IMPROVING GENERAL DEVELOPMENTAL SCREENING AND SURVEILLANCE USING ASQ-3 AT A PEDIATRIC PRIMARY CARE PRACTICE

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JUNE 23, 2021

This project is in partial fulfillment of the degree requirements for the Doctor of Nursing Practice at Touro University Nevada

INTRODUCTION

- Early childhood is the most dynamic time to ensure children develop to their utmost potential (Lehr et al., 2016).
- The American Academy of Pediatrics (AAP) recommends screening all children at ages 9, 18, and 24 or 30 months using a valid screening tool, in addition to surveillance ("Identifying infants, 2006").
- Identifying early developmental delays enables timely intervention services or further evaluation by subspecialty professionals for improved outcomes (Lehr et al., 2016; Singh et al., 2017).
- The ASQ-3 is a parent-completed and validated developmental screening tool widely used for its excellent psychometric properties (Singh et al., 2017).
- Developmental surveillance and developmental screening using a valid tool such as the ASQ-3 should be used in tandem to maximize the sensitivity of early detection of developmental delay (Barger et al., 2018).

Purpose and Project Question

- A quality gap was identified with pediatric providers only employing surveillance in screening for general development.
- Purpose: To incorporate a valid developmental screening tool, the ASQ-3, at the 9-, 18-, and 24-month well-child visits.
- Project Question: *In a group of healthcare providers at a pediatric primary care clinic, will the use of ASQ-3, compared to current practice, improve and increase the early recognition of developmental delays in a four-week time frame?*
- Objectives: In a four-week time frame, the pediatric clinic will have:

❖ Implemented ASQ-3 at the 9-, 18-, and 24-month health supervision visits.

❖ A minimum rate of 80% on participant test scores post-ASQ-3 in-service education.

❖ A minimum of 90% ASQ-3 compliance rate among the pediatric provider participants.

❖ A significant increase in the number of developmental delays identified relative to pre-intervention.

❖ A significant increase in the number of referrals made to early intervention services or subspecialty providers relative to pre-intervention.

Review of Literature

- Current Evidence: Evidence suggests developmental surveillance alone is insufficient in detecting children at risk for developmental delays which has the potential for a lifelong negative impact (Barger et al., 2018; Hernandez-Mekonnen et al., 2016).
- Current Recommendation: The AAP emphasized the use of a valid developmental screening test to all children at ages 9, 18, 24 or 30 months, in addition to surveillance, and any concern should prompt early intervention ("Identifying infants," 2006).
- The ASQ-3 is a parent-completed developmental screening tool that is globally validated with strong psychometric properties: 92% test-retest reliability, 87.4% sensitivity; 95% specificity (Singh et al., 2017).

Theoretical Framework

- *Kurt Lewin's Change Theory*

➢ A systematic and planned change that is purposeful, calculated, and collaborative is critical to overcome the challenges (Mitchell, 2013).

➢ 3-stage theory (Allen, 2016)

✓ Unfreezing: why change is desirable; establishes foundation of the change

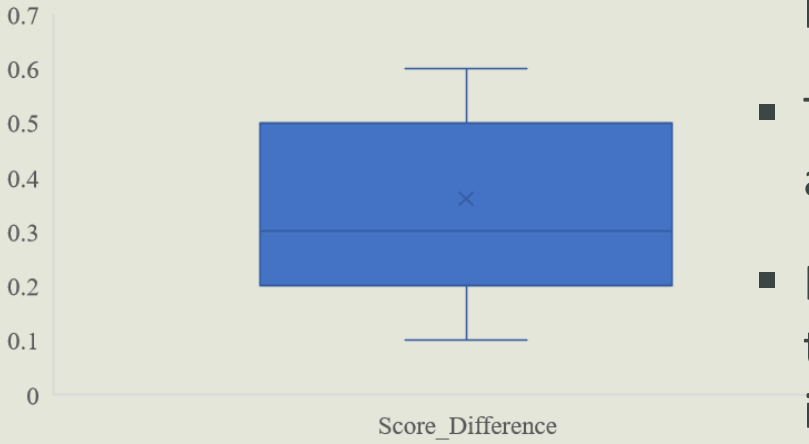
✓ Changing/moving: the necessary processes and activities to actualize the change is performed

✓ Refreezing: evaluating and sustaining the change over time

Methodology

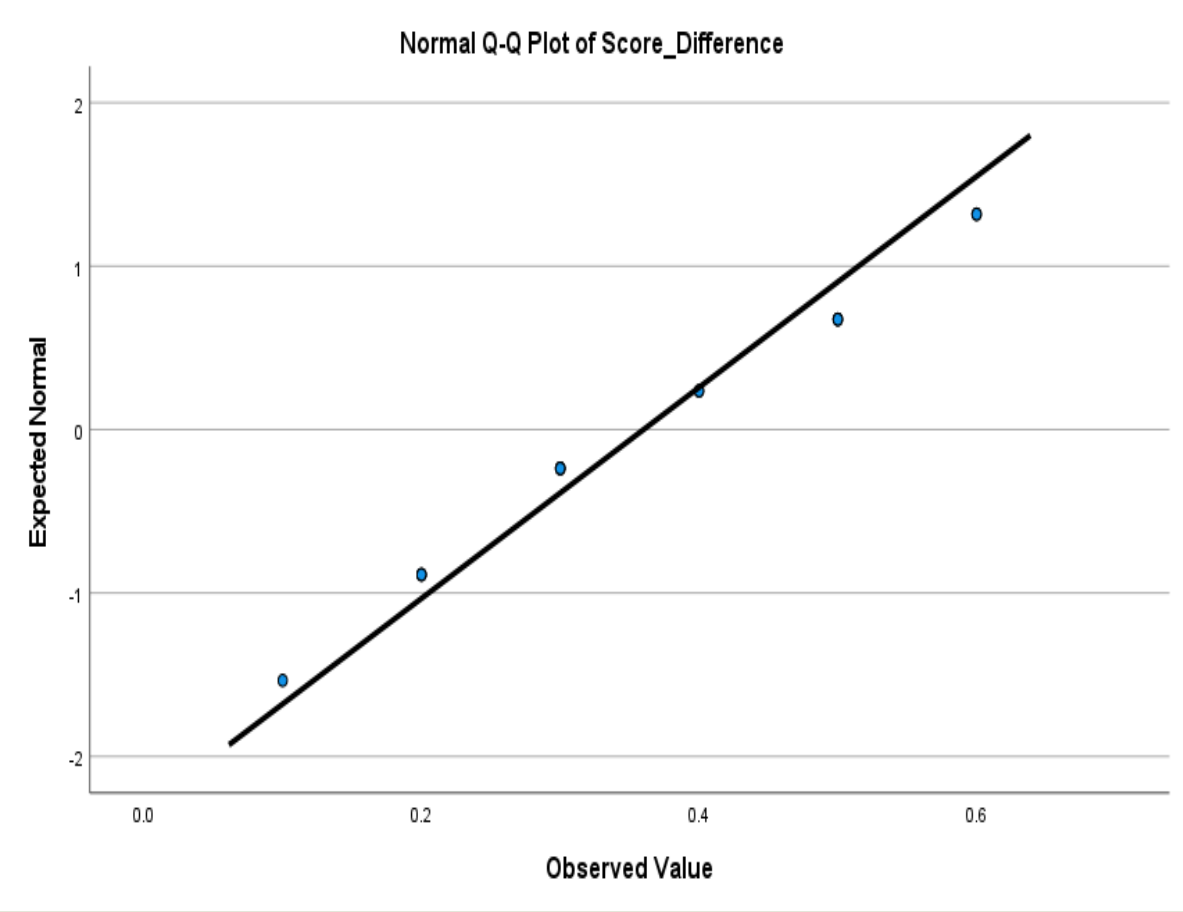
- Project/Study Design: *quality improvement project design* intended to optimize the pediatric care delivered at the host site.
- In-service ASQ-3 education was conducted using PowerPoint presentation to participants (n=15).
- Pre/post-education test scores were analyzed after the ASQ-3 in-service education intervention.
- ASQ-3 implementation occurred for 4 weeks.
- Four-week pre/post-ASQ-3 intervention aggregate data taken from all age groups were analyzed and compared using statistical analysis.

Results/Findings: Pre/Post-education Intervention



- Paired samples t-test was used to determine significant mean difference between participant's test scores pre/post-education intervention.
- The difference between pre- and post-test scores was normally distributed as assessed by Kolmogorov-Smirnov test (p= .183), Shapiro-Wilk test (p= .349).
- Participants' pre-intervention scores were less (M= 60%, SD= .19) compared to their post-intervention scores (M= 96%, SD= .05). The educational intervention led to a significant average increase in test score by 36%, 95% CI [27.4%, 44.6%], SE= .040, $t(14) = 9$, $p < .001$, d= 2.32.
- There is evidence to support the project's objective to increase the participants' knowledge about ASQ-3 was achieved and a significant difference exists between the participants' test scores after the educational intervention (p< .001). Cohen's d of 2.32 demonstrated a large effect size depicting the educational intervention's significance (Pallant, 2016).

Results/Findings: Pre/Post-education Intervention



Pre/Post-education Test Scores		
	Pre-education test score	Post-education test score
Participant 1	30%	90%
Participant 2	60%	90%
Participant 3	40%	90%
Participant 4	70%	100%
Participant 5	50%	90%
Participant 6	40%	90%
Participant 7	80%	100%
Participant 8	80%	100%
Participant 9	90%	100%
Participant 10	80%	100%
Participant 11	50%	100%
Participant 12	60%	100%
Participant 13	70%	100%
Participant 14	30%	90%
Participant 15	70%	100%

Results/Findings: Pre/Post-education Intervention

Mean Difference Pre/Post-education Intervention

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post-education score	0.96	15.00	0.05	0.01
	Pre-education score	0.60	15.00	0.19	0.05

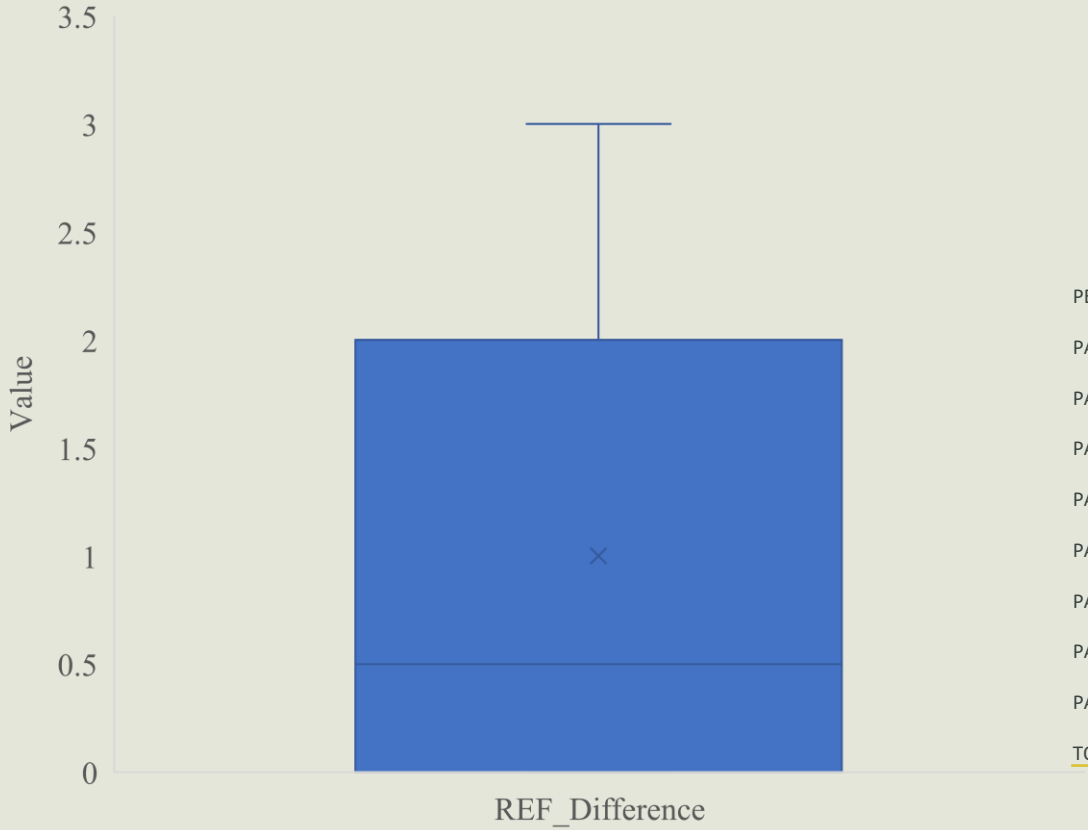
Results of Test of Difference

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Post-education score/Pre-education score	0.36	0.15	0.04	0.27	0.45	9.00	14.00	0.00

Results/Findings: Pre/Post-ASQ-3 Intervention

- Raw data showed 100% of the pediatric providers (n=8) used ASQ-3.
- Paired samples t-test was used to examine the mean differences in provider referrals before and after ASQ-3 intervention.
- The differences between the number of referrals before and after the ASQ-3 intervention were not normally distributed as assessed by Shapiro-Wilk's test (p= .041). However, as this did approach significance and because the paired samples t-test is robust to violations of normality with respect to Type I errors, the author chose to move forward recognizing the data were not normally distributed (Fradette et al., 2003; Wiedermann & von Eye, 2013).
- An increase in referrals was observed for participants after the ASQ-3 intervention (M= 1.25, SD= 1.39) versus before (M= .25, SD= .46) (Table 6). The intervention led to a mean increase in 1 referral. It elicited a statistically significant increase in the number of referrals when compared to the same participants before receiving the ASQ-3 intervention, 95% CI [.001, 2.00], $t(7) = 2.366$, p= .05, d = .84.
- There is evidence to suggest that the project's objective to increase the number of identified developmental delays and referrals was reached and a significant difference exists between the number of referrals made by the same pediatric provider participants after using ASQ-3. Cohen's d of .84 depicted a large effect size that validates the use of ASQ-3 to significantly increase the detection of developmental delays and concurrent referrals (Pallant, 2016).

Results/Findings: Pre/Post-ASQ-3 Intervention



POST-IMPLEMENTATION NUMBER OF PATIENTS SEEN FOR WELLNESS VISIT

PEDIATRIC PROVIDERS	9 MONTHS (USED ASQ-3)	9 MONTHS (DID NOT USE ASQ-3)	18 MONTHS (USED ASQ-3)	18 MONTHS (DID NOT USE ASQ-3)	24 MONTHS (USED ASQ-3)	24 MONTHS (DID NOT USE ASQ-3)	TOTAL	PATIENTS REFERRED AFTER USING ASQ-3
PARTICIPANT 9	3	0	3	0	1	0	7	2
PARTICIPANT 12	0	0	1	0	0	1	2	0
PARTICIPANT 10	1	0	1	0	1	0	3	2
PARTICIPANT 8	5	2	1	1	7	0	16	3
PARTICIPANT 13	5	0	4	1	1	1	12	3
PARTICIPANT 11	0	0	0	0	1	0	1	0
PARTICIPANT 7	1	0	2	0	3	1	7	0
PARTICIPANT 15	1	0	0	0	3	0	4	0
TOTAL	16	2	12	2	17	3	52	10

Results/Findings: Pre/Post-ASQ-3 Intervention

Mean Difference in Referrals Pre/post-ASQ-3 Intervention

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post-ASQ-3 Referral	1.25	8.00	1.39	0.49
	Pre-ASQ-3 Referral	0.25	8.00	0.46	0.16

Results of Test of Difference

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Post-ASQ-3 Referral/Pre-ASQ-3 Referral	1.00	1.20	0.42	0.00	2.00	2.37	7.00	0.05

Discussion with Key Conclusions

- The variables measured were pre/post-ASQ-3 education test scores, compliance of the pediatric providers, and referrals made that implied the recognition of developmental delays pre/post-ASQ-3 intervention.
- Primary data on post-test scores showed 100% of the participants (n=15) scored 80% or greater. Statistical analysis revealed a mean increase from 60% pre-test to 96% post-test. This achieved the benchmark of an average of 80% or greater on the post-test. This finding concluded that the ASQ-3 in-service education resulted in significantly increasing the level of knowledge acquired by the participants by 36% ($p < .001$).
- Primary data on pre/post-implementation showed that 100% of the pediatric providers (n=8) used the ASQ-3 to screen for general development at targeted ages. The finding conveyed compliance by the pediatric professionals that achieved the project's objective.
- Data comparing referral counts pre/post-ASQ-3 intervention revealed a significant increase in the number of referrals made with the use of ASQ-3, from two to ten ($p = .05$).
- Concurrently, the finding implied an increase in the number of developmental delays recognized by the pediatric providers that prompted the referrals satisfying the project's objectives. The large effect size ($d = .84$) emphasized using a validated tool such as the ASQ-3 to enhance the precision of the surveillance process since formal screening makes children's developmental status more accurate ("Identifying infants," 2006).

Discussion with Key Conclusions

- Limitations include low count data attributed to the COVID-19 global pandemic. A 73% increase in the number of patients seen post-ASQ-3 intervention may signify the increase in referrals was simply due to chance.
- Statistically significant findings from this project provide evidence of the advantage of using ASQ-3 to screen for general development and identify developmental delays in discrete ages. Early intervention is critical for a lifetime of gain.
- This project upheld the DNP-prepared nurse's leadership in facilitating change in practice delivery to meet the current and future needs of patients (Chism, 2019).
- This project can help expand the integration of a valid developmental screening instrument such as the ASQ-3 to the pediatric primary care practice for improved health outcomes. A manuscript will be submitted to the *Journal of Doctoral Nursing Practice* for publication.

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