

Family outcomes of the novel ECHO framework implemented in Singapore's early intervention programme

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Dear Editor,

About 200 million children in the world live with disability. Good quality early intervention (EI) improves the trajectory for developing life capabilities towards better adult outcomes for these children.¹⁻² High quality EI is a priority among nations. In Singapore, developmental and behavioural disabilities increased by nearly 5 folds between 2004 and 2019.³⁻⁴ With increasing public expenditure on EI services, outcome-based reporting is paramount to improve public accountability, service and policy development.⁵ Hence, the national Enabling Masterplan for disability development in 2012 to 2016 recommended the development and implementation of a common child and family outcomes measurement system for EI.⁶ In Singapore, EI services are structured along a continuum of support needs, ranging from Learning Support and Development Support programmes for children with lower support needs, to inclusive preschools for those with moderate needs, and Early Intervention Programme for Infants and Children (EIPIC) for children requiring moderate-to-intensive support.³ The Early Childhood Holistic Outcome (ECHO) project piloted a common child and family outcomes measurement system and an EI service framework for EIPIC in 2014 to 2018. This article reports the outcomes of families enrolled in Project ECHO from January 2016 to December 2017. To our knowledge, this is the first study in Singapore that demonstrates the effectiveness of EIPIC in improving family outcomes.

Project ECHO adopts a cohort methodology to measure child and family outcomes prospectively. Family outcomes (FO) were measured at entry (pre-intervention) and at first review follow-up (post-intervention) as part of the EIPIC standard service delivery, outcome monitoring and programme evaluation processes. The SingHealth Centralised Institutional Review Board approved the project (2014/099/E). Consent for data usage was obtained from families who were enrolled into 4 Thye Hua Kwan (THK) EIPIC centres from January 2016 to December

2017. FO were measured using the Family Outcome Survey-Revised (FOS-R), a validated 5-point Likert scale (1 lowest, 5 highest), with psychometric validity previously established in the Singapore population.⁷ Parents completed the English or Chinese versions of FOS-R. For this study, the FO data of families whose children remained in the THK EIPIC for at least 3 months post-enrolment were extracted for analysis. Data analysis was performed using STATA 14.2 (StataCorp, College Station, TX, US), with clinical and demographic data summarised using standard descriptive statistics. We tested the normality of FO rating distribution using the Shapiro-Wilk test and compared the entry and follow-up FO ratings using the non-parametric Wilcoxon signed-rank test in view of the largely non-normal distribution and pre-post nature of FO ratings.

Among the entry cohort from January 2016 to December 2017 (n=563), survey response rate was 52.9% (n=298). At follow-up, 218 families remained in the study cohort and 141 responded to the survey (follow-up survey response rate was 64.7%). The entry clinical and demographic profiles of the children and families in the study cohort were comparable to the general EIPIC cohort in Singapore,⁵ with 60.1% Chinese, 78.2% male, mean EIPIC entry age of 47.2 months (range 12–84 months), and the majority having a primary diagnosis of autism spectrum disorder (56.0%) and global developmental delay (33.9%). Among the parents, 67.2% of fathers and 60.4% of mothers had post-secondary or higher educational qualifications, though the majority of families were of low-to-middle income (79.9%).

The mean duration of first review was 10.5 months (standard deviation [SD] 3.2, range 6–16 months). At entry, the mean domain FO ratings ranged 3.51–3.82 (Table 1). At follow-up, there were statistically significant improvements in the mean ratings of all 5 domains, ranging 3.78–4.00 ($P<0.05$).

The highest ratings at entry and follow-up were found in the FO1 domain (understanding your child's

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strength, needs and abilities). The greatest improvement was in the FO2 domain (knowing your rights and advocating for your child), despite it being charting the lowest mean entry score.

The lowest-rated items at entry and follow-up were: knowing the options available when the child leaves the programme (A8), ability to talk to other families with children with similar needs (A16) and the

Table 1. Family outcome ratings at entry and at follow-up.

Family outcomes		Entry (n=298)	Follow-up (n=141)	P value
		Mean rating	Mean rating	
Family outcome 1: Understanding your child's strengths, needs and abilities		3.82	4.00	0.0016 ^a
A1.	We know the next steps for our child's growth and learning.	3.51	3.81	0.0011 ^a
A2.	We understand our child's strengths and abilities.	3.78	3.98	0.0829
A3.	We understand our child's delays and/or needs.	3.95	4.05	0.3572
A4.	We are able to tell when our child is making progress.	4.01	4.16	0.0252 ^a
Family outcome 2: Knowing your rights and advocating for your child		3.51	3.79	0.0006 ^a
A5.	We are able to find and use the services and programs available to us.	3.47	3.72	0.0241 ^a
A6.	We know our rights related to our child's special needs.	3.47	3.78	0.0007 ^a
A7.	We know who to contact and what to do when we have questions or concerns.	3.57	4.11	<0.0001 ^a
A8.	We know what options are available when our child leaves the ditto.	3.12	3.43	0.0035 ^a
A9.	We are comfortable asking for services & supports that our child and family need.	3.91	3.92	1.0000
Family outcome 3: Helping your child develop and learn		3.54	3.81	0.0035 ^a
A10.	We are able to help our child get along with others.	3.50	3.77	0.0156 ^a
A11.	We are able to help our child learn new skills.	3.55	3.81	0.0153 ^a
A12.	We are able to help our child take care of his/her needs.	3.67	3.89	0.0689
A13.	We are able to work on our child's goals during everyday routines.	3.44	3.77	0.0041 ^a
Family outcome 4: Having support systems		3.61	3.78	0.0336 ^a
A14.	We are comfortable talking to family and friends about our child's needs.	3.68	3.81	0.4630
A15.	We have friends or family members who listen and care.	3.84	3.93	0.4809
A16.	We are able to talk with other families who have a children with similar needs.	3.37	3.69	0.0100 ^a
A17.	We have friends or family members we can rely on when we need help.	3.62	3.72	0.0591
A18.	I am able to take care of my own needs and do things I enjoy.	3.56	3.73	0.0348 ^a
Family outcome 5: Accessing the community		3.75	3.89	0.0041 ^a
A19.	Our child participates in social, recreational or religious activities that we want.	3.11	3.45	0.0003 ^a
A20.	We are able to do things we enjoy together as a family.	3.95	3.97	0.3222
A21.	Our medical and dental needs are met.	3.70	3.80	0.0459 ^a
A22.	Our child care needs are met.	3.80	3.96	0.1173
A23.	Our transportation needs are met.	3.88	4.03	0.0597
A24.	Our food, clothing and housing needs are met.	4.06	4.14	0.1128

^a P values are statistically significant.

child's participation in social, recreational or religious activities that the family wants (A19), despite some improvement observed at follow-up.

This is the first report providing concrete evidence on the effectiveness of Singapore's EIPIC programme in improving family outcomes. The measurable improvement in families' knowledge, awareness rights, advocacy skills and broader well-being in this study demonstrates the utility of FOS-R for service quality monitoring and benchmarking in EIPIC. However, gaps remained in helping families better understand post-EIPIC options, connecting with other caregivers and improving community inclusion. These are potential areas for EIPIC providers to improve on when supporting families in EI.

The high cohort attrition and low survey response rate in this study may subject our results to biases. However, our study cohort's entry FO ratings were comparable to a previous Singapore cross-sectional study using FOS-R,⁷ suggesting that our results are adequately comparable with the rest of the EIPIC population. It is interesting to note that this study's FO ratings were higher than those of a study in Japan,⁸ but lower than those reported in the US.⁹ The follow-up duration was short in this study, though it is encouraging that statistically significant improvements were still observable. Further studies with a bigger cohort size and longer follow-up duration will be helpful to ascertain if these improvements were sustained or further enhanced. Reasons for prematurely exiting EIPIC programme and the association between improvement in FO and child outcomes should also be further studied.

With the success of project ECHO, the ECHO Framework was nationally scaled up in 2019 to 2024 in Singapore.¹⁰ However, this phase only focused on implementation of the Global Child Outcomes measurement system. Our study results not only add to the body of literature demonstrating effectiveness of EI in improving family quality of life, but these findings may also support local and regional EI providers and policymakers to enhance outcome-based accountability by holistically monitoring family quality of life using FOS-R prospectively.

Ethics statement

SingHealth Centralised Institutional Review Board approved the project (2014/099/E).

Declaration

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