Title

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Group Well Child Care and Risk for Developmental Delay: Preliminary Findings among Asian Immigrants

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ABSTRACT

Group well-child care (GWCC) may promote interactive caregiving and prevent developmental delay. *Method:* This cross-sectional study explored the association between GWCC attendance and odds for suspected developmental delay among low-income Asian immigrants as measured by the Ages and Stages Questionnaire (ASQ)-III at age 18 months. *Results:* Odds for suspected developmental delay (OR=0.81, 95% CI 0.40-1.62) were not significantly lower for GWCC infants. However, odds for developmental risk were significantly lower for GWCC infants in the ASQ's problem-solving domain (OR= 0.40, 95% CI 0.17-0.92). *Conclusion:* Among low-income Asian immigrants, GWCC participation may be associated with lower odds for cognitive developmental delay.

Keywords: early childhood development; parenting support; pediatric primary care; immigrant; Asian-American

INTRODUCTION

Responsive, nurturing caregiving during early childhood buffers the potentially toxic effects of significant childhood adversity and promotes healthy early brain development and overall resilience (Shonkoff et al., 2012)-(Johnson et al., 2013). Interventions that support parents in providing such care to their infants may help promote healthy early childhood development and thus lay the foundations for physical and mental health and educational attainment (American Academy of Pediatrics, Council on Early Childhood et al., 2016)-(Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood et al., 2012) especially for low-income families facing higher social stressors (American Academy of Pediatrics, Council on Community Pediatrics, 2016)

Group well child care (GWCC)[1] constitutes one method of providing such parenting support during early childhood in pediatric primary care settings (National Institute on Children's Health Care Quality, 2016). Rather than providing 15-20 minute individual infant check-ups (the current standard of care), GWCC places 6-8 infants and their adult caregivers together for serial 2-hour long group medical visits, creating the structure for ongoing peer support from other parents and extended discussion on parenting topics with healthcare providers. However, published research assessing GWCC's impact on child development is limited. A systematic review that included a summary of GWCC research (Coker et al., 2013) listed only one randomized controlled trial of GWCC that used validated scales to compare developmental outcomes. The other listed studies assessed visit content, attendance, health care utilization, and maternal wellness rather than child development. More research regarding GWCC's developmental impact is needed to help assess its clinical utility. In addition, to our knowledge, no published literature has examined GWCC among Asian Americans, who are relatively understudied

[1] Abbreviations: ASQ: Ages & Stages Questionnaire; CI: confidence interval; GWCC: group well child care; OR: odds ratio; QI: quality improvement; RR: relative risk

despite being the fastest growing minority population in the United States (Gustavo Lopez & Patten, 2017).

The objective of this study is to explore the association between attendance at a group well-child care (GWCC) program and odds for suspected developmental delay among infants/toddlers from low-income Asian immigrant families. This study was conducted at a federally qualified health center serving mostly low-income Asian immigrants and refugees. Based on Bright Futures (Hagan Jr et al., 2008) anticipatory guidance guidelines and the *Nurturing Parenting* (Bavolek, 2007) curriculum on positive parenting, this GWCC program was designed to promote quality parent/child interaction through increased parenting knowledge, service navigation, and peer support.

METHODS

2.1. Overview

This is a retrospective cross-sectional study utilizing existing quality improvement (QI) data for secondary analysis. Study subjects consist of all infants from the study site who received structured developmental screening with the Ages and Stages Questionnaire (ASQ)-III at age 18 months between 1/1/2014-6/30/2016. The intervention group consists of study subjects who participated in GWCC and had full developmental screening results available (n=54). For the intervention group, de-identified ASQ results were extracted from chart review as part of the study site's quality improvement (QI) efforts. The comparison group consists of infants receiving usual care who underwent developmental screening with the ASQ-III in the study period (n=299). A local non-profit agency, which supports regional developmental screening efforts and collects all ASQ results from the organizations that it supports, provided de-identified 18-month ASQ developmental screening results obtained from all infants receiving usual care from the study site between 1/1/2014-6/30/2016.

2.2. Measures

The primary outcome variable is suspected developmental delay as assessed by the Ages and Stages Questionnaire (ASQ)-III (Squires et al., 2009) administered at age 18 months. The ASQ-III is a validated, parent self-administered screening tool in widespread clinical use to screen for developmental delay in young children, with an overall sensitivity of 86% and specificity of 85% for developmental delay for children ages 0-60 months. The ASQ assesses five distinct domains of early childhood development: communication, gross motor, fine motor, problem-solving, and personal-social. Similar to other research (Folger et al., 2018) utilizing the ASQ-III, overall screening results (encompassing all domains) were dichotomized as "normative" versus "suspected delay". "Suspected delay" is defined as scores within the "referral" range (2 standard deviations below the mean) in at least one domain, or within the "monitor" range (1-2 standard deviations below the mean) in at least two domains. The secondary outcome is "elevated developmental risk" for each ASQ domain, defined as screening results falling into either the "monitor" or "referral" ranges within each domain or subscale. This categorization corresponds to common clinical utilization of the ASQ to guide monitoring and referral decisions for suspected developmental delay in young children.

2.3. Data Analysis

Odds ratios (OR) for overall suspected delay (incorporating all domains), and odds ratios for elevated developmental risk (domain-specific), were calculated through logistic regression using *Stata* 14.2 (StataCorp., College Station, TX). In this comparison, an odds ratio (OR) < 1 indicates lower odds of suspected delay/developmental risk in intervention infants compared to usual care. Because the external dataset lacked any identifiers or demographic information, statistical adjustment for covariates was not possible. To help address unmeasured confounding, E-values were calculated for all statistically significant associations between treatment and outcomes. E-values are a new form of statistical

sensitivity analysis, measured on a risk ratio scale, that quantify “how strong the unmeasured confounding would have to be to negate the observed results” (VanderWeele & Ding, 2017). If the strength of unmeasured confounding is weaker than the E-value, then the observed association between the treatment and outcome would remain significant despite the confounder. E-values higher than known relative risk measures suggest more robust study results.(VanderWeele & Ding, 2017)

2.4 Ethics

The study protocol was reviewed by the Institutional Review Board at the author’s institution and was deemed “not human subjects research” as it consisted of secondary analysis of de-identified quality improvement (QI) data.

RESULTS

3.1. Demographics

While assignment to GWCC was not randomized, the process of identifying potential cohorts of mothers and infants who happened to share a similar birthdate (within 6 weeks) and the same native language created intervention and comparison groups that did not significantly differ in a systematic way from each other on measured demographic characteristics, except that the intervention group included more refugees, who were initially targeted for recruitment because they were felt to be at higher social risk than other groups. Table 1 presents a comparison of demographic characteristics of the two study conditions, which had no statistically significant differences in levels of Medicaid eligibility, insurance type, and self-reported English language proficiency.

Table 1: *Demographic comparison of intervention and control group infants*[a]

Group	Insurance Type			Language
	%Medicaid (95% CI)	%Private (95% CI)	%Uninsured (95% CI)	%English (95% CI)
Control (Usual Care)	93% (91.3-94.7%)	3% (2.1-4.4%)	4% (2.7-9.3%)	19.7% (17.2-22.2%)
Intervention (GWCC)	95% (89.7-100%)	5% (0-9.7%)	0%	19.2% (9.7%-28.7%)

[a] For all clinic infants born 07/01/2012-12/31/2015 enrolled by age 45 days. The language is "English" if the parent self-reports lack of need for translation in clinic, even if the primary language at home is different.

3.2. Primary and Secondary Outcomes

For the primary outcome, the odds ratio (OR) for suspected developmental delay among GWCC infants was 0.81 (95% confidence interval 0.40-1.62, p=0.55), which was not significantly lower than the comparison group. However, in the domain-specific analysis, odds for developmental risk were significantly lower for GWCC infants in the problem-solving domain (OR= 0.40, 95% confidence interval 0.17-0.92, $p < 0.05$). This domain tracks early cognitive development, suggesting lower odds for cognitive developmental delay risk among intervention infants. For the other developmental domains (communication, gross motor, fine motor, and personal social), the odds for elevated developmental risk did not differ significantly between the intervention and comparison groups. Table 2 lists the odds ratios for suspected developmental delay in intervention compared to usual care infants for the ASQ overall, and for elevated developmental risk for each ASQ domain, along with 95% confidence intervals (CI).

Table 2. *18 month ASQ-III comparison: Odds of suspected developmental delay in intervention versus control group*[b]

Developmental Domain	Odds Ratio (OR) of elevated developmental risk (domains) or suspected delay (overall)	Std Error	95% CI	p-value	E-value	
					Point Estimate	CI
Communication	0.63	0.24	0.29-1.35	0.24		
Gross Motor	1.07	0.54	0.39-2.93	0.89		
Fine Motor	0.85	0.32	0.40-1.79	0.67		
Problem Solving[*]	0.40	0.17	0.17-0.92	0.032[*]	4.44	1.39
Personal Social	0.77	0.43	0.26-2.30	0.65		
OVERALL	0.81	0.29	0.41-1.62	0.55		

[b]All GWCC infants (n=54) for whom 18 month ASQ-3 data was available & all clinic infants (n=299) for whom 18 month ASQ data from 2014-2015 was provided by external agency supporting regional developmental screening

[*]statistically significant difference at 0.05 level

In the problem solving domain, the only one with a statistically significant association between the treatment and outcome, the E-value for the point estimate of the OR was 4.44, indicating that unmeasured confounders would need to have a 4-fold association with both the treatment and outcome in order to negate the observed association between GWCC attendance and risk for problem solving delay. The E-value for the confidence interval was 1.39, indicating that unmeasured confounders would need to have a 1.39-fold association with both the treatment and the outcome to move the upper range of the confidence interval (CI) to include 1, a statistically non-significant result.

CONCLUSIONS

In this observational study of low-income Asian immigrants, participation in GWCC is associated with lower odds for elevated developmental risk in the problem-solving domain of the ASQ-III at age 18 months. These

results suggest lower risk for cognitive developmental delay in intervention infants and provide preliminary evidence that GWCC may help moderate developmental risk in young, low-income Asian immigrant children.

The curriculum for this particular GWCC program centered on promoting interactive and nurturing parenting practices, adapting an existing attachment-based parenting curriculum (*Nurturing Parenting*) (Bavolek, 2007) and anticipatory guidance materials from *Bright Futures* (Hagan Jr et al., 2008), the guidelines for pediatric primary care published by the American Academy of Pediatrics. The GWCC format permitted lengthier time for group discussion on interactive play, early childhood development, caregiver/child attachment, and positive discipline, themes that formed the foundation of the curriculum and received repeated attention during GWCC meetings throughout the 18-month program. The program logic model hypothesized that the lengthier parenting-related discussion and peer support offered by GWCC may increase the use of interactive and nurturing parenting strategies, that in turn may moderate risk for developmental delay, given the well-known importance of responsive caregiving for the early brain development (National Scientific Council on the Developing Child, 2015). This study's comparison of developmental risk as measured by the 18-month ASQ flowed directly from the intervention's logic model and was designed to evaluate GWCC's potential to decrease developmental risk as hypothesized in our study population of Asian immigrants.

Few studies of GWCC have assessed impact on child development, and an existing trial demonstrated clinical non-inferiority rather than significant differences in developmental outcomes (Taylor et al., 1997). This study may have had a positive finding because it is assessing a different population, i.e., immigrants, who may particularly value the social support offered in a group due to their linguistic isolation. Immigrant populations also have unique experiences that may affect early cognitive development, such as bilingualism. In this study, as self-reported English proficiency was equal in both the intervention and comparison groups (19% for both), bilingualism is unlikely to affect study

results, but the role of multiple language exposure is an important question to address in future research on developmental interventions for young immigrant children.

This study is limited by its observational and retrospective design, limitations of available data (which did not permit statistical adjustment for possible confounders), and small sample size. Consequently, these findings are presented as being preliminary in nature and require confirmation by a larger randomized controlled trial for a more definitive assessment of GWCC's developmental impacts in a similar population. The E-value analysis provides a way to estimate the robustness of treatment/outcome association found in this observational study. Our measured E-values of 4.44 (for the point estimate of the OR) and 1.39 (for the confidence interval) should be interpreted in light of other measures of relative risk (RR) for developmental delay in young children, such as: RR of maternal adverse childhood experiences for suspected developmental delay (1.18)(Folger et al., 2018); the adjusted RR of maternal obesity for neurodevelopmental delays in young children (1.19)(Duffany et al., 2016); and OR for the association between less interactive parenting and developmental delay (1.57) (Shah et al., 2015). This range of RR estimates, running lower than this study's calculated E-value, suggests that known risk factors for developmental delay may lack the magnitude to nullify this study's point estimate of risk for problem solving delay, but could impact interpretation of the confidence interval. Thus, while suggestive of GWCC's potential to promote healthy infant development, this study is not conclusive.

Nevertheless, given this promising preliminary data on the association between GWCC and lower odds for risk for cognitive developmental delay at 18 months, the GWCC model deserves further research into its impact on early childhood development. Medical billing for each participant in the group medical visits provides a built-in funding mechanism for the GWCC model, making this a financially sustainable parenting support intervention within primary care settings. If further research supports this intervention's positive effects on early development, the financial feasibility of this

approach and near-universal reach of pediatric primary care during infancy makes GWCC a promising vehicle for the prevention of developmental delay in early childhood.

REFERENCES

American Academy of Pediatrics, Council on Community Pediatrics. (2016). Poverty and Child Health in the United States. *Pediatrics*, *137*(4), e20160339. https://doi.org/10.1542/peds.2016-0339

American Academy of Pediatrics, Council on Early Childhood, Committee on Psychosocial Aspects of Child and Family Health, & Section on Developmental and Behavioral Pediatrics. (2016). Addressing Early Childhood Emotional and Behavioral Problems. *Pediatrics*, *138*(6), e20163023. https://doi.org/10.1542/peds.2016-3023

Bavolek, S. (2007). *Community Based Education Programs—Nurturing Parenting Programs*. https://www.nurturingparenting.com/CommunityBasedEducation.html

Coker, T. R., Windon, A., Moreno, C., Schuster, M. A., & Chung, P. J. (2013). Well-Child Care Clinical Practice Redesign for Young Children: A Systematic Review of Strategies and Tools. *Pediatrics*, *131*(Suppl 1), S5–S25. https://doi.org/10.1542/peds.2012-1427c

Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Garner, A. S., Shonkoff, J. P., Siegel, B. S., Dobbins, M. I., Earls, M. F., Garner, A. S., McGuinn, L., Pascoe, J., & Wood, D. L. (2012). Early Childhood Adversity, Toxic Stress, and the Role of the Pediatrician: Translating Developmental Science Into Lifelong Health. *Pediatrics*, *129*(1), e224–e231. https://doi.org/10.1542/peds.2011-2662

Duffany, K. O., McVeigh, K. H., Kershaw, T. S., Lipkind, H. S., & Ickovics, J. R. (2016). Maternal Obesity: Risks for Developmental Delays in Early Childhood. *Maternal and Child Health Journal*, *20*(2), 219–230. https://doi.org/10.1007/s10995-015-1821-z

Folger, A. T., Eismann, E. A., Stephenson, N. B., Shapiro, R. A., Macaluso, M., Brownrigg, M. E., & Gillespie, R. J. (2018). Parental Adverse Childhood Experiences and Offspring Development at 2 Years of Age. *Pediatrics*, *141*(4). https://doi.org/10.1542/peds.2017-2826

Gustavo Lopez, N. G., & Patten, E. (2017, September 28). Key facts about Asian Americans. *Pew Research Center*. https://www.pewresearch.org/fact-tank/2017/09/08/key-facts-about-asian-americans/

Hagan Jr, J., Shaw, J. S., & Duncan, P. M. (2008). *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents* (Third). American Academy of Pediatrics.

Johnson, S. B., Riley, A. W., Granger, D. A., & Riis, J. (2013). The Science of Early Life Toxic Stress for Pediatric Practice and Advocacy. *Pediatrics*, *131*(2), 319–327. https://doi.org/10.1542/peds.2012-0469

National Scientific Council on the Developing Child. (2015). *Supportive relationships and active skill-building strengthen the foundations of resilience: Working paper 13*. https://developingchild.harvard.edu/resources/supportive-relationships-and-active-skill-building-strengthen-the-foundations-of-resilience/

Promoting Young Children's (Ages 0-3) Socioemotional Development in Primary Care. (n.d.). NICHQ - National Institute for Children's Health Quality. Retrieved August 19, 2019, from https://www.nichq.org/resource/promoting-young-childrens-ages-0-3-socioemotional-development-primary-care

Shah, R., Sobotka, S. A., Chen, Y.-F., & Msall, M. E. (2015). Positive Parenting Practices, Health Disparities, and Developmental Progress. *Pediatrics*, *136*(2), 318–326. https://doi.org/10.1542/peds.2014-3390

Shonkoff, J. P., Garner, A. S., The Committee on Psychosocial Aspects of Child and Family Health, C. on E. C., Siegel, B. S., Dobbins, M. I., Earls, M. F., Garner, A. S., McGuinn, L., Pascoe, J., & Wood, D. L. (2012). The Lifelong Effects of Early Childhood Adversity and Toxic Stress. *Pediatrics*, *129*(1), e232–e246. https://doi.org/10.1542/peds.2011-2663

Squires, J., Twombly, E., Bricker, D., & Potter, L. (2009). *Ages and Stages Questionnaire, Third Edition (ASQ-III) User's Guide*. Paul H. Brookes Publishing. http://archive.brookespublishing.com/documents/asq-3-technical-report.pdf

Taylor, J. A., Davis, R. L., & Kemper, K. J. (1997). A Randomized Controlled Trial of Group Versus Individual Well Child Care for High-risk Children: Maternal-Child Interaction and Developmental Outcomes. *Pediatrics*, *99*(6), e9–e9. https://doi.org/10.1542/peds.99.6.e9

VanderWeele, T. J., & Ding, P. (2017). Sensitivity Analysis in Observational Research: Introducing the E-Value. *Annals of Internal Medicine*, *167*(4), 268. https://doi.org/10.7326/M16-2607