Analysis of Kolkata Development Model – An Universal Practice Model for Children with Special Needs (Neurodevelopmental Disorders)

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What are Neurodevelopmental Disorders?

Several behaviours that characterize maladjustment or emotional disturbance are relatively common in childhood.

Special needs is an umbrella term covering a wide array of diagnoses, ranging from those that resolve in early periods of life to those that continue for lifetime and severity level ranging from mild to profound.

It covers developmental delays, medical conditions, psychiatric conditions, and congenital conditions that require accommodations so children can reach their potentials. Some individuals grow up from an early age (develop) with a subset of difficulties or issues that arise from the improper functioning of their brain.

The complex and heterogeneous conditions arising from perturbations of the central nervous system lead to the development of Neurodevelopmental Disorders.

Impacts of Neurodevelopmental Disorders

The impact of these deficits on children may vary depending on the time when brain abnormalities or some damage to the brain occurred (during the perinatal period, or infancy/childhood). Such abnormal functioning of the neurological system and brain, take place during the pre- and perinatal period, which interfere with the developmental of language and speech, motor skills, attention, behavior, impulse control, emotional expression, memory, learning, or other neurological functions.

Solutions

Therefore, these children need Early Detection and expert Early Intervention. We know that, otherwise, delay leads to downward spiral with lasting morbidity through adolescence and adulthood [1]. Neurodevelopmental disorders (NDD) are increasingly being recognized as a leading cause of morbidity in children, causing great suffering for patients and their families and large costs for society [2].

An indigenous and unique solution

Kolkata Development Model [3] proposes a unique and unifying practice model, which efficiently combines and simplifies management of all neurodevelopmental disorders and Special Needs in children.

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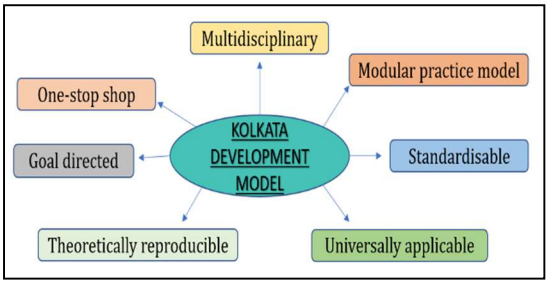
The Kolkata development model [KDM] is multidisciplinary, goal directed, standardizable and universally applicable for any age, any neuro-developmental conditions with any degree of severity. This Practice Model has been developed in Kolkata, India.

The Model in a nutshell

The model has been in existence for more than a decade in practice with plenty of anecdotal evidences of its magical efficiency that puts such children in near normal Functionality.



Study of KDM

A small pilot study which was conducted, to review retrospectively, as how the performance of the Kolkata Development Model have been, in terms of including children with special needs to mainstream schools.

Results in a nutshell

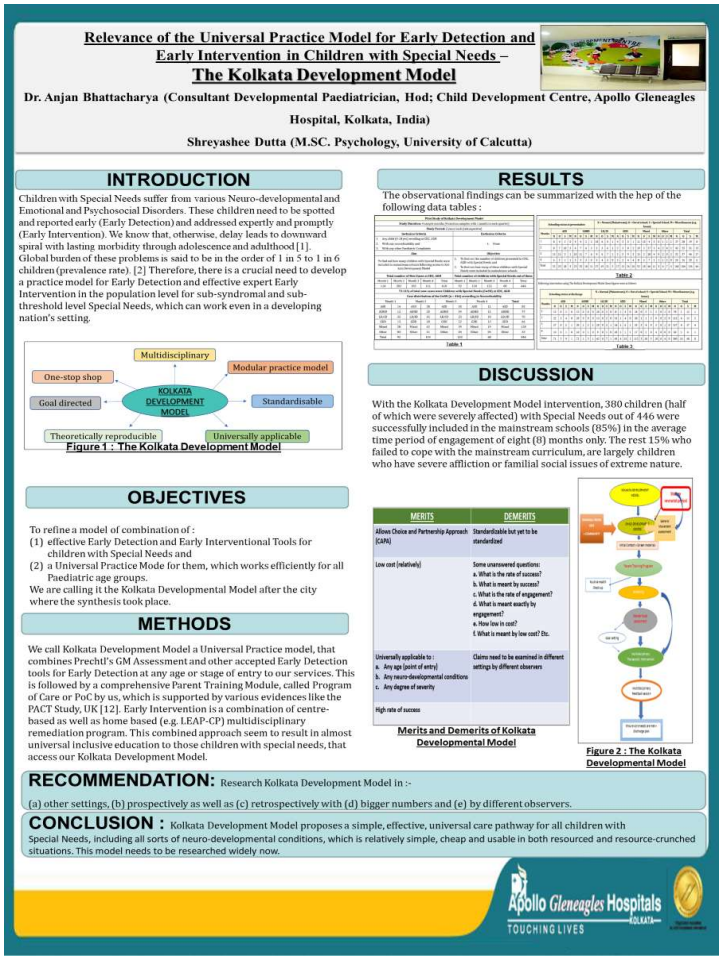
The results show that the model has a high rate of success as 380 children (half of which were severely affected) with Special Needs out of 446 were successfully included in the mainstream schools i.e., 85% of the patients, in the average time period of engagement of eight (8) months only. The rest 15% who failed to cope with the mainstream curriculum, are largely children who have severe affliction or familial social issues of extreme nature.

This model has already been presented at the Glasgow Annual Conference of RCPCH [Royal College of Paediatrics and Child Health], UK on 13th March, 2018; the EACD [European Academy of Childhood Disability] Annual Conference, Tbilisi, Georgia on 26th May in a Symposium, 2018 and Keynote Address at Paris International Paediatric Conference (Allied Health) on 16th August, 2018. At the London Conference, 2019 this Keynote address is presented with members from Child Development Centre, Apollo Gleneagles Hospital, Kolkata presenting some of its key scientific components. This model proves to be capable of being adoptable equally, with local adjustments, both in resource-crunched as well as resourced countries, equally. That model has since then been proposed as a poster at the 2019 Annual EACD Conference in Paris with Dr. Leisbeth Siderius, Consultant Paediatrician from Netherlands and Shyamani Hettiaracchi, Consultant Paediatric Speech and Language Therapist from Kelaniya University in Colombo in Sri Lanka, jointly. This model has also been presented as a poster at the 8th Congress of the European Academy of Paediatrics Societies on 19th October 2020.

Poster presented at the 2019 Annual EACD Conference in Paris with Dr. Leisbeth Siderius

KDM presented at the 2018 Annual RCPCH Conference in Glasgow with Dr. Ramesh Mehta, OBE Dr. Russel Viner, RCPCH President & Dr. Nina Modi, Immediate Past President

KDM presented at the 2018 Annual Conference of Paediatrics & Primary Health Care in Paris showing its GM use at the Tbilisi, Georgia with Post Doctoral Fellow from Queensland University, Australia and members of Multidisciplinary Team CDC, AGH with international dignitaries



Relevance of the Universal Practice Model for Early Detection and Early Intervention in Children with Special Needs –
The Kolkata Development Model

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INTRODUCTION

Children with Special Needs suffer from various Neuro-developmental and Emotional and Psychosocial Disorders. These children need to be spotted and reported early (Early Detection) and addressed expertly and promptly (Early Intervention). We know that, otherwise, delay leads to downward spiral with lasting morbidity through adolescence and adulthood [1].
Global burden of these problems is said to be in the order of 1 in 5 to 1 in 6 children (prevalence rate). [2] Therefore, there is a crucial need to develop a practice model for Early Detection and effective expert Early Intervention in the population level for sub-syndromal and sub-threshold level Special Needs, which can work even in a developing nation's setting.

Figure 1 : The Kolkata Development Model

OBJECTIVES

To refine a model of combination of :
(1) effective Early Detection and Early Interventional Tools for children with Special Needs and
(2) a Universal Practice Mode for them, which works efficiently for all Paediatric age groups.
We are calling it the Kolkata Developmental Model after the city where the synthesis took place.

METHODS

We call Kolkata Development Model a Universal Practice model, that combines Precthl's GM Assessment and other accepted Early Detection tools for Early Detection at any age or stage of entry to our services. This is followed by a comprehensive Parent Training Module, called Program of Care or PoC by us, which is supported by various evidences like the PACT Study, UK [12]. Early Intervention is a combination of centre-based as well as home based (e.g. LEAP-CP) multidisciplinary remediation program. This combined approach seem to result in almost universal inclusive education to those children with special needs, that access our Kolkata Development Model.

RESULTS

The observational findings can be summarized with the hep of the following data tables :

Table 1 Table 2 Table 3

DISCUSSION

With the Kolkata Development Model intervention, 380 children (half of which were severely affected) with Special Needs out of 446 were successfully included in the mainstream schools (85%) in the average time period of engagement of eight (8) months only. The rest 15% who failed to cope with the mainstream curriculum, are largely children who have severe affliction or familial social issues of extreme nature.

MERITS	DEMERITS
Allows Choice and Partnership Approach (CAPA)	Standardisable but yet to be standardized
Low cost (relatively)	Some unanswered questions: a. What is the rate of success? b. What is meant by success? c. What is the rate of engagement? d. What is meant exactly by engagement? e. How low in cost? f. What is meant by low cost? Etc.
Universally applicable to : a. Any age (point of entry) b. Any neuro-developmental conditions c. Any degree of severity	Claims need to be examined in different settings by different observers
High rate of success	

Merits and Demerits of Kolkata Developmental Model

Figure 2 : The Kolkata Developmental Model

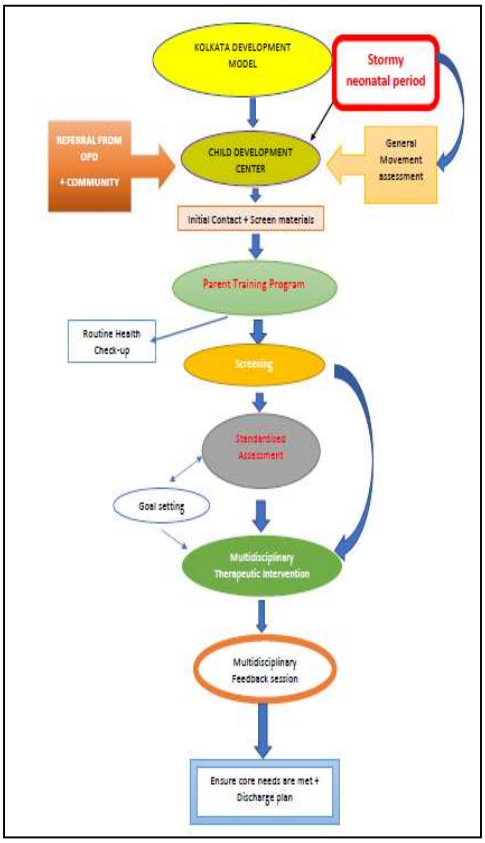
RECOMMENDATION: Research Kolkata Development Model in :-
(a) other settings, (b) prospectively as well as (c) retrospectively with (d) bigger numbers and (e) by different observers.

CONCLUSION : Kolkata Development Model proposes a simple, effective, universal care pathway for all children with Special Needs, including all sorts of neuro-developmental conditions, which is relatively simple, cheap and usable in both resourced and resource-crunched situations. This model needs to be researched widely now.

Apollo Gleneagles Hospitals KOLKATA
TOUCHING LIVES

Poster presented at the 8th Congress of the European Academy of Paediatrics Societies on 19th October 2020

How does the Kolkata Development Model work?



THE KOLKATA DEVELOPMENT MODEL

The Kolkata Development Model combines Prechtl's GM Assessment and other accepted Early Detection tools for Early Detection at any age or stage of entry to our services. This is followed by a comprehensive Parent Training Module, called Program of Care or PoC by us, which is supported by various evidences like the PACT Study, UK [4]. The diagnosis of the special needs children is done using internationally validated, standardized assessment tools like ADI-R, ADOS, Griffiths, Bayleys, WISC, Connors etc. Early Intervention is a combination of centre-based as well as home based (e.g., LEAP-CP) multidisciplinary remediation program. This combined approach seems to result in almost universal inclusive education to those children with special needs, that access our Kolkata Development Model.

Outcomes of the Kolkata Development Model

At presentation, 160 Children out of 446 children with Special Needs were able to access mainstream school (35.87%). But after going through the Kolkata Development Model intervention for average time period of engagement of eight months only, 380 (85.2%) were successfully included in the mainstream schools. This 85% were not just children with mild or moderate affliction only but more than half were severely affected. In case of Autism Spectrum Disorder specifically, 42% were able to access mainstream school at presentation and after intervention 86% of the children were included in mainstream schools. On the other hand, at

presentation there were 25.75% children with Global Developmental Delay included in normal schools, after intervention, 68% children were included into normal schools. In case of children with Learning Disability or Intellectual disability children, 88% of the children started going to normal schools after intervention whereas only 38.57% were previously studying in normal schools. Children with ADHD were the highest in terms of getting included in mainstream schools (94%) after intervention whereas only 29.87% got an opportunity of getting included in normal schools before intervention began.

Pilot Study of Kolkata Development Model									
Study Duration: 4 sample months (4 random samples with 1 month in each quarter)									
Study Period: 5 years back (retrospective)									
Inclusion Criteria					**Exclusion Criteria**				
1. Any child (0-18 yrs) enrolling at CDC, AGH 2. With any neurodisability and 3. With any other Paediatric Complaints					1. None				
Aim					**Objective**				
To find out how many children with Special Needs were included in mainstream schools following access to Kolkata Development Model					1. To find out the number of children presented to CDC, AGH with Special Needs and 2. To find out how many of these children with Special Needs were included in mainstream schools				
Total number of New Cases at CDC, AGH					**Total number of children with Special Needs out of them**				
Month 1	Month 2	Month 3	Month 4	Total	Month 1	Month 2	Month 3	Month 4	Total
114	202	183	111	610	92	134	152	68	446
73.11% of total new cases were Children with Special Needs (CwSN) at CDC, AGH									
Case distribution of the CwSN (n = 446) according to Neurodisability									
Month 1		Month 2		Month 3		Month 4		**Total**	
ASD	14	ASD	28	ASD	30	ASD	11	ASD	83
ADHD	12	ADHD	20	ADHD	34	ADHD	11	ADHD	77
LD/ID	22	LD/ID	15	LD/ID	23	LD/ID	10	LD/ID	70
GDD	13	GDD	18	GDD	22	GDD	13	GDD	66
Mixed	28	Mixed	42	Mixed	39	Mixed	19	Mixed	128
Other	03	Other	11	Other	04	Other	04	Other	22
Total	92		134		152		68		446

Table 1

Schooling status at presentation	**N = Normal (Mainstream); O = Out of school; S = Special School; M = Miscellaneous (e.g. home)**																											
Months	**ASD**				**ADHD**				**LD/ID**				**GDD**				**Mixed**				**Other**				**Total**			
	N	O	S	M	N	O	S	M	N	O	S	M	N	O	S	M	N	O	S	M	N	O	S	M	N	O	S	M
1	8	4	2	0	4	4	2	2	10	6	5	1	4	3	5	1	11	10	4	3	0	1	1	1	37	28	19	8
2	8	7	10	3	4	7	6	3	5	3	6	1	5	3	8	2	19	3	17	3	4	2	4	1	45	25	51	13
3	13	11	5	1	10	11	7	6	9	6	7	1	5	5	9	3	15	2	18	4	0	2	0	2	52	37	46	17
4	6	3	1	1	5	3	3	0	3	4	3	0	3	2	4	4	8	3	7	1	1	1	2	0	26	16	20	6
Total	35	25	18	5	23	25	18	11	27	19	21	3	17	13	26	10	53	18	46	11	5	6	7	4	160	106	136	44

Table 2

Following intervention using The Kolkata Development Model, these figures were as follows.

Schooling status at discharge					N = Normal (Mainstream); O = Out of school; S = Special School; M = Miscellaneous (e.g. home)																						
Months	ASD				ADHD				LD/ID				GDD				Mixed				Other				Total			
	N	O	S	M	N	O	S	M	N	O	S	M	N	O	S	M	N	O	S	M	N	O	S	M	N	O	S	M
1	12	0	2	0	12	0	0	0	20	0	2	0	8	1	4	0	24	0	3	1	2	0	1	0	78	1	12	1
2	22	2	4	0	20	0	0	0	13	0	2	0	13	1	4	0	38	1	1	2	9	0	2	0	115	4	13	2
3	27	0	2	1	30	1	2	1	20	0	2	1	14	1	6	1	33	2	4	0	3	0	1	0	127	4	17	4
4	10	0	1	0	10	0	1	0	9	0	1	0	10	1	1	1	17	0	2	0	4	0	0	0	60	1	6	1
Total	71	2	9	1	72	1	3	1	62	0	7	1	45	4	15	2	112	3	10	3	18	0	4	0	380	10	48	8

Table 3

We can see from Table 1 that children who were suffering from Autism Spectrum Disorder exclusively (83) and Attention Deficit Hyperactivity Disorder exclusively (77) are most in numbers at presentation. A comparative analysis between the two can result in a better success rate of the Kolkata Development Model in making children with ADHD more quickly functional enough to enroll in normal schools than children with ASD. In case of ASD, there was an increase of 44% in children who got included in normal schools after intervention began, whereas on the other hand, in children with ADHD it was observed that there was a 64% increase in children who were functional enough to study in normal schools.
This can be explained by the efficient multidisciplinary management that the Kolkata Developmental Model provides to each child.

Children of any age (0 to 18 years), any neurodevelopmental disorder, with any severity of the disorder, were presented at the centre and had undergone input using The Kolkata Development Model. Most of the children became functional enough to enrol in normal schools at a relatively low cost, at a relatively short span of time, given the rate of success of the treatment. One could rejoice such positive outcome, despite of varying length of full engagements. This model showed a low drop-off rate that is, high engagement rate [as the model also followed the Choice and Partnership Approach (CAPA)]. However, this model is followed in a standard way at our centre. Hence we postulate that this is highly standardizable, if further studies are carried out.

Kolkata Development Model, which is simple, effective, universal care pathway showed higher rate of success for most of the neurodevelopmental disorders except for children suffering from Global. But this model needs to be further researched widely now in order to be equally effective for children with complex conditions like Global Developmental Delay (GDD) and also increase the rate of success for all the other neurodevelopmental disorders.

This is a non-funded study. There are no conflict of interest issues.

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