and NNs + MT subgroup (P > 0.05) (table 4).

Table 4 Effect of different interventions on SpO2 (%)

Group	Time/min															$\bar{x} \pm S$	Dunnet′t (2sided)	P
	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13			
Intervention																		
NNS	95	95	80	71	70	72	75	78	80	82	86	90	95	95	95	83.93± 9.66	6.467	0.129
MT	95	95	81	74	73	74	78	80	82	86	89	94	95	95	95	85.73± 8.76	8.267	0.037
NNS+M	95	95	85	76	75	78	80	83	87	91	95	95	95	95	95	88.00± 7.8	15.333	0.006
Control	95	95	79	69	65	68	69	71	73	74	76	78	79	85	86	83.78± 9.55		

3.5 nips score

Before the intervention, there was no significant difference in nips scores among the groups (P > 0.05). Compared with the blank control group, three kinds of intervention measures can alleviate the changes of nips scores caused by pain stimulation. In the NNs + MT subgroup, the highest score of nips is at 1 min, the lowest score is at 4-5 min, rebound is at 6-9 min, and return to normal after 10 min Regular rating level. There was significant difference in nips score between each subgroup and the blank control group (P < 0.05), and there was no significant difference in nips score between each subgroup (P > 0.05) (Table 5 and table 5).

Table 5 Effect of different interventions on nips score

Group	Time/min															$\bar{x} \pm S$	Dunnet′t (2sided)	P
	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13			

Intervention																		
NNS	0	7	6	3	1.5	0	0	1.5	2	1	0.5	0	0	0	0	1.5± 2.23	- 2.62	0.00
MT	0	5	5.5	2.5	1.0	0	0	0.5	1	0.5	0	0	0	0	0	1.07± 1.83	- 3.05	0.01
NNS+M	0	4.5	5	1	0	0	0	0.5	0.8	0	0	0	0	0	0	1.07± 1.83	- 3.05	0.01
Control	0	7	7	6.8	6.5	6	6	5	5	4.5	4	3	1.0	0	0	4.12± 2.67		

4.Discussion

If the newborn is breastfeeding, its feeding time is not fixed. Generally, it is fed every three and a half hours and about 15 minutes each time; colostrum is very precious, and the newborn should be sucked as many times as possible. Breast milk (especially colostrum) is the best natural nutrition for infants. Infant formula is also called mother-emulsified milk powder[15]. It is an artificial food based on cow milk or other animal milk or other animal and plant ingredients as a basic ingredient, with appropriate addition of nutrients, which can provide the baby with the nutrients needed for growth and development. When breast milk is not available, fresh milk or milk powder and formula milk sold with the permission of the health department should be used and fed according to the specified eating method. Feed 6-7 times a day, every 4 hours or so. Because milk contains too much sodium, potassium and other minerals, it will increase the baby's kidney load; milk protein is mainly cheese protein, which is not conducive to the baby's digestion and absorption. Therefore, mothers should use infant formula instead of milk if they adopt artificial feeding[16].

In general, breastfeeding does not require water. Artificial and mixed feeding can be fed with warm water between the two feedings, and can be fed 2 to 3 times a day, about 40 ml each time (may increase gradually). And usually after breastfeeding, you can then feed milk or formula (rice flour), or you can feed between breastfeeding. Insist on breastfeeding three times a day[17-18].

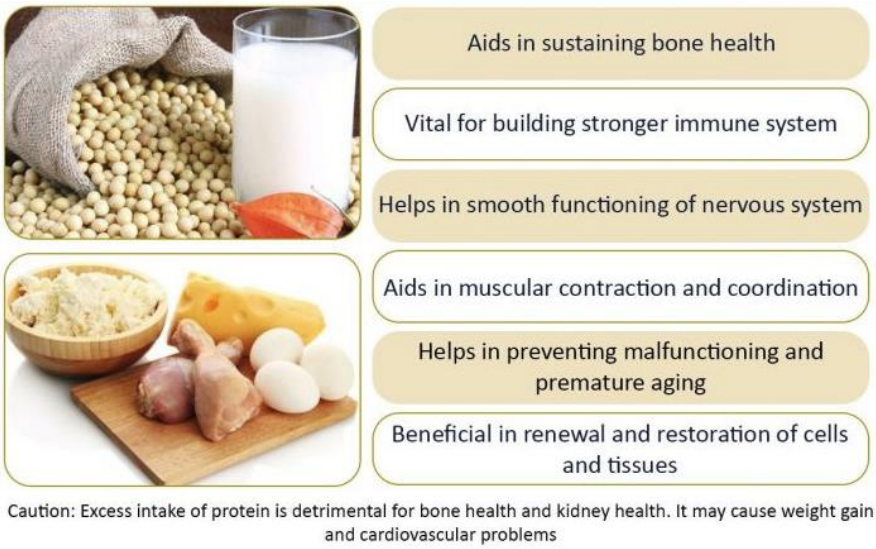

Figure 2. Protein nutrition

The psychological discomfort and behavioral abnormalities caused by neonatal pain have received more and more attention. Actively and effectively alleviating neonatal pain can help the children recover from the disease. The pathways that cause pain in newborns are as follows: The central processes that govern peripheral tactile receptor spinal ganglion (DRG) neurons synapse in the superficial spinal cord with pain information-transmitting neurons, resulting in synaptic sensitization; The peripheral receptive field of the signal transmission element is larger than that of an adult. Therefore, the neonatal pain has a strong systemic non-specific response. At the same time, oral administration of sucrose, NNS, MT, etc. can reduce the secretion of certain endogenous hormones and the sensitization of synaptic stimuli, thereby reducing various reactions caused by pain.

Domestic and foreign scholars have adopted a variety of methods to relieve pain: (1) drug interventions, such as opioid sedatives, non-steroidal antipyretic and analgesics, and local application of analgesics. (2)Non-drug intervention, for short-term repetitive pain, non-drug intervention can also have a good effect. The possible mechanism is to promote the release of endogenous opioids and 5-HT and change the state of regulation of motor sensory behavior. Non-drug interventions are effective in alleviating pain, have low cost, and are not prone to dependence, which has attracted increasing attention.

In this study, the analgesic effects of three non-drug intervention methods, NNS, MT and NNS + MT, were compared, and non-intervention was used as a blank control. NIPS is a subjective evaluation index.Evaluators can avoid the evaluation bias by watching the video centralized evaluation without participating in clinical observation. This study uses the double-blind method (between reviewers, between reviewers and researchers) So as to ensure the reliability of the subjective evaluation index of NIPS. At the same time, the appraisers' mastery of NIPS scores is also related to the evaluation scores. Therefore, a pre-evaluation was carried out before the study was conducted to ensure a good consistency of the evaluation scores between the two appraisers. NIPS was developed by the Children's Hospital of Ontario, Canada.It is mainly used to evaluate the operating pain of premature and term infants. The NIPS and heart rate and SpO2 caused by the operating pain basically returned to normal after 13 minutes.Therefore, we observed the pain stimulation. 13min. If the intervention effect is good, the child's pain and anxiety disappear, the heart rate slows, SpO2 increases, and the NIPS score decreases.The dB number of the volume of the MT intervention is not stated in the literature. 20 ～ 40dB is the standard. In this study, the volume is 20 ～ 30dB. This study shows that the volume has a better intervention effect on heart rate, SpO2 and NIPS scores.

The results of the study showed that there was no statistically significant difference in the basal heart rate of the newborns in each group before the intervention. After the pain stimulation, the heart rate of the newborns in each group was significantly accelerated; compared with the blank control group, the three interventions can alleviate the heart rate changes caused by the pain stimulation, especially in the NNS + MT subgroup, the heart rate acceleration was the least obvious and the earliest recovery normal. It can be seen that the MT or MT + NNS subgroup has the best effect on heart rate recovery to the basic level, which is significantly better than the blank control group or NNS subgroup, and the difference is statistically significant. The time point at which the heart rate returned to the basic level after pain stimulation was 10 min after stimulation as the cutoff point, suggesting that the intervention time should not be too short. After pain stimulation, the SpO2 of each group of newborns was significantly reduced. Compared with the blank control group, MT and NNS + MT interventions can alleviate the changes in SpO2 caused by pain stimulation; SpO2 decreased to the lowest value 2 to 4 minutes after the heel blood collection And then began to recover, the NNS + MT subgroup had the fastest recovery rate, and returned to normal in 9min. After pain stimulation, the NIPS scores of all groups were significantly improved. Compared with the blank control group, the three interventions can alleviate the changes in NIPS scores caused by pain stimulation. The NIPS score of the newborns in the NNS + MT subgroup reached the highest peak at 1 min. The NIPS score was the lowest valley at ～ 5min, rebounded at 6-7min, and returned to normal after 8min. This fluctuation may be related to the endogenous hormone levels of pain.

5. Conclusion

In this study, non-drug intervention played a better comforting effect, which could significantly reduce the pain of newborns, distract attention, MT had the strongest effect, and NNS also had a very important effect. The combination of the two was more significant. With the effective relief of pain, energy consumption is reduced and stress is reduced, which is conducive to the disease recovery and growth of children. Relieving neonatal pain is an ethical responsibility of medical staff.The various non-drug interventions in this study are economical, simple, and easy to carry out in hospitals at all levels.For premature babies, who need mechanical ventilation and need to be sedated, analgesic The treatment of high-risk newborns is particularly suitable, and can reduce the use of analgesics and sedatives, and effectively reduce pain.

Inadequacy and limitations of this study: Due to the complex nature of pain and the generalization of the response caused, it is recommended to use more assessment and observation indicators to evaluate pain.Because the number of cases selected in this study is limited and the time is short, the selected indicators Not many, so future research needs to further supplement the cases and increase observation indicators. If it can be combined with the prognosis of the disease and the neurobehavioral measurement of the newborn, it may be of greater significance to the interpretation of the evaluation indicators.

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