INPLASY

The effect between complete oral motor stimulation program and simple non-nutritive sucking on feeding performance in premature infants – A meta-analysis and systemic review

INPLASY2023100028

doi: 10.37766/inplasy2023.10.0028

Received: 07 October 2023

Published: 07 October 2023

Tsai, YL[1]; Lin, YC[2].

Corresponding author:
Yu-Lin Tsai

tnfsh01501@gmail.com

Author Affiliation:
National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan.

ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2023100028

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 07 October 2023 and was last updated on 07 October 2023.

INTRODUCTION

Review question / Objective Question: Does OMI+NNS better than NNS. *OMI: oral motor intervention; NNS: non-nutritive sucking. Population: Preterm baby; Intervention: OMI+NNS; Comparison: NNS; Outcome: feeding performance(Transition time, hospital stay, weight gain); Type of Question/Publication Type: Therapy / Randomized Controlled Trial.

Condition being studied Inadequate oral feeding was the most common barrier to discharge. The development of sucking behaviors in preterm infants is thought to reflect neurobehavioral maturation and organization. Moreover, the process of oral alimentation requires, in addition to a strong sucking effort, coordination of swallowing, epiglottal and uvular closure of the larynx and nasal passages and normal esophageal motility, a synchronized process that is usually absent before 34 weeks of gestion. Briefly, due to the immature coordination of the autonomic, motoric, and behavioral subsystems. A stable suck-swallow-breathe cycle is hardly to establish in preterm infant.

To improve the capability of oral feeding in preterm infants, Fucile report a program about oral motor intervention (OMI). The program was designed to reduce oral hypersensitivity, improve the range of motion and strength of muscles for sucking by stroking peri-oral and intra-oral part and non-nutritive sucking (NNS) before feeding. The programs such as stroking peri-oral and intra-oral part reported to enhance sucking rate and feeding efficiency. Arvedson defined OMI as “sensory stimulation to or actions of the lips, jaw, tongue, soft palate, pharynx, larynx, and respiratory muscles that are intended to influence the physiological underpinnings of the oropharyngeal mechanism to improve its functions. These activities for preterm infants may include non-nutritive sucking (NNS). Non-nutritive sucking (NNS), involved in the program of Fucile 2002, was using pacifiers or fingers to induce a sucking absence of nutrient flow. NNS has been shown to

assist the infant in achieving and maintaining physiological homeostasis and behavioral state. Moreover, accelerates the acquisition of mature NNS patterns and improves feeding skills. During nutritive sucking, if fluid is swallowed incorrectly it can lead to aspiration pneumonia, bradycardia, hypoxia, and fatigue In brief, non-nutritive sucking can create oral feeding experiences without the added stress of fluid.

There have been various interventions using oral motor intervention, non-nutritive sucking (NNS) that are well documented to improve oral feeding performance in preterm infants. But there was no discussing about does OMI with NNS more effective than NNS alone. As we known, NNS is easier to perform and no need for professional training. Compared to OMI, NNS alone can reduce clinical loading and financial cost.

METHODS

Search strategy Datebased: embase and pubmed used embase as example

#1: (Premature OR Preterm OR “Low birth weight” OR VLBW OR LBW OR Newborn OR Neonat* OR Infan*):ti,ab,kw,de

#2: “Prematurity”/exp OR “Low birth weight”/exp

#3: (Oral OR “Oral motor” OR Oromotor OR Orocutaneous OR Prefeeding NEAR/3 Intervent* OR Stimulat* OR Train* OR Support*):ti,ab,kw,de

#4: (Non-nutritive suck OR Pacifier OR Dummy):ti,ab,kw,de

#5: “Non nutritive sucking”/exp OR “Pacifier”/exp

#6: (#1 OR #2) AND #3 AND (#4 OR #5) AND [embase]/lim

=> #6 AND ("randomized controlled trial"/de or "controlled clinical study"/de or "randomization"/de or "intermethod comparison"/de or "double blind procedure"/de or "human experiment"/de OR (random* or placebo or "parallel group$" or crossover or "cross over" or assigned or allocated or volunteer or volunteers):ti,ab OR (open NEAR/1 label):ti,ab OR ((double or single or doubly or singly) NEAR/1 (blind or blinded or blindly)):ti,ab OR ((assign* or match or matched or allocation) NEAR/5 (alternate or group$ or intervention$ or patient$ or subject$ or participant$)):ti,ab OR (controlled NEAR/7 (study or design or trial)):ti,ab OR (compare or compared or comparison or trial):ti OR ((evaluated or evaluate or evaluating or assessed or assess) and (compare or compared or comparing or comparison)):ab) NOT (((random* NEAR/1 sampl* NEAR/7 ("cross section*" or questionnaire$ or survey* or database$)):ti,ab not ("comparative study"/de or "controlled study"/de or "randomi$ed controlled":ti,ab or "randomly assigned":ti,ab)) OR ("cross-sectional study"/de not ("randomized controlled trial"/de or "controlled clinical study"/de or "controlled study"/de or "randomi$ed controlled":ti,ab or "control group$":ti,ab)) OR ((((case NEAR/1 control*) and random*) not "randomi$ed controlled"):ti,ab) OR (("systematic review" not (trial or study)):ti) OR ((nonrandom* not random*):ti,ab) OR ("random field*":ti,ab) OR (("random cluster" NEAR/3 sampl*):ti,ab) OR ((review:ab and review/it) not trial:ti) OR ("we searched":ab and (review:ti or review/it)) OR ("update review":ab) OR ((databases NEAR/4 searched):ab) OR ((rat or rats or mouse or mice or swine or porcine or murine or sheep or lambs or pigs or piglets or rabbit or rabbits or cat or cats or dog or dogs or cattle or bovine or monkey or monkeys or trout or marmoset*):ti and "animal experiment"/de) OR ("animal experiment"/de not ("human experiment"/de or “human"/de))).

Participant or population Preterm infants under gavage feeding without presence of conditions including facial abnormalities, intraventricular hemorrhage, congenital syndromes. Moreover, without respiratory, cardiovascular, neurological, or digestive disorders.

Intervention Complete OMI program (NNS involved), was a program reported by fucile in 2002. Which was designed to improved feeding performance in preterm baby by stroking oral structure.

Comparator In the NNS method, the pacifier was placed in the infant’s mouth and the infant was allowed to suck on it. The effect of improving feeding performance have been reported in many trials.

Study designs to be included 8 RCT was involved in our meta-analysis.

Eligibility criteria Exclusion: intervention didn't describe clearly, incomplete data, not English.

Information sources Medline, Embase, Cochrane.

Main outcome(s) Transition time from intervention to complete oral feeding.

Additional outcome(s) hospital duration; weight gain.

Data management Enrolled studies were selected by screening the titles and abstracts for potentially relevant trials. Then, two reviewers screened and assessed the full text independently. The senior author made the final decision if a consensus could not be reached through discussion.

Quality assessment / Risk of bias analysis We assessed the selected studies using the Cochrane risk of bias tool for randomized controlled trials. Disagreements between results were resolved by discussion. The senior author determined the results if a consensus was not reached. Reviewer Manager version 5.3 was used to visualize the risk of bias in a graph and summary table. The certainty of the evidence of the primary outcome was assessed by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology.

Strategy of data synthesis We used Comprehensive Meta-Analysis Software version 3 ((Biostat, Englewood, NJ, USA) for all analyses.

Subgroup analysis As for the categorical variables such as transition time, the included trials would be grouped first, and the summarized effect sizes of the subgroups would be calculated separately. Nonoverlapping 95% CIs indicated significant between subgroups. The I2 statistic was used to assess between-study heterogeneity, which was defined as significant heterogeneity if over 50%. We used funnel plots and Egger's test to assess publication bias, and two-tailed p value lower than 0.1was regarded as statistically significant.

Sensitivity analysis A sensitivity analysis was performed for the primary outcome by removing one trial at a time and analyzing the remaining trials to estimate whether the effect resulted from a single study.

Language restriction English.

Country(ies) involved Taiwan - National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan.

Keywords Oral motor intervention(OMI); PIOMI; non-nutritive sucking(NNS).

Contributions of each author

Author 1 - Yu-Lin Tsai.
Email: tnfsh01501@gmail.com
Author 2 - Yu-Ching Lin - Made the final decision if a consensus could not be reached through discussion.