Determinants of Infants' Readiness Transitioning To Eating Solids: A Systematic Review

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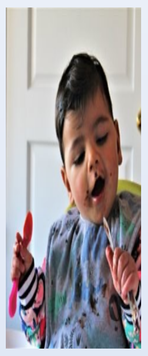
BACKGROUND

WHEN, HOW & WHY INTRODUCE SOLIDS?



<4 MONTHS

- Gastrointestinal immaturity
- Increased infection risk
- Increased eczema/allergy risk

~ 6 MONTHS

- Increased nutritional needs (iron + zinc)
- Decreased allergy risk

INTRODUCING SOLIDS >9 MONTHS CAN LEAD TO:

- Increased fussiness
- Difficult to introduce new tastes
- Decreased opportunities to learn to chew

BABY LED WEANING VS TRADITIONAL WEANING

- Independence
- Choking risk
- Texture exposure
- Nutritional intake

CDCP, 2021, WHO, 2021, SACN, 2018, NHMRC, 2013

READINESS SIGNS

- Increased appetite
- Head & Neck Control
- Exploring environment
- Hand-eye coordination

- Grasping objects
- Mouthing objects
- Tongue extrusion reflex integrated
- Development of biting

SIGNIFICANCE

- **Variability in what is recommended to parents in practice** regarding optimal transitioning to eating solids from Paediatricians, Allied Health Clinicians, Nursing etc.

➡ **Leads to sub-optimal infant care**
Reduced health outcomes

- **Parents experience stress and frustration** with mixed messages regarding guidelines and recommendations.

Koletzko et al, 2020, Schwartz et al, 2013

- **Minimal empirical research on** behaviours that are thought to indicate readiness.

To help address this gap in the literature, ***we conducted a systematic review.***

RESEARCH QUESTIONS

1. What are the developmental behaviours that indicate readiness of an infant to transition to eating solids?
2. Are developmental behaviors that indicate readiness aimed at a body functions and structures-level, activity- level, or participation-level of health?
3. What is the level of evidence to support each?

METHODS

- ICF CY (WHO, 2007) formed conceptual framework for the study
- Five key databases searched (CINAHL, Medline, Embase, APA Psych INFO, Scopus) + handsearching reference lists
- Peer-reviewed empirical research
- In English + full-text + human studies only
- Studies needed to identify *and* evaluate developmental/ behavioral indicators for readiness of solids
- Cho & Bero Appraisal Tool used
- Reported according to PRISMA Statement.

RESULTS

SEARCH RESULTS

1,805 titles → 383 abstracts → 252 full texts → 4 included

MAIN RESULTS

Study	n =	Infant Readiness-Developmental Behaviours & Skills				Internal Factors	External Factors	Findings	Cho & Bero
		Behavior	Definition	Age of Behavior	Measure				
Coulthard, 2016	61	**Tactile sensitivity**	Y	4 months n = 20 4.5-5 months n = 15 5.5-6 months n = 26	Infant/Toddler Sensory Profile	Age at wean Sex BMI	Mat ed Mat age Infant diet Maternal diet	Carrot strongly associated with TOR when weaned later ($p<0.001$); if weaned early ate similar amount of carrot regardless of TOR ($p>0.05$).	24/31 = 71%
Chung, 2014	76	**Head & neck control**	N	NR	Modified DeMauro, 2011 survey	Sex Birth weight Age & GA Plurality	Parent satisfaction at wean Attitude of family Stress & comfort with wean	Uninformed parents less satisfied with infant growth ($p<0.002$); had more developmentally unready infants at the time of weaning ($p=.03$)	16/34 = 47%
		Sitting supported	N	NR					
		Sucking	N	NR					
		Swallowing	N	NR					
		Choking	N	NR					
		Push food away	N	NR					
		Lean back	N	NR					
		Turn head	N	NR					
		Close mouth	N	NR					
		Gag	N	NR					
		Hold food in mouth	N	NR					
		Spit	N	NR					
		Cry	N	NR					
Demonteil, 2018	2999	**Sitting independently**	N	4-5 months = 29.8% 12 months = 100%		Sex Age at wean Birth order # Teeth	Parents age Mat ed Mat country of birth Source of info Breastfed Family meals Daycare meals Types of food offered Parent feeling @ wean	Parents offered mostly puree to children in first year; soft and small pieces slowly intro 6-22 months; hard/ large pieces intro 13 moths. TextExp was +assoc. with # teeth self-feeding TextExp was +assoc. with earlier wean	20/34 = 59%
		Self-finger feeding	N	4-5 months = 7.2% 12 months = 74.5%					
		Self-feeding with fork	N	4-5 months = 0% 8 months = 12.9%					
Tournier, 2021		**Gagging**	N	4-5 months = 27.5% 12 months = 100%		Sex Weight/ length Age at wean Birth order # Teeth	Breastfed Family meals Daycare meals Parent feeling @ wean	Texture acceptance +assoc with exposure to soft small pieces at 6-18 months & - assoc. with exposure to puree at 9-36 months	20/34 = 59%
		Sitting independently	N	4-5 months = 29.8% 12 months = 100%					

SUMMARY OF FINDINGS:

- From **four studies, 17 developmental behaviours were identified** as being a sign and/or associated with the infant's readiness to transition to solids.
- **Inconsistent terminology** used to describe over-lapping behaviours across studies.
- All four studies were **cross-sectional survey designs.**
- **Developmental behaviours targeted mostly a BFS-level of health (n=15)** and two behaviours targeted activity- level.
- **Wide range of external influences** on the infants' transitioning to eating solids.
- **Risk of bias high** in 3/ 4 studies.

CONCLUSIONS

❖ **FEW STUDIES**
- Heterogenous & lack of definitions
- Cross-sectional survey designs
- High-level of bias.

❖ **READINESS SIGNS**
- 17 developmental behavioural indictors of readiness in four studies = complex developmental process!
- **None of readiness behaviours have been adequately evaluated and are therefore not well-supported by evidence!**

❖ **VERY- LOW LEVEL EVIDENCE**
- Over-reliance on these developmental behaviours as indicators may:
- Delay transition to solids
- Impact nutritional adequacy.

IMPLICATIONS FOR PRACTICE

- In the **absence of robust evidence, clinicians must rely on clinical experience plus client factors**
- **Overt operational definitions of readiness behaviours in practice= creates greater transparency in clinical and research practice**
- Further empirical research that **evaluate clearly defined behaviours of interest, using longitudinal research designs** are needed to increase evidence behind recommendations.

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