

Impact of Individual Nutrients During Infancy on Long-Term Neurodevelopment: Online Independent Medical Education Significantly Improves Physician Knowledge and Confidence

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BACKGROUND

During the first 1000 days of life, optimized nutrition is particularly important for neurodevelopment including long-term outcomes, as specific nutrients affect myelination, membrane makeup, and sphingomyelin. Evidence suggests that milk fat globules membranes (MFGMs) and docosahexaenoic acid (DHA) and arachidonic acid (ARA) may have lasting and meaningful effects on long-term neurodevelopmental outcomes. We assessed the impact of a 15-minute online independent medical education activity on pediatrician and primary care physician (PCP) knowledge and confidence regarding the effect of individual nutrients present in breast milk or infant formula on long-term neurodevelopment.



METHODS

This independent medical education activity was 15-minute video-based discussion where 2 experts exchange viewpoints.



Primary Care Physicians (PCPs) (n = 1,915)



Pediatricians (n = 1,813)

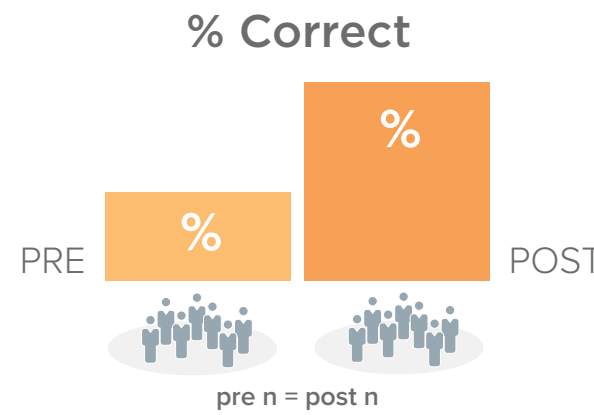


How to Read the Linked Learner Assessment

OUTCOMES COMPLETERS Each individual completed BOTH the pre and post-education questions – SAME individuals pre and post-education

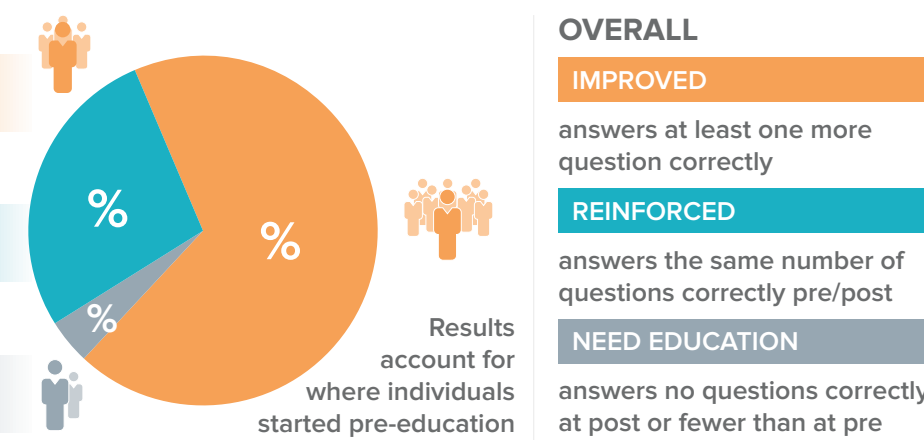
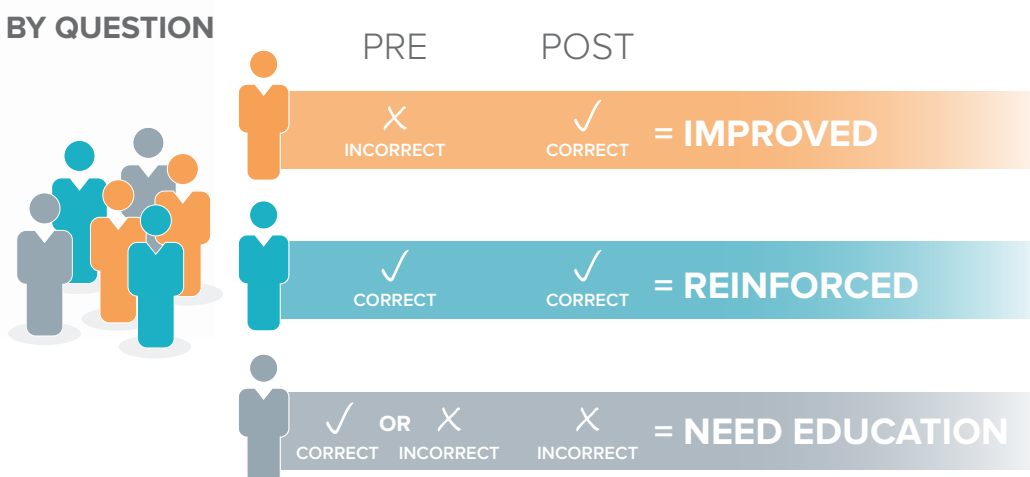


SUMMARY STATISTICS FOR PARTICIPANTS WHO PROVIDE COMPLETE DATA



LINKED LEARNER

Each individual tracked pre and post-education – Learners serve as their own controls

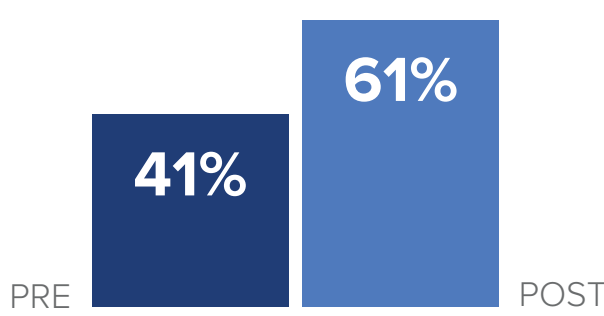


RESULTS

OVERALL

PCPs (n = 94)

AGGREGATED RESULTS



COHEN'S d

0.76

EFFECT SIZE	EDUCATIONAL IMPACT
< .20	MODEST
.20 - .49	SMALL
.5 - .79	MODERATE
≥0.80	LARGE

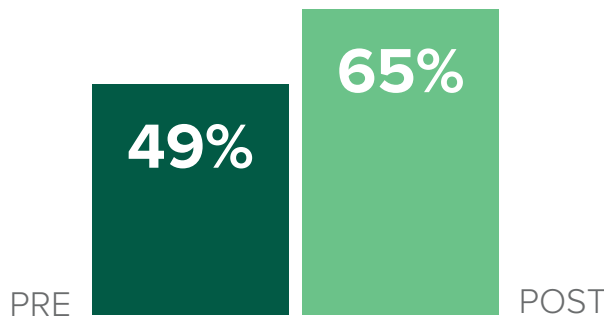
CHI-SQUARE TEST

P < .001

SIGNIFICANCE (P < .05)

Pediatricians (n = 193)

AGGREGATED RESULTS



COHEN'S d

0.70

EFFECT SIZE	EDUCATIONAL IMPACT
< .20	MODEST
.20 - .49	SMALL
.5 - .79	MODERATE
≥0.80	LARGE

CHI-SQUARE TEST

P < .001

SIGNIFICANCE (P < .05)

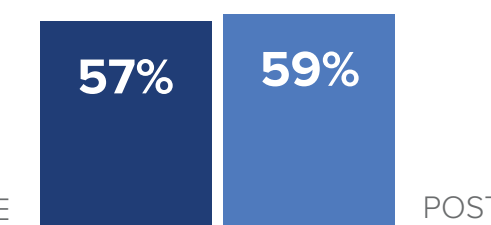
QUESTION 1 RESULTS

The question led to a numerical increase in knowledge for both specialties regarding the association of myelination with processing speed. Pre-activity baseline knowledge was very high for both groups leading to a high portion of physicians reinforcing their knowledge.

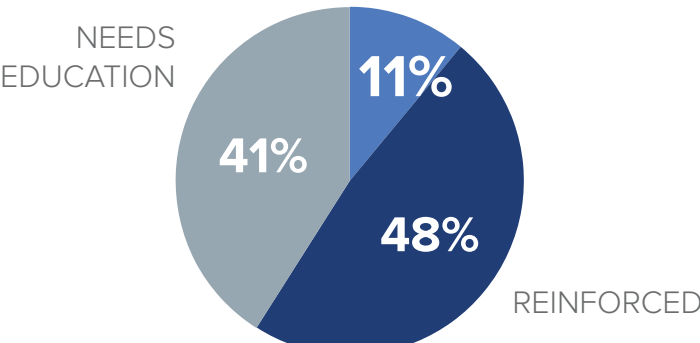
QUESTION: During the first 1000 days of life, brain networks are shaped and refined structurally and functionally through myelination. Myelination is associated with which of the following brain processes (Correct Answer: Processing speed)

PCPs (n = 94)

AGGREGATED RESULTS



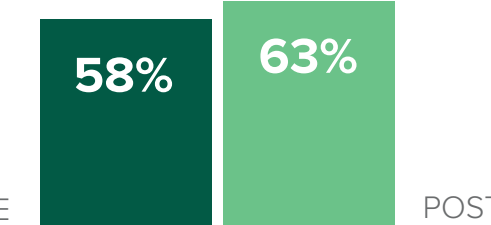
LINKED LEARNING RESULTS



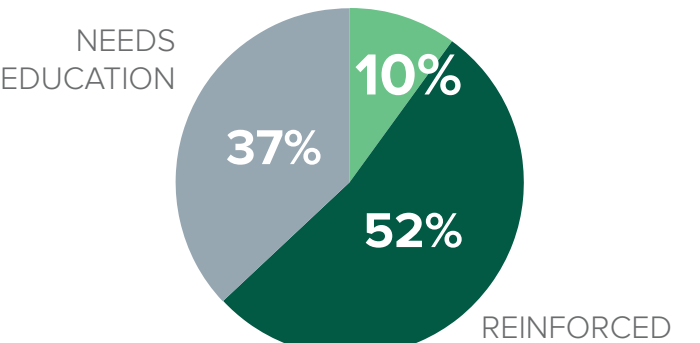
P = .818

Pediatricians (n = 193)

AGGREGATED RESULTS



LINKED LEARNING RESULTS



P = .106

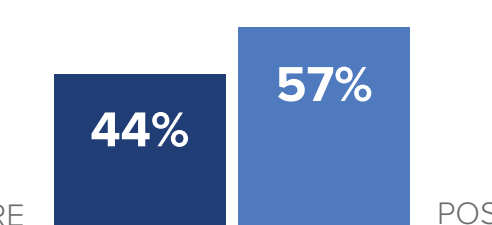
QUESTION 2 RESULTS

This question led to significant improvement in knowledge of a similar proportion of PCPs (19%) and pediatricians (20%) regarding the cognitive processes in children aged 14 years who received nutrition fortified with milk fat globule membranes compared with controls.

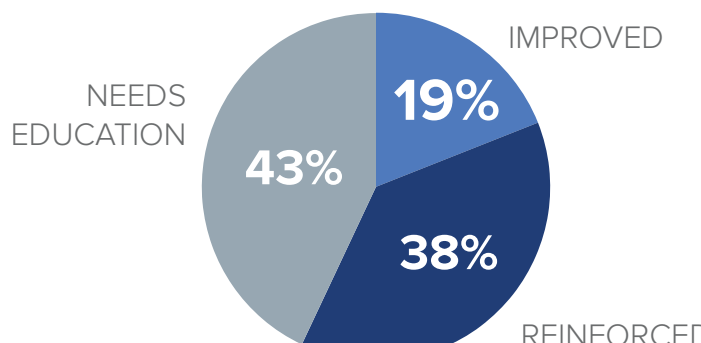
QUESTION: Milk fat globule membrane (MFGM) is a complex phospholipid trilayer with functional components that support brain development. A follow-up study assessing the long-term impact that MFGMs had on cognitive processes in children who received food fortified with MFGMs vs controls at age 6 to 11 months reported significantly better outcomes in children at 14 years in which domain? (Correct Answer: Working memory - strategy)

PCPs (n = 94)

AGGREGATED RESULTS



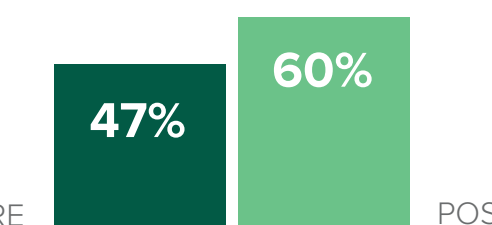
LINKED LEARNING RESULTS



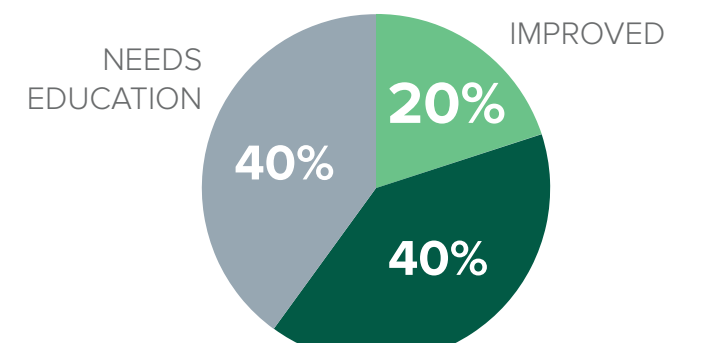
P < .01

Pediatricians (n = 193)

AGGREGATED RESULTS



LINKED LEARNING RESULTS



P < .001

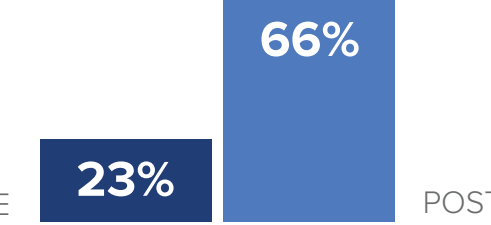
QUESTION 3 RESULTS

Significant knowledge gains were observed in physician knowledge regarding cognitive trends that were closest to breast-fed infants in infants receiving infant formula with high levels of a specific combination of nutrients.

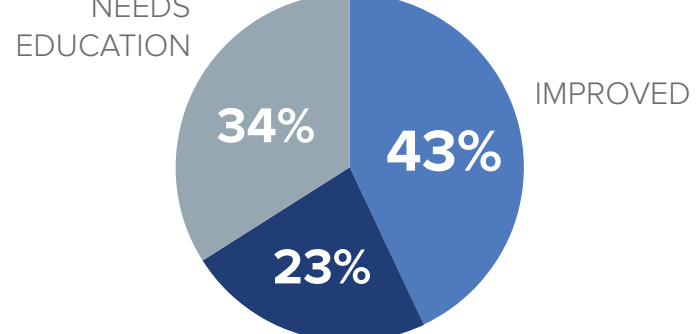
QUESTION: A study assessed the longitudinal trajectories of brain and neurocognitive development in children who were exclusively breastfed vs children fed with 3 different types of formula for at least 3 months. Each formula contained different concentrations of nutrients. Which combination of high levels of nutrients was associated with myelination trend closest to breastfeeding and cognitive trends most consistent with breastfeeding in formula-fed infants? (Correct Answer: High levels of DHA and ARA and sphingomyelin)

PCPs (n = 94)

AGGREGATED RESULTS



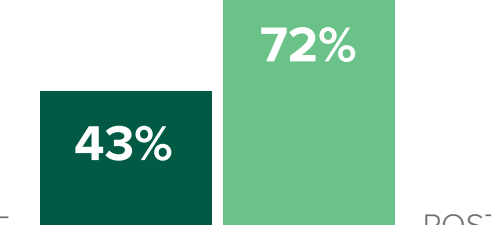
LINKED LEARNING RESULTS



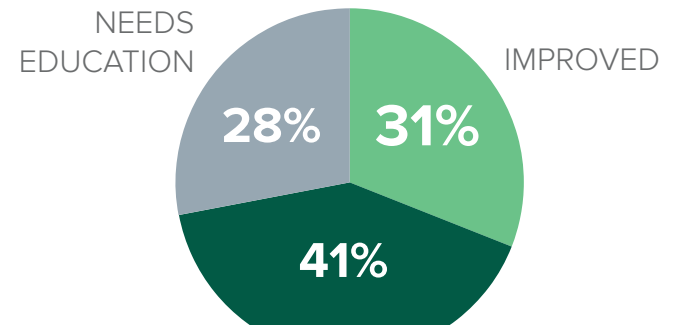
P < .001

Pediatricians (n = 193)

AGGREGATED RESULTS



LINKED LEARNING RESULTS



P < .001

CONFIDENCE ANALYSIS

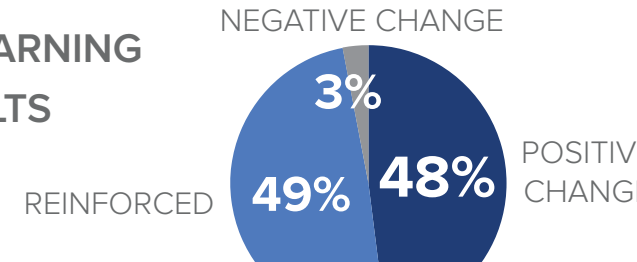
48% of PCPs and 55% of pediatricians had a measurable improvement in confidence regarding communicating with parents and caregivers the short- and long-term impacts that optimized infant nutrition can have on brain development, and, cognitive, language, and motor skills. Following education, the confidence shift for PCPs was very high at 96%.

QUESTION: How confident are you right now in your ability to discuss with parents and caregivers the short- and long-term impacts that optimized infant nutrition during the first 1000 days of life has on brain development, behavioral outcomes, and, cognitive, language, and motor skills? (Select ranking from 1 [Not confident] to 5 [Very confident])

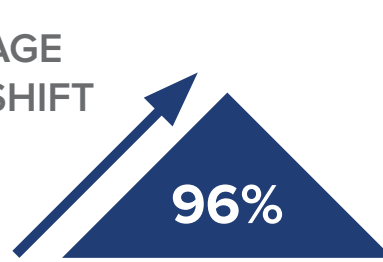
PCPs (n = 94)



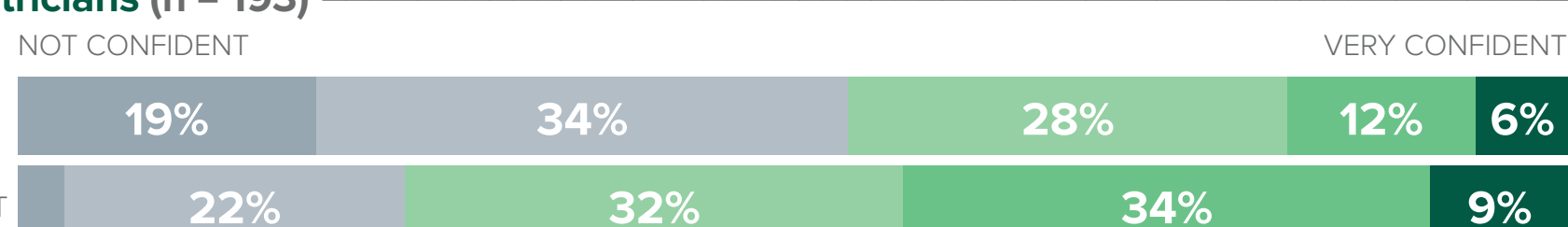
LINKED LEARNING RESULTS



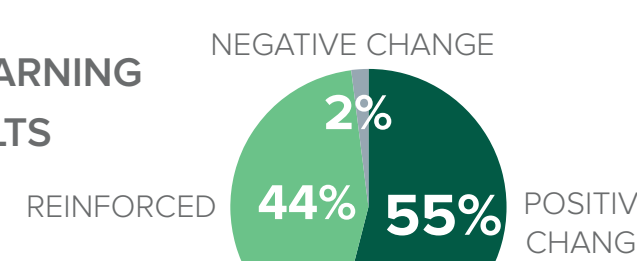
TOTAL AVERAGE CONFIDENCE SHIFT



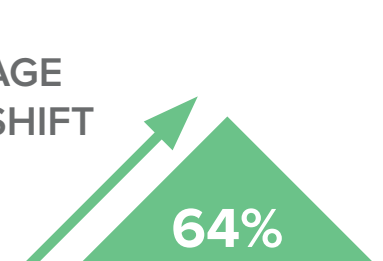
Pediatricians (n = 193)



LINKED LEARNING RESULTS



TOTAL AVERAGE CONFIDENCE SHIFT



CONCLUSIONS

- Online medical education significantly improved pediatricians' and PCPs' knowledge regarding the impact that specific nutrients can have on long-term neurodevelopmental outcomes
- Furthermore, a significant increase in confidence regarding their ability to discuss the importance of optimized infant nutrition and associated long-term outcomes was found

- This is of particular importance when recommending approaches and discussing optimal infant nutrition with parents and caregivers to ensure that infants can experience the benefits of optimized nutrition into later childhood and adolescence

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