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# The Indian Journal of Occupational Therapy

## About AIOTA and IJOT

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- ✓ The Indian Journal of Occupational Therapy (IJOT) is published quarterly (four times a year), as: Issue 1: January-March, Issue 2: April-June, Issue 3: July-September and Issue 4: October-December, effective from January, 2017.
- ✓ Guidelines to Authors for Submission: Visit AIOTA/IJOT website ([www.aiota.org/ijot](http://www.aiota.org/ijot)) for download.
- ✓ The official language of the Journal is American (US) English.
- ✓ IJOT welcomes submissions of original scientific research papers, review papers, case reports, preliminary articles, conference (OTICON) abstracts (of oral and poster: research papers only), editorials, and specialist issue editorials, on all aspects of occupational therapy. It also includes publication of book reviews & letters to the editor.
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## Editorial

# Inauguration and Inclusion of Specialty Edition of the Indian Journal of Occupational Therapy

Punita V Solanki<sup>1</sup>, Anil K Srivastava<sup>2</sup>

The Indian Journal of Occupational Therapy (IJOT) is a prestigious, peer-reviewed, quarterly official publication of All India Occupational Therapists' Association since 1955. The target readers of the journal are occupational therapy professionals from India and across the globe, as well as other allied health-care professionals such as physiotherapy, orthotists, prosthetists, and psychologists and healthcare professionals interested in the rehabilitative aspects of the health condition. We aim to get the journal indexed in as many international databases as possible, especially occupational therapy related and Scopus Database and also to get the journal impact factor soon.

We embark the year 2017 by inaugurating and including a specialty edition: Issue 4, with its theme geared to "Occupational Therapy in Pediatric Sciences."

We announce that: Now onward each year, the Issue 4 of IJOT, will be based on a specialty theme, pre-decided by the editorial board at the beginning of the year. In the year 2018, the theme "Occupational Therapy in Neurosciences" will be featured in Issue 4. The advance announcement is made with the aim to provide adequate duration to the authors, for preparing manuscripts in the specialty area of neurological rehabilitation. Every specialty edition, i.e., Issue 4, will also feature a guest editorial in addition to the editorial. The guest editorial of the special issue will be solicited to an eminent national and/or international expert in the specific field.

Specialty editions of any journal are aimed at efficient communication, and dissemination of current, evidence-based knowledge, by authors who are experienced and expert in a chosen and interested specialty area. This aids in fetching latest specialty research findings under one umbrella.

Specialty editions have manifold benefits:<sup>1</sup>

- Added readership among the specialized group of occupational therapists and other health-care professionals worldwide
- Added subscriptions: Individual as well as institutional, specialized in the said field of practice and research
- Increased citations by authors publishing research work of common interest, thereby enhancing the journal impact factor and indexing value.
- A feather in the cap of a guest editor, thereby enhancing their profile and reputation in the specialty area
- More networking among like-minded professionals, thus enhancing research culture
- Perpetual database and repository of specialty research work, enabling easy retrieval and information gathering, for newer research in the related area of interest.

Research manuscripts in the special issue may be solicited or agreeably submitted. The guest editor also reviews the special issue manuscripts, and offers expert opinion in addition to the standard peer review process employed by IJOT, so that the final versions are submitted to the journal editorial office for publication. International Committee of Medical Journal Editors (ICMJE) has laid down certain recommendations for the Supplements, Theme Issues, and Special Series.<sup>2</sup> Some of these recommendations by ICMJE include: Roles and responsibilities of the editor and guest editor, disclosure of conflict of interest with the sources of funding, avoiding favors or compensations from funding agencies, differentiating secondary publications from primary publication and acknowledging primary research work, etc.

The guest editorial for IJOT 2017, Volume 49, and Issue 4 was solicited to Dr. Mrs. Erna Imperatore (Blanche). Dr. Erna Imperatore (Blanche) is a well-known expert in pediatric occupational therapy and interventions based on occupational science. She holds Ph.D. degree in Occupational Science. Dr. Blanche's research interests are in the areas of play, clinical evaluation of children

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with developmental disabilities including autism, and the relationship between sensory processing and lifestyle choices.

We at IJOT, set the publication platform from 2017 onward, highlighting the importance of specialization in academics, clinical practice and research, thereby offering evidence-based expert therapies, built on sound clinical reasoning and judgments, for our clients. This would ensure safe-guarding ethical principles of “Do No Harm” and weigh “Benefits versus Harms” in every therapy designed after thorough research. After all, our clients are the core of the interdisciplinary team of health-care professionals. “Client-Centered Specialized Practice” will be the demand of the hour and “Specialization” will be the need, expected out of occupational therapy professionals. Hence, research is the key to unlock the answers to the challenging questions, posed by our clients, peers, and coprofessionals.

IJOT editorial board, encourage every occupational therapist from India to manage time, resources and expertise in such a

manner, that conducting research does not pose a challenge and it becomes an enjoyable exercise. We aspire and invite occupational therapy researchers to generate Indian norms and database, culturally designed for Indian population, to be published in IJOT. We are confident that IJOT will be the most sought journal to retrieve research findings based on Indian population, with Indian norms and values, in various specialty areas of practice and research with the valued cooperation of you all.

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## Guest Editorial

# Contributing to Practice-based Evidence

Erna Imperatore Blanche

I am pleased to write the editorial comment for this issue of the Indian Journal of Occupational Therapy. The articles in this issue cover a wide range of topics, and the authors have used an appropriately diverse range of methods of inquiry. The research questions being investigated by the authors are of importance to our profession. These occupational therapists as others who engage in research do so as an added task to their daily practice in academics and/or clinical work, and therefore, they inevitably encounter many challenges to complete their projects. Our discipline needs more research, but how can practitioners solve the issues present in their daily work as well as engaging in the additional task research? One can say that occupational therapists face technical, identity, and practical challenges that need to be addressed.

The technical issues include the limited training in research techniques that occupational therapists receive in their professional education. In addition, they often lack access to interdisciplinary collaborators and data analysis tools. Becoming a researcher requires understanding the multiple steps required in carrying a study to completion, including the following: Formulating the research question, choosing the methodology to answer it, gathering data, analyzing the results, deriving objective conclusions, and highlighting the importance to occupational therapy practice.

In reference to the research question, clinicians have an abundance of questions that they would like to have answered. Yerxa<sup>1</sup> called these questions “clinical irritations” that often serve as the start in the formulation of a research plan, together with an in-depth review of the existing literature. The importance of a clear research question lies in the determination of the methodology utilized to answer it. For example, a question of the effectiveness of intervention will require quantitative methodologies and statistical analysis, but a question about patients’ experiences is better answered with qualitative methodologies. Quantitative methodologies are faster, while qualitative methodologies require an extended time of exposure with the research participants.

Examples of invaluable information gathered through qualitative methods include Piaget’s rich description of cognitive development in children and Maslow’s description of the hierarchy of needs. In occupational therapy and occupational science, qualitative studies have greatly influenced the profession. For example, one of the initial stages in the Well Elderly study performed by Clark *et al.*<sup>2</sup> was a qualitative study that focused on the life experiences of the elders in the community. The data were used to inform the development of an intervention program with the elders in the community. This program is inspired by the USC/OT model of Translational Research which combines qualitative and quantitative methodologies.<sup>3</sup>

The next step after refining the research question and choosing the methodology is the performance of the research itself. In effectiveness studies, this involves applying an intervention, while in some descriptive studies, it requires administering a specific assessment tool. In such studies, either the chosen assessment tools need to be reliable and valid or the intervention needs to be well described. In large clinical trials, the interventions need to be manualized and tested with fidelity measures specifically designed for the study.

Analyzing the results and deriving objective conclusions require a change in stance. As teachers and as therapists, we want positive outcomes with our students and our patients. As researchers, we need to stay objective (null hypotheses) and accept that an outcome may not support our initial ideas. For example, a recent study involving a program to prevent pressure ulcers in adults with spinal cord injuries did not yield the expected results. Still, the results were published as they produced valuable information about the issues about pressure ulcers in adults with spinal cord injuries.<sup>4</sup>

In terms of our identity, Lawlor<sup>5</sup> describes the unique challenges occupational therapy clinicians encounter when they become qualitative researchers. Although she refers to clinicians becoming qualitative researchers, this concept also applies to occupational therapists becoming researchers in general. Lawlor describes this transformation as a shift in “gaze,” in that we view events from a different standpoint and act accordingly. Beyond a change in “gaze,” a change in identity also

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requires occupational therapists to believe that they can become researchers and apply their “OT skills” to engaging in research.

The practical challenges of engaging in research are limited time and limited resources. The “shift in gaze” described before also needs to be embraced by all occupational therapists when they deal with the many practical issues and they encounter in daily practice. Most occupational therapists perform studies that are not funded, and therefore, they need to find time to do research within their busy schedule. I believe that occupational therapists should embrace their identity as therapists and as researchers equally, as there are many commonalities. Table 1 summarizes the commonalities between the steps in research and the steps of systematic occupational therapy evaluation practices. In Table 1, the requirements of research are in the left column and the already acquired skills of occupational therapy clinical practice are in the right column. We see that several commonalities have been identified.

If we shift our gaze and view ourselves as contributors to the evidence, as all authors did in this issue, then we need to think about how we can contribute by gathering data in our daily practice.

Jensen *et al.*<sup>6</sup> offer an alternative to practitioners which they refer to it as practice-based evidence. This method requires systematic data collection in daily practice and helps clinicians understand what is and what is not effective in daily practice. I proposes several methods of systematic data gathering that can be easily incorporated into practice, so we can answer the question: Which one of our daily practices are effective? These methods are as follows: Using standardized tests to collect outcome data, collecting data through single-subject designs (SSD) with or without video recordings, analyzing systematic clinical notes, and using goal attainment scaling (GAS). These methods can be incorporated in daily practice without taking large chunks of time from a busy schedule.

## COLLECTING OUTCOMES THROUGH STANDARDIZED TESTING

Using standardized methods of data collection before and after the intervention is the most popular method of data collection used in large research studies. In practice, therapists can use the same standardized measure with a group of patients’/clients with similar participation issues and then analyze the results of the intervention as a group as well as an individual. There are several

publications in which the authors analyzed results retrospectively and hence contributed to occupational therapy evidence.

## Single Subject Design (SSD)

SSD is the study of a single or a group of patients/clients and has been used extensively in clinical research. It involves repeated and systematic collection of information over a period of time. This method is easier to incorporate into practice because it is used while delivering the intervention. The steps to developing a SSD are systematic and have been used extensively to support the success of behavioral interventions.<sup>7</sup>

Other ways of collecting information in a SSD is through video analysis. In that case, sessions are videotaped over time, and they are analyzed using a coding system. This system has also been used previously in occupational therapy practice.<sup>8</sup>

## Analysis of Treatment Notes

The next method of collecting data that lends itself to occupational therapy practice is a systematic analysis of treatment notes and text mining.<sup>9</sup> In text mining, descriptive treatment notes are analyzed to uncover the day-to-day practices that may impact outcomes. A quantitative analysis of treatment notes can also be done through electronic note-writing programs that target the essential elements of specific frames of reference and hence uncover strategies that lead to successful outcomes.<sup>10</sup>

## Goal Attainment Scales (GAS)

GAS has also been used as a systematic tool both in practice and in clinical research.<sup>11</sup> In GAS, the intervention goals are scaled on a 5-point scale based on the patient/client’s level of performance, with the middle point being where the subject is at the present time. In this method of data gathering, the behaviors and goals need to be clearly described and pre-established to serve as an objective measure of progress.<sup>12</sup>

## CONCLUSION

In conclusion, occupational therapists need to systematically contribute to the existent evidence. In this issue, the authors have done a commendable job of meeting that commitment. They asked questions, chose the methodology, collected and analyzed the data, and contributed to the existent evidence. As occupational therapists, we need to identify the need to “shift our gaze” as Lawlor<sup>3</sup> identified and view our role as contributors to evidence. That means we need to identify the challenges we face in the technical, identity, and practical area. I suggested some routes to including data collecting while we go about our daily endeavors. There are many others, as the contributors to the issue have identified. Let follow their example and find how we can contribute to build knowledge in our field.

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**Table 1:** A Comparison between Clinical Practice and Research

Steps in research	Clinical practice
Identifying the research question	Identifying the participation problems presented by a client/patient
Choose a methodology to answer the question	Choose the best method to gather information about the client/patient (assessment tools)
Generate data	Perform the evaluation
Analyze the results	Analyze the results and generate a hypotheses about the participation problems
Publish the results and make recommendations	Write the report and make recommendations about a plan of action

Based on Imperatore Blanche, 2015

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Issue	Month	Original Articles**	Review Article/ Case Report	Editorial	Guest Editorial	Conference Abstracts	Book Review/ Letter to the Editor <sup>¥</sup>
1	January-March	5	1	1	-	-	1
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3	July-September	5	1	1	-	-	1
4	October-December*	5	1	1	1 <sup>#</sup>	-	-

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# Correlation between Academic Performance and Visual Motor Integration Skills in Children with Learning Disabilities

Suhas S. Bongade<sup>1</sup>, Shailaja S. Jaywant<sup>2</sup>

## Abstract

**Background:** Learning disability is a heterogeneous group of disorders manifested by significant difficulties in acquisition and use of academic abilities. It is prevalently diagnosed in younger school age group. Visual-motor integration (VMI) skill is an important variable to child's academic performance. However, no evidence is available in India on "difficulties in particular academic skill such as language, reading, writing, mathematics, and basic abilities required for academic excellence in that particular academic skill." Knowing the correlation among these two variables is important for focused occupational therapy intervention.

**Objectives:** To find out the correlation between VMI, visual perception (VP) and motor coordination (MC) and academic performance, in children with learning disabilities. To use the study results for focused occupational therapy intervention and references and guidance to other professionals for more academic independence and remediation of these children with learning disabilities.

**Study Design:** Cohort one arm study.

**Method:** Diagnosed as learning disable, 50 children of age 10–15 years, both male and female were included by convenient sampling method after taking informed written consent from parents and informed written assent from all children. Each child was assessed on VMI and learning disabilities checklist (LDC). Age-specific scoring of each subtest of VMI is done as per VMI manual. Scoring of LDC is done by 4-point Likert scale. Data generated are analyzed by using Microsoft Excel and Pearson's correlation coefficient was applied.

**Results:** Academic performance shows a positive correlation with VMI skills of the child, ( $SE > 2$  and  $r < 0.28$ , degree of freedom (df): 48, critical value: 0.28 to  $-0.28$ ). It was evident from VMI raw scores that MC is highly related to writing and language skills. VP skills are positively correlated to reading as well as mathematical abilities of the child with  $P < 0.05$ . Attention has strong influence on the performance of all the subscales of VMI.

**Conclusion:** There is a positive correlation between MC and writing skills also in between VP and mathematical skills in children with learning disabilities. These can be used to plan a focused occupational therapy intervention and appropriate remediation in children with learning disabilities. Further studies are recommended to observe the effect of focused occupational therapy intervention based on these results.

**Key Words:** Academic Skills, Focused Occupational Therapy Intervention, Learning Disabilities, Visual-Motor Integration Skills

## INTRODUCTION

Learning disabilities (LD) are a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, speak, read, and spell or to do mathematical calculations.<sup>1</sup> LD range in severity and afflict 2%–18% of school going children in India.<sup>2,3</sup>

Learning abilities require a good motor, sensory, perceptual, and cognitive abilities. In spite of good intelligence, some children perform poorly in academics and here happens a severe discrepancy between their abilities and actual academic achievements. Visual-motor integration (VMI) skill is an important variable to child's academic performance. Brown, Rodger, and Davis had observed that VMI and visual perceptual problems are often linked to academic difficulties and other school-related task.<sup>4</sup> Emam and Kazem in their research stated poor VMI as an indicator of reading disability.<sup>5</sup> Procedural calculations skills depend on visual perceptual skills, had been found by Dehane in his research.<sup>6</sup> Although these researches show importance of VMI skills in academic performance, no research has been done in India to find out correlation between these two, hence this study was conducted to find out correlation between VMI and academic performance in Indian children, using developmental test of VMI<sup>7</sup> and learning disabilities checklist (LDC)<sup>8</sup> with the objectives to use this study results for focused occupational therapy intervention and for references and guidance to other professionals for academic independence and remediation of these children. Targeted occupational therapy, is a valuable technique in remediation of learning disable children with VMI problem to improve VMI skills, had been inferred in research of Sanghvi and Kelkar.<sup>9</sup>

## Hypothesis

Null hypothesis:  $H_0$ : There is no significant relationship between VMI and academic performance.

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Alternate hypothesis:  $H_a$ : There is a significant relationship between VMI and academic performance.

## METHODS

The study was conducted in occupational therapy department on 50 children with learning disability, both male and female.

### Inclusion criteria

- Diagnosed as learning disable
- Referred from learning disability OPD
- Age 10–15 years.

### Exclusion Criteria

- Associated central nervous system problems and neurological deficits.
- Children with mental retardation.
- Psychiatric dysfunctions such as autism, autism spectrum disorder, pervasive developmental disorder, and attention deficit hyperactivity disorder.
- Speech, hearing, and visually impaired.

Patients referred to occupational therapy dept., satisfying the inclusion criteria after thorough screening using routine examination and those willing to participate are selected after institutional review board approval and from Ethics Committee approval. Written parental consents and assent from each child had taken.

The developmental test of VMI, a standardized test (test-retest reliability reported as 0.87 and inter score reliability reported as 0.94) designed to identify deficits in VMI, visual perception (VP), and motor coordination (MC) is administered on every child and age-specific scoring is calculated as per VMI manual.

LDC got filled from each parent to score for academic performance in eight domains, namely, (1) gross and fine motor skills, (2) language, (3) reading, (4) written language, (5) math, (6) social/emotional, (7) attention, and (8) other.

This checklist is published by National Centre for Learning Disabilities and is a helpful guide and not as a tool to pinpoint specific learning disabilities. Reliability and validity of this questionnaire are not yet calculated or found out. Parents were asked to fill the age-appropriate questions which are shaded in LDC as per their child's academic grade. These eight domains of LDC consisted of minimum eight to maximum 17 questions per domain, which gave clear-cut idea of child's performance in major academic subjects. No other checklist was found available for analyzing child's skills in various domains. As this questionnaire covered maximum skills, this particular questionnaire was used for finding out academic performance of the child. Scoring was established for understanding severity of problems in acquiring academic skills. For this LDC was converted in 4 point Likert scale, where 1: Mild difficulty (0%–25%), 2: Moderate difficulty (26%–50%), 3: Severe difficulty (51%–75%), and 4: Extreme difficulty (76%–100%). Parents reported it as easy to understand and score. Further, the scores were compiled by dividing these children into different groups as per age. Percentage of difference

was found out in respective age group later this was compared with age-appropriate score of VMI.

## RESULTS

Data were generated by calculating the scores in VMI scales and LDC checklist. Descriptive statistics including mean, standard error mean, “t” and “P” value were computed on the basis of performance of children on VMI and LDC and then it was analyzed using Microsoft Excel and Pearson's correlation coefficient was applied (Table 1).

It shows disproportionate combination of male and female included in the study as per their referral from learning disability OPD. Out of 50 referred patients 82% were male and only 18% were female (Table 2).

All the three components of VMI scale, i.e., VMI, VP, and MC show significant positive correlation with academic performance with  $SE > 2$ , and  $P < 0.05$ . Highly significant positive correlation has been found in VP and academic performance with  $P < 0.008$ . For df: 48, critical value (CV): 0.28 to –0.28 so for  $n = 50$ , if  $r > 0.28$ , it is significant as  $P < 0.05$ .<sup>10,11</sup>

In further study correlation of VMI, VP, and MC with eight domains of academic performance comprised in LDC had been found out (Table 3a).

It reveals a significant positive correlation between VMI and language, writing and attention ( $SE > 2$ ). VMI tests the ability of the child to copy the geometric forms which go from simple to complex,<sup>7</sup> which requires good attention skills to perform better. Attention show significant positive correlation  $P < 0.01$  along with language and writing, CV: 0.28 to –0.28. In clinical practice, it has been always noted that children having good attention do better in VMI performance (Table 3b).

**Table 1:** Demographic Data Showing Age and Sex Distribution of Study Population

Age	Female	Male	Total
10	3	12	15
11	3	5	8
12		10	10
13	1	6	7
14	1	6	7
15	1	2	3
Grand total	9	41	50

**Table 2:** Correlation between Visual Motor Integration Scale and Academic Performance

Statistical measure	VMI/academic performance	VP/academic performance	MC/academic performance
r	0.42	0.43	0.29
SE	2.982	3.053	2.059
P	0.0014	0.008	0.0197

Standard error  $SE > 2$ ,  $P < 0.05$ , df: 48 CV: 0.28 to –0.28. For  $n = 50$ , if correlation coefficient  $r > 0.28$ , it is significant as  $P < 0.05$

It identifies a positive correlation between VP and language, reading, writing, math, and attention, with  $SE > 2$  and  $P < 0.05$  and CV: 0.28 to  $-0.28$  (Table 3c).

Table 3 summarizes significant correlation between MC and language ( $r = -0.28$ ) writing ( $r = -0.39$ ) as well as attention ( $r = -0.50$ ). For df: 48, CV: 0.28 to  $-0.28$ , so for  $n = 50$ , if  $r > 0.28$ , it is significant as  $P < 0.05$ .<sup>10,11</sup>

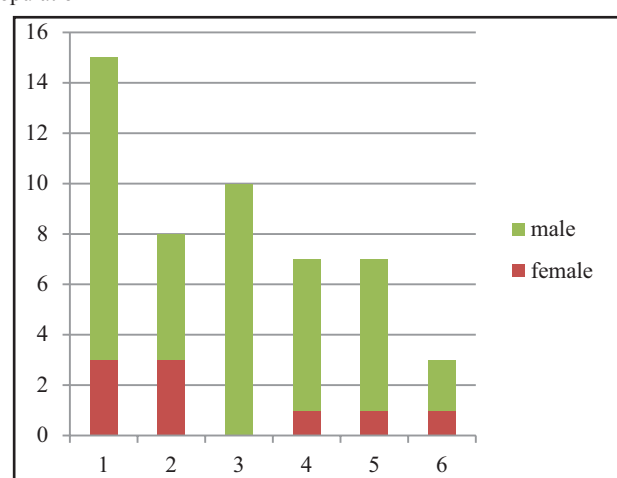
No positive correlation has been found in other domains and MC scale of VMI.

## DISCUSSION

More number of male than female children (Graph 1) is may be due to referral bias which is explicated by Douglas Haddad and Cunningham in their studies which reveal that, boys demonstrate other apparent behavior such as hyperactivity, impulsivity, and disruptive behavior due to struggled academics than girls and thus are more likely to refer to special education as compared to girls.<sup>12,13</sup> Vogas has critically suggested that LD report must be interpreted cautiously because LD samples are drawn from system identified population and may reflect selection bias.<sup>14</sup> Academic performance rely on language and reading abilities, writing speed and legibility, mathematical abilities, etc. In the study by Brown *et al.* it had been observed that difficulties in number of school-related task including handwriting, spelling, mathematics, self-care, participation in play, recreation, and or leisure activities are linked to problems related to VMI and VP.<sup>4</sup> Many researchers have shown correlation of VMI with different abilities which are prerequisite for success in academics. Sortor and Kulp analyzed relationship between performance on VMI and teachers rating on academic achievements with respect to reading, writing, and math abilities and found out the performance of visual analysis and visual motor task is significantly related to academic performance in kindergarten

through third grade.<sup>15</sup> Children spend 30%–60% of school day into writing and fine motor task and difficulty in these areas can interfere with academic achievement. Writing ability and legibility are considered as an essential ingredient for academic success. Feder has stated, VMI and VP as important components related to handwriting along with fine motor control, kinesthesia, sensory modalities, and sustained attention.<sup>16</sup> Emam and Kazem in their research on 171 reading disable pupils in Oman stated that poor VMI is good indicator of diagnosis of reading disability - essential component in academic success.<sup>5</sup> Same result of relationship between basic reading literacy and student's academic success has been also found by Espin and Deno their study on 121 10<sup>th</sup> grade students in midwestern community.<sup>17</sup> Since VMI and academic performance are showing significant positive correlation, (Graph 2) it can be concluded that VMI skills are necessary to improve academic performance. Tseng and Murry analyzed the effect of VMI skills on slow hand writers and normal speed hand writers and they found VMI as a significant predictor

**Graph 1:** Demographic Data Showing Age and Sex Distribution of Study Population



**Table 3a:** Correlation of VMI with Domains of Learning Disability Checklist

Statistical measures	VMI/gross fine motor skills	VMI/language	VMI/reading	VMI/writing	VMI/math	VMI/social, emotional	VMI/attention	VMI/other
r	0.08	0.43	0.15	0.28	0.12	0.37	0.37	0.34
SE	0.568	3.053	1.065	1.988	0.852	2.627	2.627	2.412
P	0.29	0.001	0.14	0.02	0.20	0.01	0.01	0.01

$SE > 2$ ,  $P < 0.05$ , df: 48 CV: 0.28 to  $-0.28$ . For  $n = 50$ , if  $r > 0.28$ , it is significant as  $P < 0.05$ . VMI: Visual Motor Integration

**Table 3b:** Correlation of VP with Domains of Learning Disability Checklist

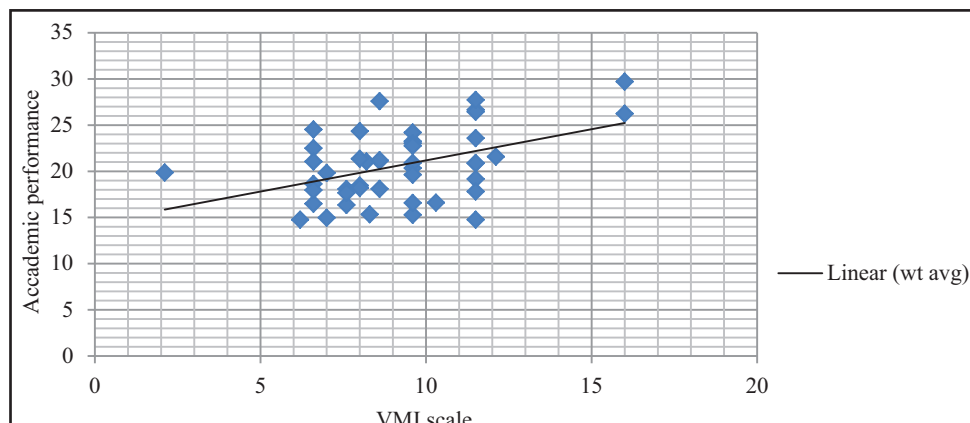
Statistical measures	VP/gross fine motor skills	VP/language	VP/reading	VP/writing	VP/math	VP/social, emotional	VP/attention	VP/other
r	0.11	0.31	0.36	0.47	0.28	0.17	0.34	0.3
SE	0.781	2.201	2.556	3.337	1.988	1.207	2.414	2.13
P	0.22	0.01	0.01	0.0001	0.02	0.11	0.01	0.02

$SE > 2$ ,  $P < 0.05$ , df: 48 CV: 0.28 to  $-0.28$ . For  $n = 50$ , if  $r > 0.28$ , it is significant as  $P < 0.05$ . VP: Visual Perception

**Table 3c:** Correlation of MC with Domains of Learning Disability Checklist

Statistical measures	MC/gross fine motor skills	MC/language	MC/reading	MC/writing	MC/math	MC/social, emotional	MC/attention	MC/other
r	0.01	0.28	0.01	0.39	0.03	0.21	0.50	0.2
SE	0.071	1.988	0.071	2.769	0.213	1.491	3.55	1.42
P	0.47	0.02	0.47	0.00	0.42	0.08	0.001	0.08

$SE > 2$ ,  $P < 0.05$ , df: 48 CV: 0.28 to  $-0.28$ . For  $n = 50$ , if  $r > 0.28$ , it is significant as  $P < 0.05$ . MC: Motor Coordination

**Graph 2:** Correlation between Visual Motor Integration Scale and Academic Performance

for slow handwriting and documented a strong correlation between VMI and writing legibility.<sup>18</sup> A significant correlation has been also found between quality of handwriting and all items composing the VMI by Marie-Laure Kaiser. This research also stated that VMI should be considered as a whole while considering the quality of handwriting.<sup>19</sup> Significant positive correlation between VMI and language has been also reflected in this study. Although no previous evidence has been found out for this correlation, it can be stated that as VMI and writing have positive correlation, writing may motivate and promote language skills of the child. Significant difference between VMI and reading and math achievements in children from second through 4<sup>th</sup> grade is shown in a study by Sortor and Kulp. He had recommended that assessment of visual perceptual abilities in children with poor reading and math attainment is necessary to analyze underlying problem leading to poor academics.<sup>20</sup> Dehaene *et al.* had also found the significant relation of visual perceptual skills to procedural calculations but not to number fact retrieval. Hence, it should be noted that procedural calculations is not a part of semantic memory but is a VP skills. This study inferred that VP is needed for calculation such as borrowing and carrying whereas it is no longer involved in the retrieval of a number from semantic memory.<sup>6</sup> Pieters *et al.* and Jongmans *et al.* had found that more problems with VMI and VP significantly lead to mathematical learning disability and decrease the academic performance.<sup>21,22</sup> Similar results had been found by Vilenius-Tuohimaa *et al.* in their study of 4<sup>th</sup> grade students. They found that better the students' reading comprehension skills better the performance on mathematical word problems and better academic performance.<sup>23</sup> Recent studies specifically focusing on reading and science proficiency by Cromley on secondary students from different countries show a very high correlation between reading comprehension and science proficiency. Thus, good VP skills play an important role in math as well as science excellence and turn essential for academic success.<sup>24</sup> Tseng and Murry stated that poor coordination or inadequate fine motor skills are related to slow handwriting speed. He has concluded that for quality and speed of handwriting fine motor training should be emphasized. Significant difference was also found between slow and normal hand writers in VMI, MC, and visual perceptual skills and sustained attention.<sup>25</sup> This study also reveals a positive correlation

between subtest of VMI scale and attention. It has been reported by many researchers that attention skills predict reading and math achievements. Inadequate attention span leads to poor handwriting proficiency. Tseng and Murry, Duncan *et al.* all explains that for children to remain engaged in academic endeavors and learning activities for longer time attention skills are mandatory.<sup>25</sup> Inadequate attention span has also been clinically observed to impair handwriting. Sandler *et al.* found that attention difficulties lead to writing disorder and lower mathematical achievements.<sup>26</sup>

## CONCLUSION

Study results show positive correlation in between academic performance and VMI skills. While analyzing different domains in academic performance, VMI has shown strong positive correlation with writing, language, and attention. It can be concluded that VP plays very significant role in academic performance as it has shown strong positive correlation with language, reading, writing, mathematical abilities, and attention. MC has a lot of correlation with writing skills, but it did not show much correlation with reading, language or mathematical skills. Social and emotional factors have shown no significant correlated to academic performance. Hence, it can be concluded that academic performance depends on the VMI skills of the individual and attention should be paid toward developing these skills for improving academic performance. It is recommended that further study should be carried on a larger group, separate age ranges and performance group as per gender should be considered. Study results seem to be helpful to provide focused intervention on targeted areas and can be beneficial for the students to overcome the lacunas during school education and to prevent further declination in children's performance and also for early IEPs. Furthermore, results will also help for suggesting the schools about adaptations and accommodations needed for better academic performance. This study will be helpful to give references and guidance to other professional for more academic independence and remediation of these children. This will have a better impact on improving the functional performance in children with learning disabilities. Small sample size, wider age group, subjectivity of the scale and complexities of the factors responsible for learning disability, these factors can be counted as limitations of the study.



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# Effectiveness of Sensory Integration Therapy for Language Development in Children with Cochlear Implant: A Pilot Study

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## Abstract

**Background:** Sensory processing disorder (SPD) is known to occur in diverse populations, including children with hearing loss and cochlear implants (CI). However, it is still unclear, and no systematic investigation was done to find out whether SPD is associated with hearing impairment and CI.

**Objectives:** Therefore, the aim of the study was to find the prevalence of SPD in children with CI and evaluate the efficacy of sensory integration therapy for developing language in children with CI.

**Study Design:** Cross sectional survey and quasi-experimental pre-post design

**Methods:** A cross-sectional survey and quasi-experimental pre- post-test design were adopted for the study and consisted of 2 phases. In phase 1, 100 children with CI were surveyed to find out the prevalence of SPD. In phase 2 of the study effectiveness of sensory integration therapy on language development was investigated on 40 children with CI having SPD. The baseline and post-test measurement was done using an integrated scale of development. The control group underwent conventional OT and speech therapy and experimental group underwent SIT and speech therapy for a total of 50 sessions, 45 min per session, for 10 weeks.

**Results:** The findings revealed atypical performance in 29% of children, of which 19% showed probable difference and 13% showed definite difference on the short sensory profile. In phase 2, the experimental group showed a significant difference in expressive language and in receptive language ( $P < 0.05$ ).

**Conclusion:** The study concluded that children with CI have sensory processing problems. Sensory integration therapy is not only effective in language development but also in other developmental components, in children with CI.

**Key Words:** Cochlear Implant, Hearing Impairment, Sensory Integration Therapy, Expressive, Receptive Language

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## Period of Study

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## INTRODUCTION

In India, 63 million people (6.3%) suffer from significant hearing loss. The National Sample Survey, 58<sup>th</sup> round (2002) surveyed disability in Indian households and found that hearing disability was the 2<sup>nd</sup> most common cause of disability and topmost cause of sensory deficit. According to the WHO global estimates, the prevalence of hearing loss in adult is 91% and children is 9%, out of which 56% of male and 44% of females are affected with hearing loss.<sup>1</sup>

Children with profound sensorineural hearing loss (SNHL) are at significant risk for serious speech and language delays that can impact their communication, academic, and social development, economic and educational backwardness, social isolation, and stigmatization. However, hearing impaired children have also a higher risk for motor and more specifically vestibular problem.<sup>2,3</sup> When the cochlea suffers damage, so does the vestibular system because it works together with the cochlea to process sensations of sound and movement.<sup>2</sup> The vestibular system affects auditory-language processing and is in some way dependent on subcortical sensory integration. One of the treatments for profound hearing loss is the cochlear implant (CI) that allows people with the severe SNHL to perceive sound. CI's have become an option at a younger age for profound hearing loss. The process of inserting electrode into cochlea can impair vestibular receptor integrity.<sup>4</sup>

Rhoades and Chisolm<sup>5</sup> reported that 78% of the children with hearing loss had sensory processing difficulties. The data also showed that atypical behaviors were present in all domains but were most prevalent in auditory and vestibular processing, followed by oral and tactile processing, and least prevalent in visual processing.

To date, there has been no systematic investigation examining whether sensory processing disorder (SPD) is present in people with hearing impairment, who are fitted with unilateral or bilateral CI device. Even though studies have been done earlier, they used a very small sample size (30 children –from North Texas). Studies exploring sensory integration therapy as an intervention for children with CI have not been investigated much.

However, emerging research suggests that sensory integrative challenges - in particular, differences in vestibular functions - may be common in children who receive CIs.<sup>6,7</sup> Therefore, exploration of

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sensory integrative pattern including skills related to vestibular function and in children with CI is warranted.

Thus, the researcher wanted to investigate the prevalence of sensory processing disorder in children with CI. Second, to find out the effectiveness of sensory integration therapy for developing language in children with CI.

## METHODS

### Research Design

A cross-sectional survey and quasi-experimental pre post-test design were adopted for the study. The study consisted of 2 phases, in Phase 1 a survey was done to find out the prevalence of SPD among children with CI. Phase 2 included study of the effectiveness of sensory integration therapy on language development using a control group design.

### Ethical Consideration

Approval to conduct the study was obtained from the Institutional Review Board. Second, a formal consent was obtained from the authorities' of the ENT hospital, Hearing aid center and parents of the children who participated in the research study as per the declaration of the Helsinki guidelines.

### Phase 1 - Survey Study

Study participants were 100 children with hearing deficit and delay in language development, with CI. Both boys (57) and girls (43) between 3 and 10 years with a mean age of  $5.28 \pm 1.68$  years were included in the study. Children who had complications after surgery suspected to have autism spectrum disorders, blindness, and other developmental disorders were excluded from the study. Sample size was estimated based on evidence from previous studies.<sup>5,6</sup> Convenient sampling method was used to select the sample based on criteria.

### Tools used

#### Short sensory profile

Short sensory profile was used to measure the responses of children to sensory events in their daily life. It is a screening tool which identifies if a child has sensory processing issues.<sup>7</sup>

### Procedure

The occupational therapist completed the short sensory profile questionnaire along with the parent as most of them were illiterate. The collected data were then subjected to statistical analysis.

### Phase 2 - Effectiveness of SIT on Language Development in Children with CI

Study participants were 40 children with hearing deficit, delay in language development, who had undergone CI and having sensory processing disorder (SPD) of probable (29-27) and definite difference on the Short sensory profile.

The participants were randomly allotted to experimental ( $n = 20$ ) and control group ( $n = 20$ ). The experimental group

included children between 3 and 10 years of age, with a mean age of  $4.57 \pm 1.47$  years and a CI mean age of  $3.72 \pm 1.35$  years, of whom 11 were boys and 9 were girls.

The control group consisted of 20 children with CI of whom were 16 boys and 4 girls, with a mean age of  $5.52 \pm 1.28$  and a CI mean age of  $3.63 \pm 1.26$  years children who had complications after surgery, suspected to have autism spectrum disorders, blindness, and other developmental disorders were excluded from the study. Sample size was estimated based on evidence from the previous studies.<sup>6,7</sup>

### Tools, equipments, and outcome measures

Integrated scale of development measures domains of listening, receptive and expressive language, speech, cognition, and social communication according to the age of the child. Raw scores based on age were added to give the final score for a component.<sup>8</sup>

### Procedure

Need and purpose of the study were explained to the parents of the children, and informed consent was obtained to ensure confidentiality. The pre-test and post-test were done using integrated scales of development for both control and experimental group.

### Intervention for control group

The 20 children in control group underwent regular speech therapy<sup>9</sup> and conventional occupational therapy for 45 min, 5 days a week, for a period of 10 weeks. The conventional OT included basic cognitive perceptual, gross and fine motor skills and self-care training. After completion of the therapy session, the caregiver was briefed about the session. They were informed about both positive and negative behaviors that the child showed during the session. The parents were given a list of activities as home program.

### Intervention for experimental group

The 20 children in experimental group underwent sensory integration therapy and speech therapy for 45 min/day, 5 days a week for 10 weeks.

The treatment protocol was individualized as per the child's capabilities and disorders based on the short sensory profile. Each session of therapy followed fidelity guidelines (this means that each session uses a standardized method of delivering Ayres sensory integration).<sup>10</sup> Opportunity for sensory experiences of vestibular (fast/slow and sudden changes in movement on different types of swing, therapy ball, proprioceptive, and tactile activities of the just right challenge were given to children). After completion of the therapy session, the caregiver was briefed about the session. They were informed about both positive and negative behaviors that the child showed during the session. A list of activities to be done at home to meet the child's sensory needs was given to the parents. Parents were taught to monitor child's alertness level and strategies for self-regulation.

## Data Analysis

The scores of experimental and control group were subjected to statistical analysis using IBM® SPSS software Version 20. Descriptive statistics were used to find out the mean, SD, and percentage of prevalence. Mean difference was calculated by subtracting the post-test mean values from the pre-test mean values to find out the effectiveness of therapy. Effect size was calculated by dividing the mean change in score by the SD of baseline scores in children who had received an intervention and were expected to change. Effect size was interpreted according to criteria set by Cohen's *d*. An effect size of 0.2–0.49 was interpreted as small, 0.50–0.79 as moderate and 0.80 or greater as large.

Non parametric test: Wilcoxon signed rank test was used for the within-group comparison. Mann–Whitney *U*-test was used for the comparison between groups.  $P < 0.05$  was taken as statistical significance.

## RESULTS

Phase 1: The findings of Phase 1 of the study revealed the presence of SPD in 29% of children with CI. Among these 19% showed probable difference and 13% showed the definite difference on the short sensory profile. Graph 1a the data in the present study also showed that atypical behaviors were present in all domains but were most prevalent in auditory filtering (45%), tactile sensitivity (29%) and movement sensitivity (25%) followed by under-responsive and seek sensation (21%) and least prevalent in low energy (8%), taste and smell (8%), and visual and auditory (8%) Graph 1b.

Phase 2: The result of Phase 2 showed that there was no significant difference in the pre-test scores of the integrated scale of development between the groups except in audition and receptive components this could be because both the groups were already undergoing speech therapy before intervention. On post-test when compared between the groups the pragmatics component was found to be significant ( $U = 47$ ,  $P < 0.05$ ) which indicates that SIT helped the experimental group to improve in social communication skills. But on comparing the mean values of speech were 19.3 and 21.88 and in expressive language 19.45 and 21.55 in the control and experimental group, respectively. This shows that the experimental group improved in speech and expressive language following SIT, and speech therapy Table 1.

Further, in the control group, there was a significant difference from pre-test to post-test in all components of the integrated scale of development, except in pragmatics. The mean difference shows that there was more improvement in the expressive language (6.25) component this shows that the speech therapy sessions helped in improving these components though there was not much improvement in the social communication component (0.75) as they had not undergone SIT Table 2.

Whereas the experimental group showed a significant difference ( $P \leq 0.05$ ) in all the components of the integrated scale of development from pre-intervention to post-intervention which proves that SIT along with auditory and speech therapy brought about a change in all areas of development Table 3.

There was a moderate effect size in audition (0.6), cognition and pragmatics and large effect size in receptive language, expressive language and speech for the experimental group. Whereas control group showed small effect size in audition and cognition, moderate effect size in receptive language, expressive language, speech, and pragmatic Table 2.

## DISCUSSION

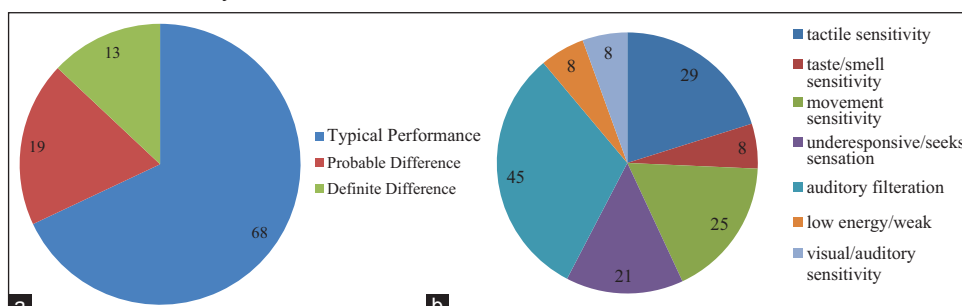
### Prevalence of SPD in Children with CI

This study sought to investigate whether SPD is prevalent in children with CI. The findings of our study revealed the presence of SPD in 29% of children with CI. Among these 19% showed probable difference and 13% showed definite difference on the short sensory profile. These findings are in contrast with the study of Bharadwaj *et al.* wherein they found that 70% of children had some sort of SPD on the short sensory profile, this could be because the data were taken from a single center.<sup>5</sup>

The data in the present study also showed that atypical behaviors were present in all domains but were most prevalent in auditory filtering (45%), tactile sensitivity (29%) and movement sensitivity (25%) followed by under-responsive and seek sensation (21%) and least prevalent in low energy (8%), taste and smell (8%), and visual and auditory (8%). These findings are consistent with the study of Koester *et al.*<sup>7</sup>

Previous studies have shown that children with hearing loss may also experience vestibular dysfunction.<sup>2</sup> The results of

**Graph 1:** (a) Percentage Prevalence of Sensory Processing Disorder in Children with Cochlear Implants on the Short Sensory Profile. (b) Percentage of Distribution of Children in Each Domain of Short Sensory Profile



present study are also consistent with these findings wherein out of 100 children with CI who were tested with SSP, 25 children showed a dysfunction in movement sensitivity. This finding tends to reflect hyperresponsiveness to vestibular sensation because children with CI seem to show signs of poor vestibular processing versus heightened reactivity to movement, the questions on the SSP are not likely to capture the type of vestibular dysfunction children with CI experience. Selz and colleagues suggested that etiological factors responsible for hearing loss may also affect the vestibular system, given the proximity of the cochlea, to the vestibular end organ.<sup>11</sup>

The fact that the large subset of children was classified as having probable and definite difference in the domain of tactile sensitivity is supported by Jean Ayres statement that the vestibular, proprioceptive, and tactile system are highlighted as the precursors to the development of the auditory and visual system. Further, it was noted that small subset of children actually showed the least involvement of taste/smell, low energy/weak, and visual/auditory processing. This might suggest that people with hearing impairment have to monitor the environment by enhanced recruitment of multimodal areas of the cortex.

### Effectiveness of Sensory Integration therapy on Speech and language in children with CI

On investigating the effect of SIT at baseline there was no significant difference on the pre-test scores of the integrated scale of development between the groups, except in audition and receptive components, therefore, both the components were not comparable. However, on post-test, it was found that the experimental group had a higher mean value in the above 2

components than the control group, thereby indicating that SI therapy played a role in improving the audition and receptive skills post-intervention.

In this study, there was an improvement in the pragmatics component (in social communication skills) in the experimental rather than in the control group ( $U=47$ ,  $P < 0.05$ ). These findings are consistent with the study conducted by Megha, Pooja, wherein they found that sensory integration therapy had an effect on social and self-care skills in children with Autism.<sup>12</sup> But on comparing the mean values the experimental group, improved more in the areas of speech ( $x = 21.88$ ) and expressive language ( $x = 21.55$ ) following SIT, auditory and speech therapy Table 1.<sup>9,10</sup>

Post-intervention the control group had improved in all components of the integrated scale of development, except in pragmatics. The mean difference shows that the control group improved in the expressive language component indicating that the auditory and speech therapy sessions helped in improving these components.<sup>9</sup> However, there was not much improvement in the social communication component as they had not undergone SIT. SIT postulates that on controlled sensory input the children show adaptive responses. In the current study social communication improved since as part of therapy the children had to maintain eye contact, interact with the therapist, demonstrate smile response, and turn taking during SIT sessions.

In the experimental group (Table 2) highest change was noted in the receptive language followed by expressive language and speech. The least change was noted in the audition component. This could

**Table 1:** Comparison of All Components of Integrated Scale of Development between the Groups on Pre- and Post-Test

Test	Outcome measure	Group	N	Mean	U score	Significant (two-tailed)
Pre-test	Audition	Control	20	24.85	113.000	0.017*
		Experimental	20	16.15		
	Receptive	Control	20	24.35	123.000	0.036*
		Experimental	20	16.65		
	Expressive	Control	20	23.55	139.000	0.096
		Experimental	20	17.45		
	Speech	Control	20	23.48	140.500	0.102
		Experimental	20	17.53		
	Cognition	Control	20	20.05	149.000	0.165
		Experimental	20	17.95		
	Pragmatics	Control	20	17.35	137.000	0.084
		Experimental	20	23.65		
Post-test	Audition (listening)	Control	20	22.08	168.500	0.389
		Experimental	20	18.93		
	Receptive language	Control	20	20.60	198.000	0.956
		Experimental	20	20.40		
	Expressive language	Control	20	19.45	179.000	0.565
		Experimental	20	21.55		
	Speech	Control	20	19.13	172.500	0.455
		Experimental	20	21.88		
	Cognition	Control	20	20.08	191.500	0.818
		Experimental	20	20.93		
	Pragmatics (social communication)	Control	20	12.85	47.000	0.000***
		Experimental	20	28.15		

\*Significance at less than 0.05, \*\*\*Significance at less than 0.001



be because the children in this group showed more problem in the auditory filtering and thereby did not develop much of listening skills (auditory awareness, listen accurately, response to sound by smile or head turning, and listening to own voice). The findings of the present study are consistent with the findings of the study conducted by Jean Ayres and Zoe Mailloux, that there was a rate of language growth before and after starting occupational therapy.<sup>13</sup> The children demonstrated notable gains on expressive language measures. Their findings also suggest a definite relationship between expressive language development and vestibular processing which takes place during sensory integrative therapy.<sup>14</sup> Similarly, in this study, the control group children showed the highest gain in expressive language. Michael *et al.*<sup>15</sup> found an increase in spontaneous verbal language use for mentally deficient and five developmentally retarded preschoolers immediately after the vestibular stimulation periods, and suggest vestibular stimulation as an effective nonverbal intervention method for the facilitation of spontaneous language. Therefore, this suggests that sensory integration has an effect on language development.

Scott *et al.* in their study on sensory pattern contribution to developmental performance in children with the autism spectrum disorder have suggested that sensory processing patterns are strongly related to preschool-age children receptive and expressive language abilities<sup>16</sup> specifically, we found that children with high scores in low energy/weak and auditory/visual sensitivity showed

an increase in receptive and expressive language skills conversely, children who showed more difference in hyporesponsivity and taste/smell sensitivity demonstrated a decrease in language skills. Interestingly, sensory seeking/distractibility significantly contributed to receptive, not expressive language skills.

Both the groups also showed an improvement in the cognitive domain, i.e., in areas of awareness, looking at objects, imitation of action, and symbolic play and basic concepts had improved.

In this study, the mean difference of the experimental group, the percentage of improvement and the significant difference in the post-test scores of the integrated scale of development can be considered as an evidence that the sensory integration therapy is effective for language development. This is further substantiated by the considerable increase in effect size in experimental group when compared with control group in receptive language, expressive language, and speech (large effect size). In control group, there was a small increase in effect size in audition and cognition and a moderate increase in receptive language, expressive language, speech, and pragmatic skills.

## CONCLUSION

The study concluded that children with CI have sensory processing difficulties. Sensory integration therapy is not only effective in language development but also in other

**Table 2:** Comparison of Mean Difference and Effect Size on Integrated Scale of Development in the Control and Experimental Group

Components	Control group			Experimental group		
	Mean±SD	Mean difference	Effect size	Mean±SD	Mean difference	Effect size
Audition pre	20.90±5.20	3.6	0.6	14.50±12.11	9.15	0.7
Audition post score	24.50±6.06			23.65±12.10		
Receptive language pre score	37.50±16.03	5.1	0.3	26.75±15.70	15.65	0.9
Receptive language post score	42.60±16.75			42.40±16.03		
Expressive language pre score	26.25±13.08	6.25	0.4	19.60±14.97	14.9	1
Expressive language post score	32.50±12.87			34.50±14.76		
Speech pre	24.00±12.83	5	0.3	17.05±12.75	13.95	1.0
Speech post	29.00±12.73			31.00±13.11		
Cognition pre score	52.95±19.05	3.7	0.1	44.85±20.34	13.7	0.6
Cognition post	56.65±16.78			58.55±16.39151		
Pragmatics pre score	33.55±12.39	0.75	0.06	41.55±16.60525	13.15	0.7
Pragmatics post score	34.30±11.98			54.70±13.93632		

SD: Standard Deviation

**Table 3:** Comparison of Pre- and Post-Test Scores of Integrated Scale of Development in the Experimental Group

Integrated scale	Test	N	Mean	Mean difference	SD	Z score	Significant (two-tailed)
Audition	Pre	20	14.5000	9.15	12.11133	-3.931	0.000*
	Post	20	23.6500		12.10600		
Receptive language	Pre	20	26.7500	15.65	15.70074	-3.928	0.000*
	Post	20	42.4000		16.03089		
Expressive language	Pre	20	19.6000	14.9	14.97155	-3.923	0.000*
	Post	20	34.5000		14.76304		
Speech	Pre	20	17.0500	13.95	12.75467	-3.926	0.000*
	Post	20	31.0000		13.11889		
Cognition	Pre	20	44.8500	13.7	20.34253	-3.828	0.000*
	Post	20	58.5500		16.39151		
Pragmatics	Pre	20	41.5500	13.15	16.60525	-3.830	0.000*
	Post	20	54.7000		13.93632		

SD: Standard Deviation, \*Significance at less than 0.001 level



developmental components, in children with CI. Thus, referral of children with CI to an occupational therapist can be considered. Occupational therapy practitioners working with children with CIs should consider evaluating sensory integration dysfunction in the assessment process. Practitioners should consider over- or under-responsiveness to various types of sensation during the assessment, because these issues may be present in some children with CI.

### Study Limitations and Further Research

The study had certain limitations, i.e., to select a better-matched sample in terms of domains of development and sensory processing. CI age was not taken into consideration use of scales which would also include motor components rather than only speech, cognition, and pragmatics. Future studies are needed to evaluate the types of sensory-processing issues in a large sample of children with CI. Exploring the relationship between CI and SPD. VPBIS pattern of sensory integration dysfunction. To use sensory profile (long form) as an outcome measure and to conduct intervention studies.

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# Preoccupations to Occupations: Bridging the Gap in Toddlers and Preschoolers with Autism Spectrum Disorders

Aishwarya Swaminathan

## Abstract

**Background:** Toddlers and preschoolers with ASD have difficulty in participating in age-appropriate occupations due to preoccupations caused by core symptoms of the condition, sensory integration dysfunction, and lack of joint attentional skills.

**Objectives:** The aim of the study is to understand the role of occupational therapy (OT) along with joint attentional training (JAT) in reducing preoccupations and facilitating participation in age-appropriate occupations among toddlers and preschoolers with ASD.

**Study Design:** This was a randomized control study.

**Methods:** Thirty subjects diagnosed with ASD as per DSM-V, age range 2–5 years, were randomly allotted to two groups using lottery method - control group - conventional OT and experimental group - conventional OT plus JAT. Fifteen subjects were allotted to each group. Intervention was provided for 6 months. Subjects were assessed using observational coding system as well as repetitive behaviors scale - early childhood (RBS-EC), revised Knox preschool play scale (RKPPS), and Canadian occupational performance measure (COPM).

**Results:** Observational coding and scores of RBS-EC showed a reduction in preoccupations, and scores of COPM and RKPPS showed improvement in participation in occupations like activities of daily living, work (preschool activities) and play. Statistical analysis showed significant improvement post-intervention in both the groups (paired *t*-test,  $P < 0.05$ ), and the experimental group showed more improvement than control group (unpaired *t*-test,  $P < 0.05$ ).

**Conclusion:** OT along with JAT played an important role in a reduction of preoccupations and improving participation of age-appropriate occupations in toddlers and preschoolers with ASD. Specific joint attentional assessment and intervention methods should be used along with OT for better outcomes in toddlers and preschoolers with ASD.

**Key Words:** Autism Spectrum Disorder, Joint Attentional Training, Occupational Therapy, Preschoolers, Toddlers

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## INTRODUCTION

The diagnostic and statistical manual of mental disorders (DSM V), diagnostic criteria lists preoccupations as a core symptom of ASD.<sup>1</sup> These preoccupations are caused due to underlying issues such as sensory integration dysfunction and lack of joint attentional skills, which most often, interfere with the participation in occupations,<sup>2</sup> in individuals with ASD across all ages including individuals in toddler and preschool age. Although the role of conventional occupational therapy (OT) using sensory integration and other frames of references (FORs) has been researched extensively in early intervention (EI) of toddlers and preschoolers with ASD, its role in working on joint attentional skills needs more research and so does its role in bridging the gap between preoccupations and occupations.<sup>3</sup> Therefore, the aim of this study is to compare the role of OT and OT with specific joint attentional training (JAT) in reducing preoccupations and facilitating participation in age-appropriate occupations among toddlers and preschoolers with ASD.

## METHODS

### Study Design

This was a randomized control study.

### Participants

The inclusion criteria were (1) The diagnosis of childhood autism according to DSM V and age range of 2–5 years, (2) children with preoccupations as per parent reports as well as definite or probable difference as per scores of infant toddler sensory profile and sensory profile and any repetitive behaviors from any of the four subscales, repetitive motor, self-directed, restricted interests, and ritual and routines as per repetitive behavior scale-early childhood (RBS-EC) with composite raw score cutoff above 50 and cutoff <5 on autism mental scale examination. Exclusion criteria were prematurity >6 weeks or other comorbid developmental disabilities such as down syndrome. Written informed consent was obtained from the parents of the subjects, and the study was conducted as per the “Declaration of Helsinki” guidelines.

## Study Procedure

Thirty subjects (24 boys and 6 girls) were selected as per the inclusion criteria. The subjects were randomly allotted to two groups using lottery method: Control group (C) - conventional OT and experimental group (E) - conventional OT plus joint attentional training OT-JAT. Fifteen subjects were allotted to each group. The subjects, their mothers, and preschool teachers were blinded as to which group the subjects were allotted to.

## Assessment

Subjects' demographics were collected, history was obtained from mother and preschool teachers, general OT evaluation was done, and the assessment was done using RBS-EC, Canadian occupational performance measure (COPM), and revised Knox preschool play scale (RKPPS).

## Intervention

The intervention was provided for 6 months, 45 min each session, 3 times a week (two individual and one group session) using standard EI program. Mother and preschool teacher training was an important part of the intervention program.

## Control Group (C)

Conventional OT: Considering the toddler and preschool age group sensorimotor exploration and play based activities were provided, and gradation of the activities was done over the 6 months of intervention. Use of various FORs was done: (i) Sensory integration FOR: The activities were provided for tactile, vestibular and proprioceptive stimulation, interspersed between structure and freedom. Play-based and child directed activities were provided following the fidelity guidelines.<sup>4</sup> Sensory diet home program was also provided to the mothers (ii) Cognitive perceptual FOR: Learning -based activities and games were provided. (iii) Psychosocial FOR Group therapy activities were provided with three subjects in a group. Positive behavioral supports were also provided. (iv) Rehabilitative FOR Visual schedules for daily routines was provided. Preschool activity training included circle time and tabletop activities to facilitate play exploration and participation skills. Preschool teachers were taught strategies to reduce subjects' preoccupations and facilitate occupations, i.e., preschool activities through consultation, telephonic conversation, and exchange of notes.

## Experimental Group (E)

Conventional OT plus JAT: The JAT program was based on joint attention mediated learning intervention (JAML) which used various mediated learning principles such as focus, organization/planning, encouragement, giving meaning and expanding to facilitate joint attentional skills, i.e., focusing on faces (FF), turn taking (TT), response to joint attention (RJA), and initiation of joint attention (IJA). The activities were used from the study by Schertz *et al.*<sup>5</sup>

## Outcome Measures

### Observational assessment

Observers who were not part of the study (evaluator blinding) coded preoccupation behaviors that occurred during the therapy

sessions using the video recordings. The following behaviors were coded: Episodes of preoccupations, task engagement, physical or verbal redirection from preoccupations to occupations by the therapist, and joint engagement between therapist and subject (during individual therapy) and/or between subjects (during group therapy), i.e., paying joint attention to both the task at hand and the therapist or peers. The following codes were assigned as per the frequency percentages of the observed behaviors: Always 81%-100%, very often 61%-80%, often 41-60%, sometimes 21%-40%, rarely 1%-20%, and never 0%.

## Standardized assessments

- RBS-EC<sup>6</sup> - it is a questionnaire measure of restricted and repetitive behaviors designed for use in children from infancy through early school age. It is intended to capture individual differences across a broad range of behaviors associated with the repetitive behavior domain. The RBS-EC consists of 34 items across 4 subscales. The rating was given by mothers' pre- and post-intervention in this study.
- RKPPS<sup>7</sup> - this instrument measures the free play of children from birth to 6 years of age. It yields an overall play age as well as age level scores in four dimensions of play: Space management, material management, imitation, and participation. In this study, the overall play ages of the participants were determined using this scale by direct observation (by observers who were not part of the study - evaluator blinding) of free play of the subjects in the clinic for 2 h pre- and post-intervention.
- COPM<sup>8</sup> - it uses a collaborative method of goal setting using client-centered approach. In children, the caregivers can identify the most important occupational performance areas that need to be considered for therapy in terms of activities of daily living (ADL), productive activities, and play. Pre- and post-intervention, performance (P), and satisfaction (S) scores in these areas are given by the caregivers on a scale of 10. In this study, goals were set for the ADL, work, and play areas in consultation with the mothers and preschool teachers for individual subjects. They rated the subjects' performance and satisfaction in the occupational performance pre- and post-intervention keeping in mind their preoccupations and their effect on occupational performance. These ratings are the pre- and post-performance (P) and pre- and post-satisfaction (S) scores. The pre- and post-scores were then compared to measure the change in performance and satisfaction post-intervention.

## Data Analysis

The data within the groups, i.e., pre- and post-scores of control and experimental groups were analyzed using paired t-test, and the data between the groups, i.e., the comparison between control and experimental groups were done using unpaired t-test. An online software Graph Pad was used for data analysis.

## RESULTS

1. The mean age of children in control and experimental group was 3.5 and 4, respectively. The control group consisted of 86.6% boys and 13.4% girls, and experimental

group consisted of 73.3% boys and 26.7% girls. As per Tables 1-3 pre-intervention, both groups were similar in their repetitive behaviors/preoccupations, play age, and occupational performance skills as per pre-intervention scores of RBS-EC, RKPPS, and COPM which show no significant difference (unpaired *t*-test  $P > 0.05$ ). As per Graph 1, the attentional abilities of subjects of both groups were similar as per the frequency percentages of preoccupations, task engagement, joint engagement, and physical and verbal redirection measured during the 1<sup>st</sup> month of intervention. As per Table 4, the preoccupations found in the subjects based on mother's reports and observations are categorized into four categories, and the possible causes for the same are predicted.

2. As per Tables 1-3, statistical analysis shows overall results as follows: Significant improvement post-intervention in both the groups (paired *t*-test,  $P < 0.05$ ). Significantly more improvement in the experimental group than control group (unpaired *t*-test,  $P < 0.05$ ).
3. As per Table 1, the preoccupations reduced significantly as seen by comparing the pre- and post-scores of all four subscales of RBS-EC, i.e., repetitive motor behaviors, self-directed behaviors, restricted interests and behaviors, and rituals and routines. The intensity of the preoccupation/how much the preoccupation interfered with participation in various occupations also decreased significantly post-intervention.
4. As per Graph 1, observational codes of behaviors during intervention show that the mean frequency percentages of preoccupations, physical redirection to occupations reduced and verbal redirection to occupations, task engagement, and joint engagement improved gradually throughout the intervention.
5. As per Table 2, significant increase in performance (P) and satisfaction (S) scores post-intervention in the areas of ADL, work (preschool activities), and play is seen.

6. As per Table 3, significant improvement in play age post-intervention in all four domains space management, material management, pretense symbolic, and participation is seen.

## DISCUSSION

### Reduction in Preoccupations

In this study (Table 4), various types of preoccupations and the underlying causes for the same have been identified, and it was found that these preoccupations interfered with the participation in occupations of the subjects in tasks and occupations (Table 1). In lines with this, a study by Williams *et al.*<sup>9,10</sup> have mentioned that preoccupation is one of the core symptoms of ASD and have classified preoccupations into five categories, i.e., healthy preoccupations of great intensity, unusual preoccupations, sensory preoccupations, preoccupations of routine, and mannerisms of odd movements/stereotypes. They have described that preoccupations though encompass most of the time of the individuals and many times prevent them from participating in other occupations, individuals with ASD do enjoy the preoccupations as well as use them for self-regulation. Therefore the aims of health workers in helping children with preoccupations may be to limit their preoccupation behaviors so that it no longer interferes with participation in various occupations and not necessarily to prevent the preoccupations completely. In the present study, OT and the JAT led to a gradual reduction of preoccupations throughout the intervention, as well as a reduction in preoccupations post-intervention as compared to pre-intervention, and there was also decrease in interference of the preoccupations with the occupations (Table 1 and Graph 1).

Reduction in sensorimotor preoccupations: The sensory motor exploratory play activities, the sensory integration therapy

**Table 1:** Comparison of RBS-EC Scores

RBS-EC behaviors	G	Pre Post	Mean	SD	SE	95% CI	<i>P</i> value within group	<i>P</i> value between groups
(A) Repetitive motor	C	Pre	3.78	0.44	0.15	3.49,4.07	0.00**	Pre-1.00 Post- 0.02*
		Post	3.11	0.60	0.20	2.72,3.50		
	E	Pre	3.78	0.44	0.15	3.49,4.07	0.00**	
		Post	2.78	0.44	0.15	2.10,2.79		
(B) Self directed	C	Pre	2.71	0.49	0.18	2.35,3.08	0.03*	Pre-0.55 Post-0.00***
		Post	2.14	0.38	0.14	1.86,2.42		
	E	Pre	2.86	0.38	0.14	2.58,3.14	0.00***	
		Post	1.00	0.58	0.22	0.57,1.43		
(C) Restricted interests	C	Pre	3.75	0.46	0.16	3.43,4.07	0.04*	Pre-0.61 Post-0.01**
		Post	3.13	0.35	0.13	2.88,3.37		
	E	Pre	3.63	0.52	0.18	3.27,3.98	0.00**	
		Post	2.50	0.56	0.19	2.13,2.87		
(D) Rituals and routines	C	Pre	3.50	0.53	0.17	3.17,3.83	0.00***	Pre-0.67 Post- 0.00**
		Post	2.40	0.52	0.16	2.17,2.83		
	E	Pre	3.60	0.52	0.16	3.28,3.92	0.00***	
		Post	2.00	0.82	0.26	1.16,2.03		
Interference with occupations	C	Pre	3.75	0.50	0.25	3.26,4.24	0.01*	Pre-0.53 Post-0.04*
		Post	2.50	0.58	0.29	1.93,3.07		
	E	Pre	3.50	0.58	0.29	2.93,4.06	0.04*	
		Post	2.25	0.50	0.25	0.93,2.07		

G: Groups, C: Control Group, E: Experimental Group, S: Significant, NS: Not Significant, [P value<0.05 (\*), <0.01 (\*\*), <0.001 (\*\*\*)], RBS-EC- Repetitive Behavior Scale- Early Childhood, SE: Standard Error

**Table 2:** Comparison of COPM Scores

COPM	G	Pre Post	Mean	SD	SE	95% CI	P value within group	P value between groups
ADL	C	P1	4.00	0.76	0.20	3.62,4.38	0.00***	P1-1.00 P2-0.00** S1-1.00 S2-0.01*
		P2	6.00	0.76	0.20	5.62,6.38		
		S1	4.00	0.85	0.22	3.57,4.43	0.00***	
		S2	6.00	1.20	0.31	5.39,6.60		
	E	P1	4.00	1.07	0.28	3.46,4.54	0.00***	
		P2	7.00	1.13	0.29	6.43,7.57		
		S1	4.00	0.85	0.22	2.57,3.42	0.00***	
		S2	7.00	0.85	0.22	5.57,6.42		
	Work	P1	3.00	0.85	0.22	3.57,4.43	0.00***	P1-0.35 P2- 0.01* S1-1.00 S2- 0.01*
		P2	6.00	0.85	0.22	6.57,7.43		
		S1	3.00	1.25	0.32	2.36,3.63	0.00***	
		S2	6.00	1.13	0.29	5.42,6.57		
	Play	P1	3.00	0.70	0.18	2.49,3.13	0.00***	
		P2	7.00	1.13	0.29	6.43,7.57		
		S1	3.00	1.20	0.31	2.59,3.67	0.00***	
		S2	7.00	1.00	0.26	6.49,7.50		

C: Control Group, E: Experimental Group, P1: Pre Intervention Performance, P2: Post Intervention Performance, S1: Pre Intervention Satisfaction, S2: Post Intervention Satisfaction, S-Significant, NS: Not Significant, [P value < 0.05 (\*), <0.01 (\*\*), <0.001 (\*\*\*)], COPM: Canadian Occupational Performance Measure, SE: Standard Error

**Table 3:** Comparison of RKPPS Scores

RKPPS	G	Pre Post	Mean	SD	SE	95% CI	P value within groups	P value between groups
Space dimension	C	Pre	22.40	1.40	0.36	21.68,23.11	0.00***	Pre-0.39
		Post	36.00	1.77	0.46	35.10,36.89		Post-0.03*
	E	Pre	22.80	1.15	0.30	22.21,23.38	0.00***	
		Post	37.20	1.15	0.30	36.61,37.78		
Material management	C	Pre	24.60	1.72	0.44	23.72,25.47	0.00***	Pre-0.74
		Post	35.50	1.70	0.69	34.13,36.86		Post-0.01*
	E	Pre	24.80	1.57	0.40	24.00,25.50	0.00***	
		Post	37.00	1.25	0.32	36.36,37.63		
Pretense symbolic	C	Pre	18.00	1.13	0.29	17.42,18.57	0.00***	Pre-0.08
		Post	24.20	1.57	0.40	23.40,24.99		Post- 0.01*
	E	Pre	17.80	0.77	0.20	17.37,18.22	0.00***	
		Post	26.00	2.56	0.66	24.70,27.29		
Participation	C	Pre	26.30	2.57	0.66	24.99,27.60	0.00***	Pre-0.59
		Post	37.40	1.29	0.33	36.74,38.05		Post-0.00***
	E	Pre	26.80	2.54	0.66	25.51,28.08	0.00***	
		Post	39.00	0.93	0.24	38.53,39.46		

C: Control Group, E: Experimental Group S: Significant, NS: Not Significant,[P value<0.05 (\*), <0.01 (\*\*), <0.001 (\*\*\*)], RKPPS: Revised Knox Preschool Play Scale, SE: Standard Error

provided to these toddlers, preschoolers, and sensory diet home program given to the mothers may have attributed in improving the sensory motor, sensory processing, and modulation skills,

thus reducing sensory motor preoccupations (Tables 1 and 4 and Graph 1). In lines with this, a study by Roberts *et al.*<sup>11</sup> describes the use of sensory integration FOR in a 3-year-old boy with



ASD, in whom sensory preoccupations such as touching and pushing other children and mouthing objects decreased post-intervention from 90% to 10%.

**Reduction in cognitive-perceptual preoccupations:** In this study, the OT intervention provided using graded activities and the introduction of novelty into the child-directed activity may have helped in improving subjects' natural ability to shift attention from preoccupations toward the tasks, and therefore, there was improvement in task engagement, verbal redirection, and decrease in physical redirection toward tasks (Graph 1). In lines with this, in the study by Roberts *et al.*,<sup>11</sup> the decreased preoccupation led to improvement in engagement in tasks from 30% to 90% and decreased intensity of prompts from 100% to 25%.

**Reduction in psychosocial preoccupations:** The OT as well as the JAT (JAML) intervention provided to the children may have helped in improving their joint attentional skills such as FF, TT, RJA skills, and IJA skills, i.e., joint engagement of the subject with the therapists during individual sessions as well as with peers during group sessions (Graph 1). In lines with these results, a review on methods of improving joint attention in young children with autism by Paparella *et al.*<sup>12</sup> mentioned about JAML having positive effects on RJA and IJA. In a study, Bono *et al.*<sup>13</sup> mentioned that joint attention provides a context for the emergence of receptive and expressive language skills which can further lead to improvement of social interaction and can thus improve the experiences with intervention, which is seen in this present study as joint engagement.

In this present study, mothers were trained to have joint engagement sessions with their children at home. The implementation of this program effectively by the mothers (as understood through the logs that were maintained by them) might have led to the improved behavioral and emotional coregulation in the subjects (Table 1 [B Subscale]). Mothers also anecdotally reported that their children post-intervention display decreased outbursts of negative/ self-injurious behaviors as well as were more compliant at home. In lines with this, in a study by Gulsurd *et al.*,<sup>14</sup> 34 toddlers with autism and their mothers participated in an EI program targeting joint engagement and the results indicated a positive effect of the intervention targeting joint engagement on emotional coregulation outcomes.

## Participation in Occupations

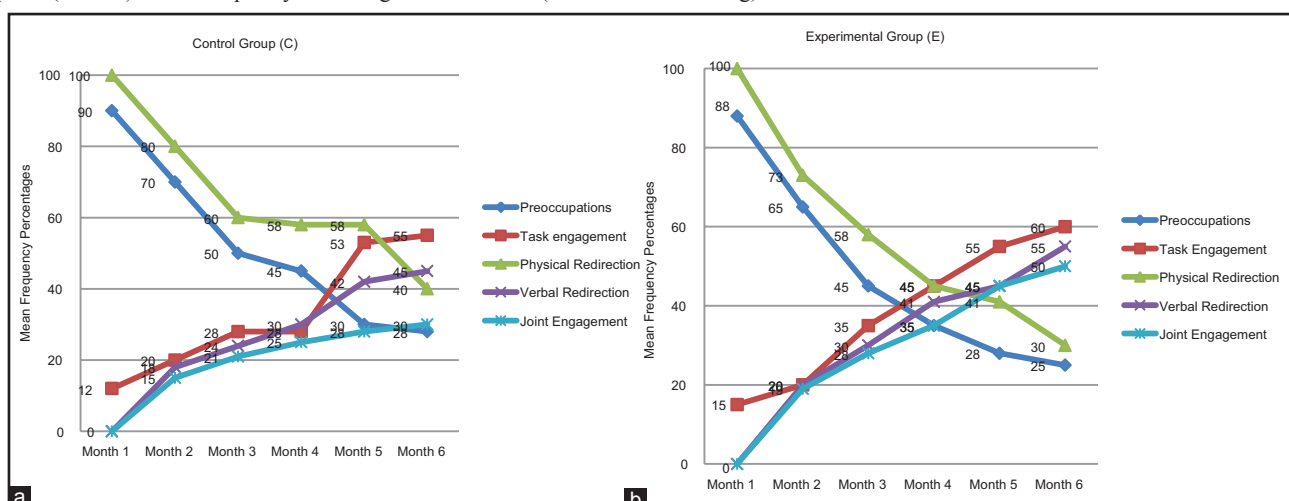
**ADL:** Wigham *et al.*<sup>15</sup> in their study described the relationship between the repetitive behaviors, insistence of sameness in terms of rituals and routines, and anxiety due to which individuals with ASD are unable to participate in various ADLs. Reduction in preoccupations related to rituals and routines (Table 1 [D Subscale]) as a result of OT provided using rehabilitative FOR may have attributed to the better participation in ADL activities at home in this present study (Table 2).

**Work (preschool activities):** In the present study, reduction in cognitive-perceptual preoccupations, i.e., ability to shift attention from preoccupations of restricted interests and behaviors (Table 1 [C Subscale]) may have led to better participation in preschool activities at school (Table 2). In a

**Table 4:** Pre-intervention Profile of Preoccupations (Subjects of Both Control and Experimental Group as per Mothers Report and Observations)

Preoccupation type	Examples	Possible cause
Sensory motor	Stereotypic motor patterns such as rocking, spinning, and hand flapping. Sensory seeking behaviors like staring at fans, lights, etc.,	Core symptoms of ASD and sensory processing and modulation dysfunction
Cognitive-perceptual	Selective attention to objects of interest and not to the tasks	Lack of joint attention and engagement
Psychosocial	Preference of solitary play with objects of interest	Lack of cooperative play
Occupational	Rigidity to stick to routines and the abovementioned preoccupations present during ADL, work, and play	No flexibility in terms of change in routine among subjects. Lack of knowledge and skills to redirect subjects from preoccupations to occupations among parents and teachers

**Graph 1:** (a and b) Mean Frequency Percentages of Behaviors (Observational Coding)



systematic review of OT interventions to improve cognitive development in children between ages of 0–5 years, Clark *et al.*<sup>16</sup> identified two major categories of intervention (i) developmental interventions and (ii) joint attention interventions. In similar lines in this present study, the use of developmentally based conventional OT along with JAT played an important role in improving the cognitive and metacognitive functions of the subjects so that they could redirect their attention from preoccupations toward occupations with support and scaffolding from preschool teachers.

**Play and leisure:** Preoccupation behaviors are maximally seen when an individual is idle. In this study, it was observed that the subjects' need to obsessively and compulsively be preoccupied, reduced as subjects got alternatives as to "what to do if not to be preoccupied," i.e., an array of choices of activities were provided to them to choose from (improvement in play exploration). In this study, the sensory and repetitive motor preoccupations (Table 1 [A Subscale]) were modified into purposeful, meaningful play activities for better motivation of the subjects to participate in the play activities (improvement in play participation), and therefore, the subjects' space and material management domains of play improved post intervention (Table 3). The group therapy provided to the subjects may have attributed to reduce the preoccupations of solitary play and facilitated better participation (Table 3) in associative, cooperative as well as symbolic play. In lines with this, a systematic review of individuals with ASD by Tanner *et al.*<sup>3</sup> stated that OT and joint attention interventions showed moderately strong evidence in reducing restrictive, repetitive behaviors, and improving play performances.

## Preoccupations to Occupations- Bridging the Gap

Control group which was given only conventional OT also showed improvement in joint attentional skills and engagement. In lines with this, a study by Bono *et al.*<sup>13</sup> mentioned that OT involves repeated attempts to engage young children with autism in episodes of joint attention as part of their sessions. However, the authors have also stated that there is a need for exploration of larger samples with process measures to gauge the frequency of attempts to establish joint attention in young children with autism and that the joint attentional skills should be specifically targeted as part of intervention. The pivotal skill hypothesis as per Koegel *et al.*<sup>17</sup> states that joint attention is a pivotal skill in autism and targeting this particular pivotal skill can lead to improvement in a larger domain of behaviors which are characteristic of young children with autism. In these lines, in the present study, joint attention was specifically targeted as well as measured during the process of intervention, and although there was improvement in both the groups, there was more improvement in experimental group (OT-JAT) in terms of joint attention and engagement as well as in other domains as compared to control group. In lines with this in the study by Bono *et al.*,<sup>13</sup> the authors mentioned that joint attention skills unlock the means of increasing the benefits of interventions like OT. Whalen *et al.*<sup>18</sup> stated that joint attentional skills can also act as social moderators of intervention effects and improve

the social validity of the research studies so that even naïve observers can understand a positive change in the subjects. Thus, by combining OT along with specific JAT, the bridging of the gap between preoccupations and occupations is better, becomes more evident, and socially valid.

A limitation of the study was the small sample size, and this limits the generalizability of the results. Future OT research studies should try to incorporate larger sample size and also include methods of eliminating confounding factors such as mother and teacher compliance to have better outcomes.

## CONCLUSION

Thus, it can be concluded that OT along with JAT plays an important role in a reduction of preoccupations and improving participation of age appropriate occupations, i.e., in bridging the gap between preoccupations and occupations in toddlers and preschoolers with ASD. Joint attentional assessment and intervention methods should be used along with OT for better outcomes in toddlers and preschoolers with ASD.

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### HIGHLIGHTS

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*Environment, Ergonomics, Safety and Wellness at Workplace)*

#### **Resource Faculties:**

- **Dr. Paresh Chandra Ghosh:** Ergo-physiologist ,Formerly Director of Central Labor Institute, Mumbai & consultant in Furniture & Steel industries, India.
- **Dr. Nandu Nandoskar:** Senior Occupational Therapist, Founder & Director of Occupational Health, Adelaide, Australia & Founder & Director of Fit 4 Health, India.

#### ❖ **Key Note Address: Dr. Vijay Suple (Canada)**

#### ❖ **Guest & Special Talks**

- Occupational Therapy-a Vital Role in Dysphagia Care of Developmentally Disabled: **Dr. Shreeavtar Rai, MHS, OTR/L, Michigan, USA**
- Driving Assessment-Canadian Concept: **Dr. Vjay Suple, Canada**
- The Use of Tele Health in Occupational Therapy: **Joseph K. Wells, USA**
- An Opportunity for the Occupational Therapy Profession to take the Lead in Providing Case Management Services in India: **Dr. Gazala Makda, USA**
- An Introduction to ABA: **Dr. M. Masilamani, Board Certified Applied Behavior Analyst, Transition Center for ABA Services, Chennai**
- Past, Present and Future of Ergonomics: **Dr. Bharati Jajoo, OTR CEAS, Ergonomics, Ergoworks Inc. Bangalore & Formerly O'Connor Hospital California USA**

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# Effect of Occupational Therapy as Part of a Multidisciplinary Intervention, on Functioning in Children with Attention Deficit Hyperactivity Disorder

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## Abstract

**Background:** Occupational therapy (OT) can strengthen a child's modulation of senses, particularly in Attention Deficit Hyperactivity Disorder (ADHD), to optimize responses to sensory inputs and improve behaviors. However, studies are needed in the Indian context to document the same.

**Objectives:** The present study aims to compare the functioning in children with ADHD, before and after receiving OT as part of a broader multidisciplinary intervention in Mumbai.

**Study Design:** Information obtained from case reports of children ( $n = 1073$ ) evaluated for developmental concerns (2009-2012) was retrospectively analyzed.

**Methods:** A total of 377 children (average age: 7 years 1 month; average IQ: 107; 286 boys and 91 girls) were diagnosed with ADHD (using fourth edition of the Diagnostic and Statistical Manual of Mental Disorders) and 43 underwent OT evaluation, before and after the intervention. Children received intervention for 6 months (average), including consultation by a developmental pediatrician, OT, speech and language therapy, and monthly parental counselling. Indicators based on clinical observations (e.g., behavior) and assessment of visual-motor integration (VMI) were compared pre- and post-intervention, using Stata-12.

**Results:** During the post-intervention OT evaluation, 14% of children ( $n = 43$ ) showed moderate-severe restlessness (66% at pre-intervention evaluation,  $P < 0.05$ , 95% confidence interval (CI): 34.1% to 69.8%), 14% showed hyperactivity (31% at pre-intervention evaluation,  $P = 0.06$ , 95% CI: -0.4% to 34%), and 12% showed moderate-severe impulsivity (48% at pre-intervention evaluation,  $P < 0.05$ , 95% CI: 18% to 53.9%). Substantial improvements were noted in handwriting, namely, in writing style and pressure. Vestibular and proprioceptive concerns significantly reduced. The proportion of children with below age-equivalent VMI score significantly decreased from pre-intervention (50%) to post-intervention evaluation (20.5%).

**Conclusions:** OT as part of a coordinated multidisciplinary approach, with regular monitoring for compliance, and documentation of clinical outcomes, optimizes functional improvement in ADHD.

**Key Words:** Attention Deficit Hyperactivity Disorder, Intervention, Multidisciplinary, Sensory

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## INTRODUCTION

Studies have pointed that Attention Deficit Hyperactivity Disorder (ADHD) could be the most common pediatric neurobehavioral condition.<sup>1,2</sup> A retrospective review of archival data (2009–2012) from case records of 1301 children (mean age: 6 years) presenting with developmental concerns to an intervention center in Mumbai identified 422 children with ADHD (32.4%).<sup>3</sup> A 2013 study in Southern India reported 11.3% of primary school children having ADHD.<sup>4</sup>

Few studies in India have evaluated the effectiveness of non-pharmacological interventions for ADHD. The diverse nature of these interventions ranges from yoga, meditation, and play therapy,<sup>5,6</sup> supplementation with flax oil and vitamin C,<sup>7</sup> additive-free and sugar-restricted diet,<sup>8</sup> and exposure to outdoor settings.<sup>8</sup> A comprehensive 2016 update on the same, cited evidence gaps including lack of control group, robust evaluation methods, feasibility and cultural compatibility, structure, and cost-effectiveness of interventions.<sup>9</sup>

In 2017, the Indian Academy of Pediatrics published national consensus guidelines for evaluation and management of ADHD,<sup>10</sup> citing the crucial evidence-based role of a multidisciplinary approach to mitigate concerns in children. The multidisciplinary “team” approach includes a number of modalities with a primary clinical focus on pharmacological intervention, occupational therapy (OT)/sensory integration, parental counseling, and remedial education for academic concerns. Among these modalities, OT plays a critical role in modulating the sensory responses of a child with ADHD. However, few studies in India have evaluated the effect of such approaches on the functioning of children with ADHD. The present study aims to bridge this evidence gap.

*Presented at OTICON, 2017: The 54<sup>th</sup> Annual National Conference of AIOTA at Jaipur.*



## METHODS

### Study Background

The present study has a cross-sectional, centre-based, and retrospective design. The analysis aims to understand the effectiveness of a structured, goal-oriented, multidisciplinary intervention for children with ADHD. Secondary analysis of data pertaining to children who reported with developmental concerns to a multidisciplinary intervention center in Mumbai during 2009–2012 was conducted, and results were published in 2014.<sup>3</sup> These results focused on the incidence of developmental disorders among 1301 children.

### Sampling

Children in the aforesaid intervention center reported to the developmental pediatrician in the outpatient clinic. After a thorough consultation, caregivers were requested to schedule an appointment for a comprehensive developmental evaluation. These evaluations were documented by individual therapists, and clinical reports were prepared. Information obtained from these reports formed the basis for the present analysis. During 2009–2012, 1301 children received a comprehensive evaluation under various disciplines based on the nature of their presenting concerns and the clinical impression made by the developmental pediatrician. Of these children, 1073 received an evaluation by an occupational therapist and were included in the present retrospective analysis, and 377 of these were diagnosed with ADHD (Figure 1). Thus, convenience sampling was employed within a retrospective design; or the available reports of children who received evaluation during 2009–2012 were included for secondary analysis.

### Study Aim

Through a secondary analysis, the present study aims to compare functioning in children with ADHD before and after receiving multidisciplinary intervention, including OT as one of its critical components.

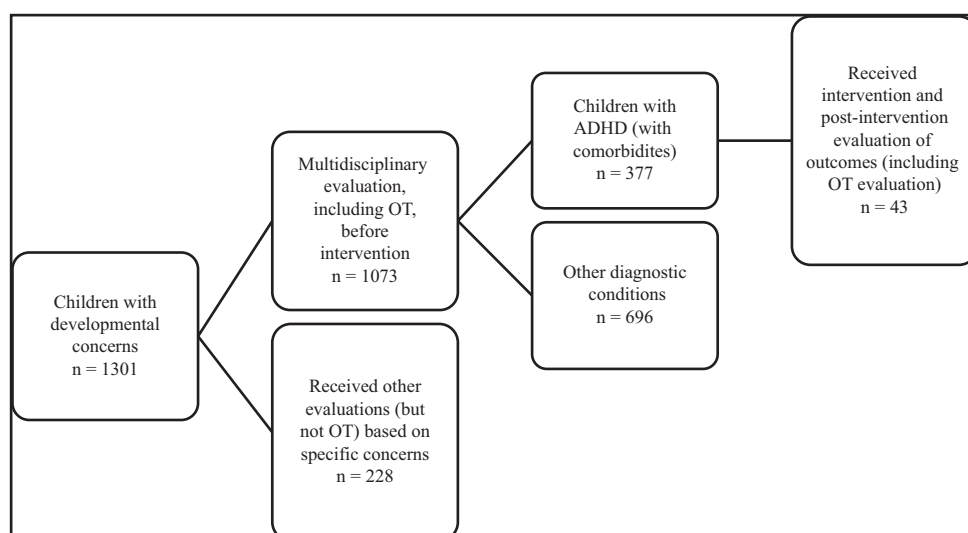
### Intervention Model

Intervention was delivered over periodic sessions by a multidisciplinary team, headed by a developmental pediatrician, and composed of an occupational therapist, physical therapist, speech and language therapist, remedial educator, and the psychologist. Within OT, the core modality adopted was sensory integration, owing to multiple sensory concerns in children during initial (pre-intervention) evaluation, including difficulties in processing vestibular, proprioceptive, tactile, and auditory stimuli (some children had concerns in processing visual stimuli). These concerns influenced the behavior of children, with the resulting manifestations of hyperactivity, restlessness, and impulsivity. In turn, the children had difficulties in attention and concentration, which adversely affected their academics and activities of daily living. Thus, it was critical to target sensory concerns, particularly vestibular and proprioceptive concerns, and limit their sequelae.

Table 1 summarizes the activities conducted during OT sessions aimed at reducing sensory concerns as well as other targeted domains. Activities were combined to potentiate the therapeutic effect and ensure the child's complete attention; for example, beading and singing a rhyme or jumping and counting numbers simultaneously. Over 6 months, two sessions of OT were delivered to each child in a week; or eight sessions per child per month or 48 total sessions per child. Each individualized session (1:1 = therapist: child ratio) lasted for 45 min and was followed by informing parents on feasible ways in which the activities could be continued at home to sustain improvements.

It should be noted that therapeutic goals were constant for each individual child's customized developmental intervention program that spanned 6 months. Attainment of goals was reviewed at the end of the intervention period through a developmental re-evaluation which was similar to the transdepartmental evaluation conducted before the intervention delivery. Revised goals were framed to initiate the next intervention cycle of 6 months. The present analysis focuses

**Figure 1:** Study Sample





**Table 1:** OT Activities and Targeted Sensory Concerns/Other Domains

Targeted domains	Activities
Processing vestibular stimuli	Rhythmic jumping, bouncing on ball/trampoline
Joint proprioception	Crawling, commando crawling, animal walk, tandem walk, one-foot walk, climbing
Attention and balance	Activities performed on a swing; tandem walk; climbing
Attention	Activities in sitting position: Puzzles, 3D puzzles, find the difference, spot the odd one out, reading activities
Fine motor skills	Balance board (e.g., beading)
Eye-hand coordination	Target throw, hitting, bull's eye
Strength in upper extremities to improve posture	Push-ups, planks, over-head activities
Writing	First three sessions focused on assessing the child's speed of writing, grasp, pressure applied, word alignment and spacing, followed by activities to improve posture, adjustable table and chairs during writing tasks, verbal reminders for posture
Task completion (low psychosocial skills due to impulsivity)	Obstacle course

OT: Occupational Therapy

on the effect of the intervention model over the first 6 months, as the majority of children received one cycle of intervention during 2009–2012. Intervention does vary from child to child, but we are referring to a cross-sectional retrospective analysis where each child received customized intervention based on therapeutic goals that remained constant over the 6-month period. The general OT modalities mentioned in Table 1 were customized to the child's needs.

Similar individualized sessions by the speech and language therapist and remedial educator were provided, based on specific concerns of children (e.g., academic concerns, speech delay, or deviations). However, gains achieved from OT (e.g., the stability of behavior) helped the child's participation and compliance to other intervention activities (e.g., speech and language therapy).

Monthly parental counselling by the psychologist helped parents to cope with the child's behavioral concerns and channelize his strengths. The counselling team formulated "best practices" to mitigate behavior concerns (e.g., hyperactivity). Parents were counseled to adhere to these practices during the child's routine and that the effectiveness of intervention depended on their adherence. The best practices focused on: (1) Minimum exposure to electronic gadgets and reduction of television viewing, especially animation; (2) avoidance of food with preservatives and additives; (3) increased physical activity or outdoor play in the evening; and (4) increased night sleep. Adherence of parents was reviewed during their therapy visits, counselling, or follow-up visits with the developmental pediatrician. Parents expressed routine concerns in adhering to these practices, and alternative strategies were suggested by the intervention team. These practices are based on the evidence around unhealthy habits that predispose a child to developing behavioral problems, particularly hyperactivity and inattention.<sup>11–15</sup> In addition, parents were encouraged to maintain a daily diary to note the child's concerns, which were reviewed by the psychologist during each monthly parental counselling session. The diary functioned as a monitoring tool and actively involved parents in the intervention process.

Each child was "trans-departmentally" assessed and provided with a "strengths and challenges" report, rather than a diagnosis

alone. Challenges across all developmental domains were divided into small functional goals based on the discrepancy between the child's current and age-expected skill achievement. Developmental interventions were individualized to each child. Decisions on subsequent intervention were made on the basis of the degrees of achievement of goals, as assessed during the post-intervention evaluation. Thus, therapeutic goals were set based on the child's strengths and weaknesses observed during the initial (pre-intervention) evaluations, and achievement of the same was checked (compared) during the post-intervention evaluations. All children received goal-oriented and structured intervention, and all outcomes were documented, aiding the process of analysis described in the subsequent section.

## Methods/Analysis

### *Ethical process*

During retrospective analysis, identification codes were used to maintain client anonymity, and all research information was kept confidential. As part of the protocols of the preceding study (from where the sample was derived for secondary analysis),<sup>3</sup> written informed consent was obtained from all caregivers. The preceding study had received the Institutional Ethics Committee approval under Tata Institute of Social Sciences, Mumbai.

1301 children reported with developmental concerns during 2009–2012 at the multidisciplinary intervention center. Parents of these children predominantly belonged to the middle-income group (monthly family income of caregivers: INR 16000 to INR 33000).<sup>16</sup> Of these, 1073 children received a pre-intervention evaluation by the OT team and other disciplines. Of 1073, 377 children (average age: 7 years 1 month; average IQ: 107; 286 boys and 91 girls) were diagnosed with ADHD (using the 4<sup>th</sup> Edition of Diagnostic and Statistical Manual of Mental Disorders<sup>2</sup>). Of 377 children, 43 received intervention for the entire 6-month period and also received a post-intervention evaluation of outcomes. Thus, it was possible to compare changes in behavior and functioning in these 43 children. The sampling process has been shown in Figure 1.

During the preceding retrospective study,<sup>3</sup> a codebook was formulated based on content in the clinical reports, inputs from

the therapists, and observation of the child during individual evaluation and intervention sessions. The same codebook was used for the present analysis and included variables denoting a range of domains for pre- and post-intervention evaluation.

Each domain was further categorized on the basis of the child's functioning during evaluation, as judged by the clinician or as per an informal assessment (in case of visual-motor skills or sensory profile). For example, within the "behavior" domain, "hyperactivity" was categorized as "absent," "mild," "moderate," and "severe," whereas within the "handwriting" domain, "writing style" was categorized as "poor," "fair," and "good."

The codebook was prepared to assist data entry, cleaning, and analysis. Information from clinical reports was coded into categorical variables (e.g., vestibular concerns: Hyposensitive or hypersensitive). Percentages of children with particular kinds of concerns were calculated using these variables, and thereafter, statistical relationships were established. Thus, the codebook was not a clinical assessment tool in itself but a document prepared by the study team to analyze clinical data from reports.

Available standardized tests (e.g., related to sensory integration and praxis) have not been validated for the Indian population, and moreover, the tests are expensive, which limits their applicability in India. In the aforesaid intervention center, informal evaluations were developed on the basis of clinical judgements of trained therapists. All therapists received similar training under a common protocol, which standardized the evaluation procedures.

Descriptive statistics and tests of significance were used to analyze data. Percentages of children showing various degrees of concerns and those that did not show concerns were computed for each category, for all domains at pre- and post-intervention time points. Indicators based on clinical observations (e.g., behavior) and evaluations of visual-motor integration (VMI) were calculated using Microsoft Excel 2007 and Stata-12.<sup>17</sup> Classical tests of hypotheses were used specifically the two sample proportion comparison test or the Z-test of proportion, using Stata-12 IC.

## RESULTS

Table 2 summarizes the outcome measurement tools.<sup>18,19</sup> Tables 3-5 explain the patterns observed before and after intervention; they describe the changes in behavior, various aspects of handwriting, and sensory concerns. Table 6 summarizes the results of statistical analyses. Classical tests of hypotheses were used, specifically the two sample proportion comparison test or the Z-test of proportion, using Stata-12 IC.

During post-intervention OT evaluation, 14% of children ( $n = 43$ ) showed moderate-severe restlessness (66% at pre-intervention evaluation, difference: 52%, standard error: 0.09,  $P < 0.05$ , 95% confidence interval [CI]: 34.1% to 69.8%), 14% showed hyperactivity (31% at pre-intervention evaluation, difference: 17%, standard error: 0.08,  $P = 0.06$ , 95% CI: -0.4% to 34%), 12% showed moderate-severe impulsivity (48% at pre-intervention evaluation, difference: 36%, standard error: 0.09,  $P < 0.05$ , 95% CI: 18% to 53.9%), and 14% of children ( $n = 43$ ) showed poor attention (81% at pre-intervention evaluation, difference: 67%, standard error: 0.08,  $P < 0.05$ , 95% CI: 51.2% to 82.7%).

Substantial improvements were noted in salient aspects of handwriting, namely, in writing style and pressure. During post-intervention evaluation, 7.7% of children showed poor writing style (44% at pre-intervention evaluation, difference: 36.3%, standard error: 0.09,  $P < 0.05$ , 95% CI: 18.4% to 55.5%) and 29% of children showed inappropriate writing pressure (57% at pre-intervention evaluation, difference: 28%, standard error: 0.12,  $P < 0.05$ , 95% CI: 4% to 51.8%). However, differences in font size were non-significant: 68% of children at pre-intervention and 46% at post-intervention showed inappropriate font size (difference: 22%, standard error: 0.13,  $P = 0.106$ , 95% CI: -4% to 47.9%).

In terms of sensory concerns, during post-intervention OT evaluation, 40% of children ( $n = 42$ ) showed vestibular concerns (64% at pre-intervention, difference: 24%, standard error: 0.1,  $P < 0.05$ , 95% CI: 3% to 44.7%) and 28.5% showed proprioceptive concerns (59.5% at pre-intervention, difference: 31%, standard error: 0.1,  $P < 0.05$ , 95% CI: 10.8% to 51.1%).

**Table 2:** Outcome Measurement Tools

Targeted domains	Measurement tool/method
Diagnosis of ADHD	Fourth edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-IV TR)
Behavioral concerns: Hyperactivity, restlessness, impulsivity, inattention	Clinical assessment by the occupational therapist before (evaluation) and after the cumulative intervention period (re-evaluation after 6 months); assessment based on observation of the child's behavior, by giving the child certain tasks to evaluate concerns (e.g., turn-taking) and parent-reporting of behaviors at home
Handwriting: Handedness, pressure, writing style, font size, grip, location of hand, posture	Clinical assessment as above, based on parent-reporting and giving a writing task to the child
Sensory concerns: Vestibular concerns, proprioceptive concerns	Dunn's sensory profile ((informal, not scored); children classified into vestibular hyposensitivity and hypersensitivity and proprioceptive hypersensitivity ("refusing") and hyposensitivity ("seeking") responses/behaviors
Visual-motor skills	Visual-motor integration scale (informal)

ADHD: Attention Deficit Hyperactivity Disorder

**Table 3:** Pre- and Post-Intervention Changes in Behavior

Domain - Behavior	Number of children (pre-)	Number of children (post-)
Hyperactivity profile	N=42*	N=43
Severe	10	1
Moderate	13	5
Mild	8	16
Absent	11	21
Restlessness profile	N=41*	N=43
Severe	12	1
Moderate	15	5
Mild	5	22
Absent	9	15
Impulsivity profile	N=42*	N=43
Severe	5	1
Moderate	15	4
Mild	8	13
Absent	14	25
Attention profile	N=42*	N=43
Poor	34	6
Fair	7	29
Good	1	8

\*Total sample sizes varied across categories due to missing values or incompletely filled reports or age of the child not being applicable to conduct a particular clinical observation/assessment

**Table 4:** Pre- and Post-Intervention Changes in Handwriting

Domain - Behavior	Number of children (pre-)	Number of children (post-)
Handedness	N=40	N=41
Left	7	7
Right	32	32
Ambidextrous	0	0
Not developed	1	2
Posture	N=11	N=19
Leans and writes	9	15
Normal	2	4
Grip	N=37	N=40
Static tripod	11	14
Dynamic tripod	18	21
Pincer grasp	1	0
Mass grasp	4	4
Quadrapod	2	1
Lateral tripod	1	0
Location of hand while writing	N=23	N=28
Close to the tip	13	16
Away from the tip	10	12
Writing style	N=34	N=39
Poor	15	3
Fair	15	26
Good	4	10
Pressure	N=28	N=34
More	11	6
Less	1	1
Appropriate	12	24
Unequal	4	3
Font size	N=25	N=28
Large	2	2
Small	2	1
Varying	13	10
Proper	8	15

**Table 5:** Pre- and Post-Intervention Changes in Sensory and Visual-Motor Concerns

Domain - Behavior	Number of children (pre-)	Number of children (post-)
Vestibular concerns	N=42	N=42
Hyposensitivity	1	0
Hypersensitivity	26	17
Not a concern	15	25
Proprioceptive concerns	N=42	N=42
Refusing	3	0
Seeking	22	12
Not a concern	17	30
Visual-motor skills*	N=33	N=37
Poor (number of children with below 75% of expected score)	18	8
Fair (number of children with 75% and above of expected score)	9	11
Good (number of children with exact score)	6	18

\*Visual-motor skills were assessed through an informal assessment tool

On informal assessment of visual-motor skills, 18% of children showed age-equivalent skills during pre-intervention evaluation ( $n = 33$ ), while 48.6% showed age-equivalent skills during post-intervention evaluation ( $n = 37$ ), indicating a significant difference (difference: 30.6%, standard error: 0.1,  $P < 0.05$ , 95% CI: 9% to 51%).

## DISCUSSION

OT can strengthen a child's modulation of senses, particularly in ADHD, to optimize responses to sensory inputs and improve behaviors.<sup>20-24</sup> However, the present study attempts to document the same, to generate early evidence in the Indian context. The results demonstrate that OT as part of a coordinated multidisciplinary approach optimizes functional improvement in ADHD. Statistically significant improvements in behavior, handwriting, and sensory concerns were possible due to a regular intervention program delivered through structured sessions and guided by intervention goals, where outcomes were evaluated at 6-month follow-up.

This study has several limitations. First, globally standardized tools (in place of clinical judgements) could not be used as their costs precluded their application (e.g., sensory integration and praxis tests). This is relevant in developing countries where clinical skills of limited numbers of specialized professionals are often the only resources available to measure degrees of disability. Further studies should include standardized tools to enable more rigorous data analysis and increase objectivity of results. Second, the sample of case records was clinic-based, and the design was retrospective. Subsequent studies should have a sampling strategy that ensures greater representation of the larger population of interest (i.e., children with ADHD in the community). Third, the design of the study and the nature of the intervention model made it difficult to separate the effects of various intervention components on developmental outcomes (i.e., OT, speech and language therapy, remedial education, and counselling). However, the gains from OT (e.g., stability of behavior and sensory responses) helped the

**Table 6:** Statistical Test Results

Indicator: % of children with	Pre-intervention (%)	Post-intervention (%)	Difference (%)	Standard error	P value	95% CI (%-%)
Moderate-severe restlessness	66	14	52	0.09	<0.05	34.1,69.8
Moderate-severe hyperactivity	31	14	17	0.08	0.06	-0.4,34
Moderate-severe impulsivity	48	12	36	0.09	<0.05	18,53.9
Poor attention	81	14	67	0.08	<0.05	51.2,82.7
Poor writing style	44	7.7	36.3	0.09	<0.05	18.4,55.5
Inappropriate writing pressure	57	29	28	0.12	<0.05	4,51.8
Inappropriate font size	68	46	22	0.13	0.106	-4,47.9
Vestibular concerns	64	40	24	0.1	<0.05	3,44.7
Proprioceptive concerns	59.5	28.5	31	0.1	<0.05	10.8,51.1
Age-equivalent visual motor skills	18	48.6	30.6	0.1	<0.05	9,51

child's participation and compliance to speech therapy and remedial education. Thus, from an ADHD perspective, OT is a key modality to "prime" the child for increased engagement in other concurrent therapies and strongly contributes to the effectiveness of the overall multidisciplinary intervention model. Fourth, the sample was composed of children belonging to middle-income urban families, which merits further studies on evaluation of similar interventions for lower-income populations to understand the possible effects of the socioeconomic context on the relationship between intervention and outcomes (e.g., level of awareness and adherence of practices at home). Fifth, effect of extraneous variables on outcomes, such as adherence to intervention practices at home by caregivers and receiving other kinds of therapy outside the center, could not be accounted for, due to the retrospective design/secondary analysis of archival data. Sixth, the absence of a control group limits the validity and generalizability of the pre- and post-intervention comparisons. Subsequent studies should have a prospective design and compare results with children of similar age, developmental profile, and socioeconomic status receiving multidisciplinary intervention over an identical time period.

Finally, it should be noted that of 377 children with ADHD, only 43 continued to follow-up for regular intervention over 6 months and received a post-intervention evaluation. The remaining 334 received consultation by the developmental pediatrician in the OPD but did not follow-up for an evaluation (i.e., the comprehensive evaluation conducted before commencing treatment). Hence, progress notes could not be documented. This reflects the challenges in making caregivers adhere to rigorously structured intervention programs. Some of these challenges include logistical difficulties of urban working parents to regularly report to an intervention centre over a sustained period of 6 months, and the chronic nature of interventions where improvements are noticed gradually and require adherence of intervention practices at home.

## CONCLUSION

This study is one of the few published analyses on pre- and post-intervention outcomes in children with ADHD receiving OT as a critical component of a larger multidisciplinary intervention. ADHD is widely prevalent in India, and multidisciplinary approaches have been strongly recommended as the way forward.<sup>10</sup> Further research using rigorous study designs and

assessment tools is warranted. In spite of their challenges, the authors propose that coordinated multidisciplinary interventions are essential for children with ADHD. While OT helps integrate sensory responses, speech and language therapy enables the child to articulate specific sounds and words and form sentences, gradually leading to enhanced interaction and regulation of behavior. Special educators help the child to cope with educational demands, while counseling helps caregivers to deal with their anxieties and emotional concerns that accompany the child's condition.

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# Use of the Kawa Model for Occupation-based Culturally Responsive Occupational Therapy in India

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## Abstract

**Background:** Across the globe, occupational therapy practitioners are pushing for a paradigm shift toward occupation-based and client-centered rehabilitation. Evidence supports the adoption of holistic, occupation-focused, performance-oriented, and culturally responsive models of care delivery rather than mechanistic and dysfunction-based biomechanical approaches. However, prevalent Western-centric models of practice are unable to provide a good fit to client-centered practice in Eastern contexts. The Eastern philosophy-based Kawa model may be well-suited to guide evidence-based occupational therapy in India, given the reason for its origins, philosophy, and the potential for varied avenues of application, specific to the practice of occupational therapy in India.

**Objective:** The purpose of this narrative literature review is to encourage Indian occupational therapy practitioners to align themselves with the profession's paradigm shift, utilizing a theoretical model relevant to the Indian culture and practice contexts, and join hands in global collaboration for the benefit of the profession and its clients.

**Study Design:** Narrative literature review.

**Methods:** Analysis of available qualitative and quantitative literature, published between 2007 and 2017, was conducted to consolidate data in support of the potential of the Kawa model to serve as an effective practice model for the Indian health-care context.

**Results:** An emerging body of evidence points to the effectiveness of the Kawa model as an occupation-based and culturally responsive model to guide clinical and non-clinical processes in Eastern contexts.

**Conclusion:** The Kawa model has the inherent potential to facilitate alignment of evidence-based, occupation-focused occupational therapy practices in India with the profession's paradigm shift. However, qualitative and quantitative research regarding the direct application of this model in the Indian occupational therapy arena is required to test its effectiveness and success as well as to guide the development of more specific culturally responsive theoretical models.

**Key Words:** Culture, Kawa, Occupation, Theoretical Model

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## INTRODUCTION

The occupational therapy paradigm represents the knowledge, belief system, and global perspective that unites practitioners all over the world.<sup>1</sup> Despite clients' identification of occupational needs, the medical model-based health-care administration and institutional processes in the hospital system convert the parameters of change to objective biomedical units to align them with the medical model for operation and reimbursement, thus shifting the entire treatment from a client-centered occupational context to a standard and stratified medical context severely limited in understanding or addressing the complexity of daily occupational performance impacted by social, personal, and environmental circumstances.<sup>2</sup> This observation is true of many medical model-based settings in India, which influences occupational therapy practitioners to gravitate away from their professional promise of occupation to the reductionistic realms of medical positivism in an effort to gain acceptance, recognition, and reimbursement as a scientific health profession.

Today, there is increasing mobilization among occupational therapy practitioners to move away from mechanistic and positivistic treatment approaches and embrace the roots of the profession in occupation.<sup>1,3-6</sup> Occupational therapy upholds the tenet that occupation, consisting of contextually meaningful and purposeful daily life activities, has the ability to holistically affect the health and well-being of human beings and the dual optimization of occupations as means and ends differentiates the profession of occupational therapy from other health-care fields.<sup>7-10</sup> As occupations occur within natural contexts, the influence of culture on occupation is undeniable.<sup>11,12</sup> The effectiveness of culturally responsive care has been demonstrated by several quantitative and qualitative studies.<sup>13-18</sup>

A cursory review of content tables and abstracts published in the Indian Journal of Occupational Therapy (IJOT) between January 2001 and May 2017 reveals that the occupation-based perspective has not herein been explicitly articulated or discussed by researchers and practitioners. Only 2% of the articles published in IJOT between 2005 and 2011 examined the relationship

between engagement in occupation and health.<sup>19</sup> Although practitioners may be aware of the need for occupation-based intervention, there is no clear guidance to its application in the medical or biomechanical paradigms. Hence, it is pertinent to focus on theoretical models and frames of reference as they equip clinicians to communicate the logic and defend the rationale of their treatment decisions by supporting the evidence to explain not only why a certain intervention is used but also how it works.<sup>20</sup> One must, however, be aware that several practice models are identified as occupation-based yet Western-centric in the literature including but not limited to the Canadian Model of Occupational Performance and Engagement, Model of Human Occupation, and the Person-Environment-Occupational Performance model.<sup>21-25</sup> Occupation is viewed through such Western-centric models as a manifestation of human beings' intrinsic need to be active, to act on and gain mastery of their environments, to be purposeful, to set and achieve targets, and to be productive.<sup>26</sup> This view of occupation is a perfect fit for Western societies that value individualism, industrialism, capitalism, intrinsic motivation, autonomy, independence, and control over the environment. However, the constructivist critique of the Western-produced models argues that these models do not capture the core of occupation and occupational performance in the Eastern context as they are difficult to apply to a society that embodies collectivism, decentralization of the self, oneness with the environment, and social hierarchies.<sup>27,28</sup> An Eastern society may view the person as one with his or her environment, consider occupation a part of life-long identity, fail to understand why a person needs to gain mastery over contextual elements, and reject the importance of the individual over the collective or of independence over interdependence.<sup>28,29</sup> Many of the terms and concepts of Western models are difficult to translate into Eastern languages, and often, the real and complete meaning of those concepts is lost in literal translation.<sup>26</sup> Gupta<sup>30</sup> described karma, fate, evil eye, somatization of poorly defined symptoms, and other such faith or belief-related concepts, as well as social devaluation and stigma associated with disability as major factors impacting health-care attitudes in India. These beliefs and attitudes are difficult to account for and address in Western-centric models of practice. In the Indian context, it is difficult to categorize caregiving, prayer, or community duties into the "privileged triad" of activities of daily living (ADLs), leisure, and work.<sup>29</sup> Similarly, productivity and contentment are sought in harmonious interdependence and community rather than individualism or financial independence.<sup>29</sup> Social systems are deeply hierarchical even today and play a central role in defining self-identity. All decisions, including health- and rehabilitation-related decisions, are often made collectively rather than individually.<sup>30,31</sup> Imposing the Western models on practice in Eastern contexts is, therefore, considered hegemonic theoretical imperialism and must be consciously avoided.<sup>29</sup> In these times of an ongoing paradigm shift, occupational therapy practitioners in Eastern parts of the world, such as India, are encouraged to evaluate models that are not only occupation-based but also appropriately responsive to the needs of their clients within their own cultural contexts.

However, the cultural impact on health care must not be misconstrued as social backwardness, lack of scientific

attitudes, or construction of traditional health system silos. By the year 2030, nearly 590 million people in India will reside in urban areas.<sup>32</sup> Although traditions and cultural influences are central to the concept of "being" in health care for Indian clients, the amalgamation of multilingualistic, multicultural ethnicities with rapid industrialization, globalization, and urbanization is leading to the development of a distinct cultural identity, inclusive of both contemporary scientific affinity and cultural loyalty, for educated, globally-connected Indians as well, which cannot be ignored.

The traditional and non-traditional cultural idiosyncrasies and characteristics of the Indian cultural context need to be addressed competently by a model of occupational therapy customized to the occupational story of the unique client it seeks to serve, without subjecting the client or the model to forced conformity. The Kawa model's Eastern philosophy and the decentralized view of the individual as an indivisible element of his or her environment demonstrate the characteristics required of an occupation-focused, culturally responsive, and client-centered practice model,<sup>33</sup> with the potential to serve as a relevant and effective practice model for occupational therapy in India. Hence, an exploration of this model with regard to its application in the Indian context is warranted.

## METHODS

This is a narrative literature review. Using a purposive sampling technique, an extensive search of various online databases relevant to health care, and specifically occupational therapy, including but not limited to PubMed, EBSCO, OTSeeker, Google Scholar, and CINAHL, was conducted. Qualitative as well as quantitative human research regarding occupation-based and culturally responsive occupational therapy as well as the use of the Kawa model was consolidated. A summary of the most relevant search results and strategies is displayed in Table 1. Due to the high number of yields on Google Scholar, a visual search of the first 15 pages, followed by a review of selected abstracts, was conducted to narrow down the results. In addition, online searches were conducted pertaining to related knowledge fields, such as medicine, nursing, rehabilitation and occupational sciences, social sciences, education, employment, and psychology. Contemporary occupational therapy practice and research in the Indian subcontinent and the impact of culture on Indian health care was researched through Google Scholar as well. Books relevant to theoretical model use in occupational therapy, with emphasis on the Kawa model, were reviewed in detail. All literature selected for detailed review was in English or with available translation to English and was published between 2007 and 2017.

## RESULTS

The Kawa model, created by Michael Iwama in collaboration with Japanese occupational therapy practitioners, is based on a holistic approach to life and occupation with the tacit assumption of decentralization of self, wherein the individual is an inseparable part of the collective whole, one with nature, and contextual in existence.<sup>28,33</sup> Although this model has its

**Table 1:** Online Search Results

Database	Keywords and limits	Number of results	Number of articles selected for detailed review
PubMed (Search 1)	Occupation-based AND (cultural OR culture OR culturally) Limits: 2007–2017	Initial hits: 19 After limits: 16	7
CINAHL Plus (Search 1)	Occupation-based AND (culture OR cultural OR culturally) Limits: 2007–2017, academic journals, duplicates removed	Initial hits: 30 After limits: 15	9
PubMed (Search 2)	Kawa model AND occupational Limits: 2007–2017	Initial hits: 4 After limits: 4	4
CINAHL Plus (Search 2)	Kawa model AND (MH “Models, Theoretical+”) Limits: 2007–2017, duplicates removed	Initial hits: 20 After limits: 16	5
Google Scholar (Search 1)	Kawa model AND occupation OR occupational Limits: 2007–2017, exact phrase “Kawa model,” duplicates removed	Initial hits: 419 After limits: 374	19
Google Scholar (Search 2)	“Kawa model” AND India AND “occupational therapy” Limits: 2007–2017, exact phrase “occupational therapy” and “Kawa model,” duplicates removed	Initial hits: 59 After limits: 4	0
Google Scholar (Search 3)	“Culturally relevant” OR “culturally responsive” OR “culturally competent” AND India AND “occupational therapy” Limits: 2007–2017, exact phrase “culturally relevant,” “culturally responsive,” “culturally competent,” and “occupational therapy,” duplicates removed, English language, discipline specific	Initial hits: 691 After limits: 17	3

philosophical and metaphysical roots in the Japanese cultural context, it is designed to be adaptable to the social and cultural context of the user. It places an emphasis on the entire “being” of the client instead of focusing on the separate elements that are otherwise classified by Western theoretical models to explain processes or components of occupational performance.<sup>33</sup>

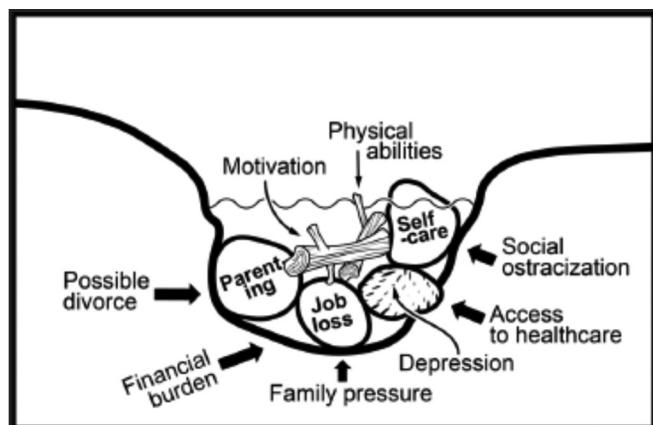
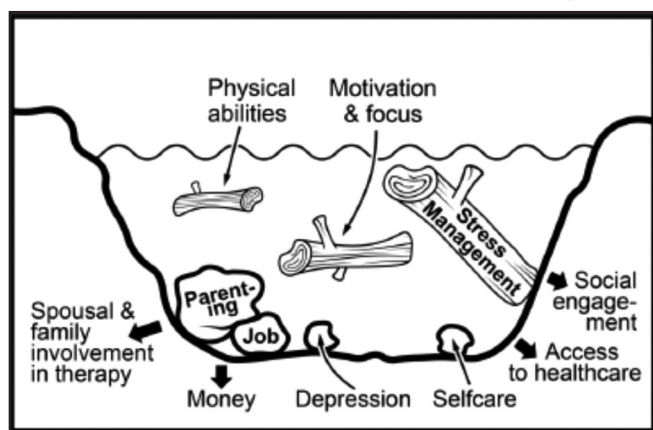
The structure of the Kawa model is based on the metaphor of a river (*kawa* in Japanese), reflective of the unidirectional journey of life from birth to death. The illustration of the model represents a cross-section of the *kawa* of a person’s life in the present.<sup>33</sup> The various components and features of the Kawa model are as follows:

1. Water (*mizu* in Japanese): *Mizu* represents the client’s “life flow.” Just as water changes its shape according to its surroundings, a person’s life flow changes according to the different events, characters, barriers, facilitators, and emotions that occur from time to time. In the Kawa model, the water interacts with the rocks, driftwood, and river walls and riverbed to represent the current life flow of the client.<sup>33</sup>
2. River walls and riverbed (*kawa zoko* in Japanese): The *kawa zoko* represents the social, physical, cultural, and occupational circumstances of the client and can impede or facilitate the speed and the volume of water that flows in the client’s *kawa*.<sup>33</sup>
3. Rocks (*iwa* in Japanese): The *iwa* or rocks represent objects, circumstances, events, or characters that the client perceives as challenges to optimal life flow, occupational performance, or participation.<sup>33</sup>
4. Driftwood (*ryuboku* in Japanese): Personal assets and liabilities are both represented by *ryuboku* as it can either float without affecting the water flow, act as a barrier when it gets stuck between rocks or river walls, and also push rocks and silt out of the way. Driftwood can stand for personal characteristics, skills, attitudes, behaviors, beliefs, resources, people, objects, or phenomena and can change functionality according to the circumstances.<sup>33</sup>

5. Spaces (*sukima* in Japanese): When all the different components of the Kawa model are put together in one picture, the *sukima* represents the spaces between these various objects and ideas, wherefrom the water can flow to maintain the life flow of the client. These spaces are the foci for occupational therapy intervention. By facilitating an increase in the *sukima*, the occupational therapy practitioner focuses on increasing the speed, volume, and overall flow of the client’s life.<sup>33</sup>
6. Health and Disability: In the Eastern context, health and disability are viewed in relation to the level of harmony between different elements of life.<sup>33</sup> Dysfunction and disability are viewed as the absence of harmony, wherein barriers, liabilities, relationship issues, and broken interdependencies between various elements obstruct the *kawa*’s smooth life flow through the *sukima*. If life flow is thus diminished, the emergent challenges may impact the speed and volume of the life flow even more negatively than otherwise.<sup>28</sup> On the other hand, good health is viewed as the harmonious coexistence, interdependence, and dynamic interaction between the challenges, barriers, assets, liabilities, and personal, and social environments in such a way that the course of life’s *mizu* is strong, free-flowing, and voluminous. Figure 1 shows the disease and disability end of the spectrum through the Kawa model, and Figure 2 represents progress toward the health and optimal occupational performance end of the same spectrum.

An in-depth analysis of currently available literature has revealed that there is a significant dearth of literature exploring the use of the Kawa model in India, as no published empirical research directly addressing the use of this model in clinical practice in the Indian context exists. However, the consolidation and analysis of the obtained search results, as elaborated on in the discussion section of this paper, demonstrate that the Kawa model is not only an occupation-based model of practice but also possesses the attribute of cultural responsiveness largely suitable to effective



**Figure 1:** Illustration of a Hypothetical Client's Kawa Model at Evaluation**Figure 2:** Illustration of the Client's Kawa Model at Follow-up

application in the Indian occupational therapy market for clinical as well as non-clinical purposes.

Carmody *et al.*'s<sup>34</sup> grounded theory approach to studying the experience of using the Kawa model with two clients with multiple sclerosis reported that the Kawa model enabled the occupational therapy process by allowing the participating clients to express their cultural perspectives and beliefs, and the practitioners and clients to experience a positive clinical interaction with focus on physical aspects, social factors, and occupational needs and strategies. Occupational therapy practitioners were able to build comprehensive occupational profiles of the clients as a result of the Kawa narrative.<sup>34</sup>

Similarly, a phenomenological study of the lived experiences of occupational therapy practitioners in applying the Kawa model in a mental health setting found that there was a definitive increase in two-way dialog between the practitioners and their clients as a result of using the Kawa model, which led to a significant increase in goal-directed collaboration.<sup>35</sup> This collaboration further affected an increase in client-practitioner interaction and positive energy levels, automatically ensuring client-centered care and successful outcomes. The Kawa model allowed the clients to easily express themselves in a manner consistent with their own cultural beliefs and values. Although the model placed the clients' narratives at the center, it still had some structure in terms of its various components, thus preventing the language from becoming too vague, subjective, or medically-oriented.<sup>35</sup>

Another phenomenological study demonstrated that the Kawa model is an excellent theoretical model to guide exploration and intervention of recovery experiences of female survivors of intimate partner violence.<sup>36</sup> This study displayed the potential of the model to enable occupational justice by guiding intervention with economically, socially, and culturally marginalized populations, as it allowed contextual understanding of the clients' circumstances, cultural adaptability, and responsiveness to their distinct occupational needs without depending on a medical diagnosis to warrant occupational therapy intervention.<sup>36</sup> Thus, evidence points to the possibility for the Kawa model to be used as a medium and catalyst for holistic recovery and rehabilitation in institutional and community-based mental and physical health-care settings.

A quantitative one group pretest-posttest study has demonstrated that intervention guided by the Kawa model and characterized by client-driven, client-specific treatment methods with emphasis on close client-provider collaboration, harmonious occurrence of occupations within natural contexts, and multi-factorial and dynamic support-challenge systems within the occupational therapy process can effectively improve overall holistic occupational performance for clients in terms of (1) ADL performance, (2) quality of social interaction, (3) satisfaction with occupational performance and activity levels, (4) independence and effort required for daily occupations, (5) reducing psychological problems and severity of psychopathological symptoms, and (6) goal attainment ability.<sup>28,37</sup> The inherent holistic approach of the Kawa model combats the pressure of fitting the occupation-based practice into biomedical boxes in medical records by allowing client-centered care, which is able to capture the complexity and synergy of the various elements that constitute occupation, while at the same time, allowing the practitioners to be evidence based and technically sound on their end.

In terms of non-clinical application, Lape and Scaife used an exploratory qualitative approach to explore group perceptions regarding the use of the Kawa model among rehabilitative professionals, deliberate on methods of using the Kawa model as a tool for interprofessional collaboration and teambuilding, and outline potential areas and issues for further research regarding the use of the Kawa model as a tool for interprofessional collaboration and teambuilding.<sup>38</sup> They found that using the Kawa model in team building and collaborative processes creates a positive environment, increases interprofessional empathy and team cohesiveness, helps to identify the strengths and weaknesses of the individuals and the team as a whole, and guides conflict resolution.<sup>38</sup>

Despite promising findings from qualitative studies, conclusive quantitative evidence regarding the Kawa model's effectiveness is limited at this time. However, there is an emerging body of research, which speaks to the potential of this model in enriching the quality of evidence-based occupational therapy.

## DISCUSSION

This narrative literature review highlights the fact that the Kawa model is both a model and a frame of reference.<sup>33</sup> Its content is

the client's own narrative, because of which it is important to define the "client" in practice.<sup>33</sup> The model appears different and applies in variable ways for each client. That is the model's locus of client centeredness. It is pertinent for practitioners and clients to examine their own cultural lenses and compatibility with the sensibilities of the Kawa philosophy before applying the model's metaphorical concepts to everyday clinical situations.<sup>33-37</sup> It is evident from this narrative review that the use of the Kawa model has several potential advantages in the Indian occupational therapy field as the model has the potential to respond to both clinical and non-clinical needs of occupational therapy service users and providers.<sup>34-38</sup>

Indian practitioners and clients are likely to truly understand the value of the metaphor and the decentralized self in providing occupational insight by virtue of their own cultural backgrounds, thus allowing them to easily and competently alter the identification and definition of the "client" from a single referred individual to a patient-caregiver dyad, a family, or a community, depending on the occupational circumstances.<sup>33</sup> At the same time, a certain level of difficulty with changing practitioner attitudes from positivistic to holistic and from medical to occupation based is to be initially expected in the contemporary Indian context, because of which discussions regarding occupation-based and culturally responsive practice are necessary at individual, local, national, and international levels. The Kawa model's focus on the "life flow" of a person instead of compartmentalization of the client's life into separate personal and environmental factors or into ADLs, work, and leisure naturally impels the clinician to adopt a holistic occupational performance-based approach instead of a positivistic, dysfunction-based medical approach.

The Kawa model may provide direct insight into the operational aspects of occupational therapy as well. In Indian rehabilitation facilities and hospitals, occupational, physical, and speech therapy practitioners often function as separate departments. As demonstrated by Lape and Scaife, applying the Kawa model toward team building could bridge the divide between these departments, facilitate cohesiveness among professional counterparts, and help provide a truly seamless and interdisciplinary health-care experience to clients.<sup>38</sup> The strengths, weaknesses, opportunities, and threats (SWOT) analysis is a popular strategic analysis method used in business and management sectors. It enables measurement of internal qualities (strengths and weaknesses) of a proposal, plan, program, business, or idea against the existing and potential external impacting factors (opportunities and weaknesses) to identify and guide a strategic path for vision fulfilment.<sup>39</sup> Van Wijngaarden, Scholten, and van Wijk emphasize the need for a more open and flexible organic SWOT instead of a regulated one for use in health care as it allows the various elements to assume different qualities and impact one another dynamically, thus creating a more holistic analysis of the entity under the study.<sup>39</sup> This type of organic SWOT analysis is comparable to the Kawa model's structure and functionality. The holistic and interdependent view of the elements of the SWOT analysis matrix can be made possible by the Kawa model and can, in fact, allow more detailed and insightful strategizing than using the SWOT alone.

Further, the Kawa model can potentially be used in a creative and effective manner for employee or student appraisals in Indian rehabilitation settings, including educational and clinical practices. The collaborative interaction between the reviewer and reviewee, the establishment of an intimate and trusting dialog, the revelation of suppressed interdependent factors affecting participation, and the holistic view of occupational performance made possible by the Kawa model are as beneficial in appraisals and career planning as in client evaluations and treatment planning. It is expected that the Indian context is well-suited for using the Kawa model in this manner due to the strong prevalence of professional hierarchy, value-based collective attitudes, and prevailing cultural and socio-economic diversity in the workplace. The Kawa model, complemented with existing objective assessments, will help gain more insight into the overall performance and "life flow" of employees or students instead of providing an incidental view of performance in a cross-sectional plane. It will also help employers and employees set culturally responsive and subject-oriented career goals and measure their achievement. The use of the Kawa model will facilitate dialog between supervisors and employees or teacher and students at a level that is authentic, meaningful, and which allows one to view another as a "person in context" versus just a professional label or position. The Kawa model can similarly be used by Indian occupational therapy practitioners to conduct their own self-appraisals to map their career graphs, to strategize for future growth, and to facilitate continued competency.

## CONCLUSION

The Kawa model's great promise lies in its ability to be culturally responsive as a philosophy and practice model for clinical and non-clinical application in India, while granting occupational therapy practitioners the potential to remain true to the foundational occupation-based principles of their profession as they compete in the race for scientific progress and technological advancement. The rich cultural heritage, beauty, pride, and prosperity of India lie in its cultural, religious, linguistic, and socioeconomic diversity. Hence, occupational therapy models such as the Kawa model that honor, respect, understand, and respond positively to the unique life circumstances of Indian clients should be considered, examined, and implemented by Indian occupational therapy practitioners in clinical, community, and educational settings, as these models inherently facilitate bimodal authenticity that is professional as well as cultural. The roots of the Kawa model are in Japan. Its structure and philosophy are similar to the Indian way of life. However, the next step in the assimilation of occupation-based, culturally responsive practice would be to create and develop a model and frame of reference that is rooted in Indian values, ideologies, and beliefs. A more detailed study of the Kawa model, creation and inclusion of culturally responsive theoretical practice models in occupational therapy practice and education, an ongoing analysis of emerging literature regarding occupation-based practice from the Indian perspective, and original quantitative and qualitative research in this field will definitely contribute to this effort.

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# Formulating Functional Goals in Pediatrics: A Process Shaping the Intervention

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## Abstract

**Background:** Occupational therapy (OT) aims at promoting health and well-being, through participation in occupations that people want to or are expected to perform in society that is unique to the individual and context. For a child, the family forms major context influencing child's participation. Same holds true for families' participation in society.

**Objectives:** This pilot study shares the process of formulating functional goals, one of the pivotal steps of intervention; with a family using a semi-structured interview.

**Study Design:** Qualitative case study.

**Methods:** This qualitative case study uses semi-structured interview, spread across two sessions were conducted for formulating functional goals with the family of a 5-year-old girl child diagnosed with autism spectrum disorder. She has been receiving OT at author's workplace since 2 years. Each session was structured to get specific information as follows: First: Child's interests, participation in everyday routines in different contexts and families' hopes. The questions helped them articulate reasons for choosing a participation outcome and identify contextually appropriate activities for its achievement. Second: Performance components required to reach the outcome. After 2 months, the parents were interviewed to understand their perspective on this process.

**Results:** This method of formulating functional goals in collaboration with the family seemed to influence the child, family, and therapist. Child's participation within home, school, and community was central focus of the intervention plan. It increased the opportunities to practice the skills in specific context thus leading to independence. The child's increased participation reduced the family's stress and allowed them to reorganize their time and energy for interaction with their other child and for household chores. Understanding the child's strengths and difficulties helped them apply therapeutic activities in their context. It allowed the therapist to step down from expert position to partner with the family. This facilitated opportunity for mutual learning.

**Conclusion:** Such a method of formulating functional, participation based goals is congruent to fundamentals of OT. The therapist family collaboration not only influences the primary recipient of services - the child; but also the family and the therapist. It highlights the reciprocity of child and family's participation on each other and supports the shift toward family-centered practices.

**Key Words:** Collaboration, Context, Family-centered Practices, Functional Goals, Participation

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July, 2016 to October, 2016

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## INTRODUCTION

The emphasis on using the biopsychosocial model of the International Classification of Functioning, Disability, and Health (ICF) framework within pediatric practices to understand disability and its impact on a child and his/her family is increasing.<sup>1</sup> It emphasizes the bidirectional influence of participation in activity and function and vice versa.<sup>1</sup> The participation is also shaped by the families' context, priorities, desires, and values.<sup>2</sup> This seems to support the shift from client-centered approach of occupational therapy (OT)<sup>3</sup> to family-centered practices (FCP).

Using FCP, therapists collaborate with families to involve them in equal decision-making related to assessment, goal-setting, intervention planning, and designing a home program.<sup>4</sup> Setting goals is one of the pivotal steps of intervention planning and implementation.<sup>5</sup> Goals should be such that they are unique for the clients and influence their participation in preferred occupations in society. Focussing on participation and the values and hopes of the family behind it makes the exercise of goal-setting more participatory, and family-centered.

This case study presents a unique goal-setting approach that deconstructs the families' hopes for the child's participation in various settings. Goals that are aligned with this objective are designed. Greater ownership of the goals and its implementation, parent empowerment and a shared understanding of therapeutic objectives are expected to be outcomes of such an approach for goal-setting.

## METHODS

### Study Design

This is a qualitative pilot case study which uses semi-structured interview for data collection. The data were analyzed using thematic analysis.

*Presented at OTICON, 2017: The 54<sup>th</sup> Annual National Conference of AIOTA at Jaipur.*



## Participant Information

This case study<sup>6</sup> was undertaken with the family of a 5-year-old girl child, S, diagnosed with autism spectrum disorder. The child has been receiving OT services at author's workplace for 2 years for individual intervention sessions provided by the first author.

S's family consists of her parents and an elder sister. Her mother accompanies her most of the therapy sessions. Her father is equally involved in the intervention process such as decision-making and implementing some of the home-based strategies. A written informed consent was obtained from S's caregivers for documenting and sharing this data for research purposes.

## Intervention Characteristics

At author's workplace, therapeutic services are offered in cycles of 8 weeks on-off, i.e., 8 weeks of intervention (ON) followed by 8 weeks of break (OFF). During the ON phase, intervention is provided for 8 consecutive weeks for an hour. The primary source of intervention during the OFF phase is the home program. The participant of this study has received 5 such cycles of OT intervention. The present study shares the goal setting process done in the 4<sup>th</sup> cycle with the child.

Goals are formulated for the children with the families and documented in the form of individualized family service plan (IFSP) at the start of each intervention cycle and reviewed at the end.

Each intervention session is structured into two parts: 50 min of direct intervention with the child and 10 min of discussing the session and its link with the IFSP and home program for that week. Families are invited to participate in both of these parts.

## Rationale for the Goal-setting Questionnaire

The ICF model provides a framework for goal-setting as it helps in understanding the client's activity level and participation in various contexts.<sup>1,5</sup> Both activity and participation are defined by additional qualifiers such as capacity and performance.<sup>1,5</sup> The capacity of a client refers to the capabilities to function in an ideal situation, whereas the performance is the capabilities to function in the actual given context.<sup>1,5</sup> The therapist then can identify the gap between the two and determine the goals for the child's participation.<sup>1,5</sup> When this is done in collaboration with the family and taking their values and hopes for the child into account, it makes this exercise more meaningful and participatory.<sup>7,8</sup>

A semi-structured interview with six stem questions was then developed by the first author, which were designed to elicit information regarding:

- The child's participation in everyday routines across contexts
- Family's hopes for child's participation
- Performance components needed to achieve the desired outcomes.

## Process of Formulating Functional Goals with S's Parents

The interview was conducted in two parts in the last 15–20 min of the first two sessions of the 8 week cycle. Spanning the

interview across two sessions provided the family with an opportunity to reflect on the discussion. For this family, the interview questions were translated into Marathi. Both parents were available during the first part of the interview while for the second part the mother was present. While the interview was in progress, the author made handwritten notes of the information shared by the parents.

Table 1 (Refer Appendix) summarizes the questions asked by the therapist and the intentions behind asking those questions. The author used scaffolding questions along with summarizing to facilitate the stem questions.

An excerpt of this conversation is depicted in Table 2 (Refer Appendix).

In this particular part of conversation, the gap between the capacity and performance qualifier helped the therapist and the families develop goals for functional hand use. Thus using FCP principles with this family, participation based goals were elicited.

## Data Collection and Analysis

After 2 months, the parents were interviewed to understand their perspective on this process (Refer Appendix Table 3). These feedback questions were developed by first and second author with an aim to get information on the influence of this process on intervention and on child and family's participation. The interview was recorded and transcribed. Written informed consent was taken from the parents to use the interview data for the research. The information was iterated using thematic analysis by first and second authors individually. Final conclusion was agreed on with the third author.

## RESULTS

The feedback at the end of 2 months to review this process of setting goals provided valuable information. Apart from formulating goals, this process seemed to influence all three stakeholders of the intervention: Child, family, and therapist. The verbatim of the family members (M: Mother, F: Father) is mentioned in italics.

### Child

The intervention plan focused around increasing the child's participation in the different settings - home, school, and community. The family expected goals to be applicable even beyond the therapeutic scenario. This was evident when they said:

*M: Goals should be practically possible...*

*F: It should be easily implemented in our settings.... because there are certain things that she does here... (pause)...but....the goals should be such that it should be easily applicable for our settings..*

As part of formulating the goals, performance components for the desired behavior were discussed with the family at the start. This seemed to help the family make specific observations during the sessions and link it to the outcome as well as execution of home program by the family. More opportunities were created for the child to practice these components in a specific context and contributing to independence. The family

shared some of the opportunities that they created within their context:

*F: (For a goal which involved S's ability to walk over uneven surfaces in community) At home we have stairs...so letting her walk on that...even walking through obstacles (things fallen down already)...We let her climb stairs at the station (railway station)...she still needs support while coming down... but definitely can climb up (the stairs) without support... (For the upper extremity use) Pouring the wheat in the bottle...that she has to hold the bottle with one hand and pour it with the other...It is easily available at home and that's why it is possible also...While eating, holding the dish in one hand and then eating with the other...During bathing...holding the bucket with left hand and then puts water on one side only... then we show her and tell her... "put on this side also..."*

The father also mentioned the need to create these opportunities out from home and therapy session and within the natural context such as commuting on the road.

*F: (If we were to create) Anything at home we ask her to do... becomes artificial...but if while walking on roads...there are obstacles...she has to understand how to cross over those... It should not be that the making her sit and then do certain things...but it should happen naturally...while walking, talking etc....in her regular life she has to walk...so then teaching her during that time...giving her instructions...*

## Parents

The child's increased participation in their context seemed to reduce the family's stress. The father mentioned the influence of this on their family:

*F: She has achieved around 80 to 90 percent of the goals... Little bit...means...mentally...ummmm...(pause)...means little bit...(stretched)... initially the tension which was at the peak...very high (pause)...that has little bit reduced...now that her increased ability to do things independently...it feels good...this is very important...it is very difficult to articulate how helpful it is...but we are experiencing it right now...*

With the child's increased independence, allowed the parents to reorganize their time and energy for interaction with their other child and for household chores. They described this using the following words:

*F: (As S's ability to follow instructions and attend to one activity improved) Now S is able to sit at one place and concentrate on her favourite things...so we let her do that...and utilise that time to do our other work...this (her progress) has impacted on us a lot...now we can spend time on ourselves...until now we used to not look at ourselves... not attend to our elder child...now that S is stable...sitting at one place...so let's take A's (elder child's) studies... F: Initially...our social life...what do we want..we used to not consider that only...only S...that's it...now atleast a little bit...not complete but even that little bit of time we can attend to each other.*

Discussions around activities and their rationale during the therapeutic sessions contributed to devising a collaborative home program. The parents shared the creative ideas that they formulated at home. For an instance, participation in household chores such as holding the box of rice with one hand and pouring it into the other

container with the other hand, carrying a heavy bag of vegetables in right hand, and pushing the door open in stores.

The parental focus was more toward identifying the child's strengths and using that to work toward some of her difficulties. They identified her learning styles and shared examples of teaching her new skills using following words:

*M: Nothing is going to be easy and quick...for everything we will have to give enough time...*

*F: She always wants to learn new thing....how she does it...she will look (at others) and will do it...*

Both parents expressed the need for collaborating with their child's therapist. They mentioned how this should be something that all parents experience.

*F: Definitely it is needed...every parent should know how our child is talking, walking...unless and until we tell you our observations...we will not be able to decide on a goal...because we are with her for more time...then you match it...that she is behaving like this so it could this...*

They mentioned that their understanding and observing S during the course of therapy extends to other children in their neighborhood. They said:

*F: Apart from our child, we are even observant of other children...how are they developing their milestones...when and how are they walking, talking...etc...and we do tell their parents to look and check...discuss with a doctor...*

## Therapist

Finally, this collaborative method of formulating functional goals allowed the therapist to step down from expert position to partner with the family. This created opportunities for parental participation in the therapy process. The sharing of information between the therapist and family facilitated learning for the therapist and made the intervention plan smoother and more impactful for the child.

This partnership was expressed in the parental words in the following way:

*F: We told you about S, her schedule, this is the way she eats...walks...accordingly you set the therapy (session)... we don't have much knowledge on this...for instance... you told us the reason behind why you were doing the bouncing on the ball...and then we understand that it is very important for her body tone.*

## DISCUSSION

The method of formulating functional goals described in this study allowed the therapist to partner with the families for the participation focused intervention. The discussions with S's parents around her capacity and performance across the different contexts and their hopes for her participation appeared to be of prime importance to this case. The following section highlights the impact of these two components on the intervention, the participation based intervention and use of FCP approach.

The present study supports the core idea of OT of enabling participation.<sup>3</sup> The semi-structured interview questions helped formulate the goals focusing on the participation of the child and

also guided and influenced the entire intervention of the child.

Acknowledging the performance qualifier while implementing intervention had a significant impact on the home program plan.<sup>5</sup> Considering their contexts while developing the plan in itself increased the opportunities for families to carry out the home-based strategies. It enhanced the compliance to adhere to the home program. Another thing which stood out was the ability of parents to generalize the plan and add variations to those, which enhanced the incidental learning. The increased participation in the different contexts influenced the bodily structures and functions as well. Thus, this study supports two-way process illustrated in the ICF model.<sup>1</sup>

This study supports previous literature related to incorporating FCP in therapeutic intervention while working with children.<sup>7,8</sup> Parents assume the driver's role in the intervention and make the decisions while the therapist assumes the role of a facilitator.<sup>8</sup>

The questions around hopes and dreams of the families for their child strongly comes from the assumption that parents do have realistic hopes for their children as they are the experts of their children.<sup>9</sup> The hopes are shaped by the values. Asking questions related to the parental values helps the therapist understand what is important for them.

Inviting the parents to contribute to the therapeutic process from the start then set the ground for further collaboration such as planning intervention and designing a home program. Such collaboration involves both the relational as well as participatory components of FCP.<sup>10,11</sup> In this study, the regularity of services offered could be one of the significant factors contributing to the relational component of FCP. In addition to this, respecting and honoring the hopes and dreams expressed by the family along with active and empathetic listening could be contributors. The question stems facilitating the discussion around outlining the steps needed to reach toward the desired outcome could be linked to the participatory component. The participatory component was not limited to the goal-setting process.

As goal-setting guides the intervention, this method of goal setting seemed to be the keystone for the development of the partner relationship between the parents and the therapist for the rest of the intervention plan. Continued discussions around the different contexts, child's behaviors and different strategies used promoted the partnership constantly. As proved in previous studies, this collaboration and active participation of families not only helped in increasing the parental understanding of their child but also enhanced their sense of perceived competency.<sup>11-13</sup>

Another highlight of this study is the influence of child's participation in the families' participation. Rentick *et al.* in their study with families of children with cerebral palsy describe the perceived restriction of families in their personal chores and roles linked with the care of their child with cerebral palsy.<sup>14</sup> Thus, families' participation in their occupations is influenced largely by the child's ability to participate.<sup>14</sup> Intervention services with children are thus not impacting the child but also the families' participation. In this study, the parents felt empowered not only because of the child's ability

to participate in different contexts but also with the parents' increased participation in other roles or occupations that they are expected to perform.

## Future Scope and Limitations

This study supports the employment of FCP in pediatric OT. The method used in formulating goals invited the family to participate actively in the therapy. This needs to be explored further with other families across different disabilities.

The questions in themselves carried the therapeutic values. The skills around questioning and scaffolding are assumed to be an integral part of such a process. Thus, this questionnaire can be used differently by different professionals. Mentioning the intention behind asking a particular question is a way to reduce this uncertainty. However, a list of probing questions would help a beginner with the scaffolding as well as maintain uniformity across its administration.

## CONCLUSION

This method of formulating functional, participation based goals-assists the OTs to enable the child to participate in the society. Thus, the therapist family collaboration influences the primary recipient of the services, i.e., the child. The mutual learning and shared implementation of services are encouraged during this process, thus having an impact on also the family and the therapist. In addition to this, it highlights the reciprocity of child and family's participation on each other and supports the shift toward FCP. The conversations facilitated by this method of goal setting in itself had therapeutic value.

## ACKNOWLEDGMENTS

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## APPENDIX TABLES

**Table 1:** Question used During Goal-setting Process

Sr. No.	Questions	Intentions
1.	Before we move on to our hopes for S, I would want to know some of the things that she has recently started doing	To understand child's current functional status across different contexts majorly. It also captured some of her recently developed interests
2.	What are your hopes for S for these 2 months? What are your intentions behind having those hopes? Why it is so important for you?	To understand families' hopes for her. It helped the family visualize their expectations for future and its importance for them as well as for the child
3.	Where and how will she be using these components in routine? What will be possible for S if she could perform these tasks?	To help families' link their hopes with her abilities to participate in the desired context. And to visualize the desired functional behaviors that will be seen when she achieves a particular outcome
4.	How does she perform these tasks right now?	Understanding her performance in the areas that are mentioned by the parents as their hopes
5.	What are some of the steps we need to take to reach the outcome that you mentioned?	To formulate the plan collaboratively with families based on the outcomes discussed
6.	What are some of the behaviors that we expect to see while we are working on these steps?	Helping the families visualize the expected component behaviors

**Table 2:** Excerpt of the Conversation during the Goal-Setting Process

Q: What are your hopes for S for this present cycle?
F: We feel that she should start using her right hand now
Q: Where do you want her to use her right hand now? What will S be able to do if she starts using her right hand?
F: Eating is an important thing for her. She should start using her right hand for holding the plate now for eating. Everything else she is doing very nicely. She asks for food and eats by herself with the left hand but her right-hand use is very important
Q: Why is it important for you?
M: We see that she has understood how to do a sequence of actions but she is not able to do it because of her right hand (being not used). So it is important
Q: What will happen or be possible for S if she starts using her right hand?
F: I think it will help her hold the plate in one place and then eat with the other. The spillage will reduce. She will get more independent in this task. Also once she understands how to use her right hand for eating it will be automatically translated to other activities like bathing, dressing, etc., So she will become more independent in general. Plus, presently this is something interfering with her studying also. She is not able to grip the pencil properly and write on the paper. So in school then she lacks behind in writing related to this. We don't want her to write. But at least holding the pencil properly in one hand, the paper in the other and at least scribbling. So, in general, this will in all these activities make her independent
S: The child, M: S's mother, F: S's father

**Table 3:** Feedback Questions

Sr. No.	Feedback questions
1.	What were your thoughts when you were told that we will set goals for your child? What were you expecting will/should happen?
2.	How did the process occur?
3.	Did it match/not match/somewhat match with your expectations in the same? What parts did/did not match?
4.	What are some of the things that stood out to you from this meeting? Why did it stand out?
5.	How do you think this influenced the therapy process?
6.	Has S's increased participation changed or influenced your participation in other chores? What has that made possible for you both as parents or your family has whole? Why is that so important for you?
7.	Do you have any thoughts of how we can make this smoother for other families?



## NEWS AND INFORMATION

### OT Day 2017 (Oct.27): Celebration Report

Members of AIOTA, OT Educational centers and branches organized many events around the country to mark World OT Day-2017. The Theme for this year's OT Day and OTIndia Month-2017 was **"Inform, Inspire, Influence"**

The main focus was on promoting OT and to spread awareness about, how the occupational therapists use processes of enabling occupation to optimize human activity and participation in all life domains across the lifespan, and thus promote the health and well-being of individuals, groups, and communities. The events planned on OT Day by AIOTA members include helping children with disabilities to participate fully in school and social situations, helping people recovering from injury to regain skills, and providing supports for older adults experiencing physical and cognitive changes. To achieve it the events arranged were scientific talks, competitive activities by students and special children, flash mob & street plays at public places, blood donation camps, relief camps for specific problems and street walk and use of print, social media and discussions on national and state TV to generate public awareness. Occupational Therapy Institutions of G.S. Medical College, TN. Medical College, LTM Medical College, Dr. DY Patil Medical Colleges of Mumbai with Bombay Branch of AIOTA, PT. DDUIPH, Jamia Humdard, Indian Spinal Injury Center and OT4Kids center, Delhi with Delhi Branch, Kerala Branch with Pratyna Center, Cochin, Mahatma Gandhi University, Jaipur with Rajasthan Branch, Bihar College with Bihar Branch, Manipal College, and T.N. Branch have sent the celebration report. The celebration report is available on AIOTA Website [www.aiota.org](http://www.aiota.org) and is also being published in AIOTA News Letter.

Ritchard Ledger Executive Director WFOT has conveyed appreciation, thanks and gratitude to AIOTA, for once again coordinating a spectacular celebration of World Occupational Therapy Day and his appreciation to the institutions and branches of AIOTA. Visit World Occupational Therapy Day 2017 Roundup at <http://www.wfot.org/AboutUs/WorldOTDay.aspx>

### OTICON2018' Nagpur

OTICON'2018 is the 55th Annual National Conference of AIOTA is being organized at Nagpur from Feb. 16-18, 2018 to commemorate the Diamond Jubilee of OT School & Center, Government Medical College, Nagpur. The theme of this year's conference is 'Occupational Therapy: Independence, Empowerment and inclusion'

Industrial Health & Occupational Therapy (Environment, Ergonomics, Safety and Wellness at Workplace) is the title of ACOT organized Pre-conf. COTE. The resource faculties to conduct the COTE are Dr. Nandu Nandoskar (OT), Founder-Director of Occupational Health Adelaide, Australia and renowned Ergo-Physiologist and formerly Director of Central Labor Institute, Mumbai.

Many of the international faculties and alumni of OT School Nagpur and guests from USA, Canada, UK, Australia, Sri Lanka and Middle East have consented for participation and academically contribution. Dr. Vijay Suple (Canada) will deliver Key Note Address encircling theme of the conference.

The conference work is in full swing under the control of Org. Secretary Dr. Sofia Azad Principal & Professor, Occupational Therapy School & Centre, Govt. Medical College, Nagpur and EC Member AIOTA Dr.

Neeraj Mishra (New Delhi)- Chairman of the Scientific Program OTICON'2018. For more information visit [www.aiotanagpur.in/OTICON18](http://www.aiotanagpur.in/OTICON18), [www.aiot.org](http://www.aiot.org)

### Change of Venue of OTICON'2018-Nagpur

The conference will now not be held at earlier informed Vasant Rao Deshpande Hall due to unavoidable circumstances. The information pertaining to the Changed Venue will be uploaded soon on [www.aiotanagpur.in/OTICON18](http://www.aiotanagpur.in/OTICON18), [www.aiot.org](http://www.aiot.org). Regret for the inconvenience.

**Dr. Sofia Azad**  
Org. Secretary  
[oticon2018@gmail.com](mailto:oticon2018@gmail.com)

### Autism Therapy at Private Centers too brought under CM's Insurance

TNN | Nov 17, 2017

TRICHY: Therapy for autism will be free of cost in private centers as it has been included under the Chief Minister's Comprehensive Health Insurance Scheme (CMCHIS) in Tamil Nadu Autism spectrum disorder (ASD) leaves affected patients with impaired social interaction and communication skills. Considering the children being impaired due to the neurological condition, the therapy for autism has been listed as one of the treatments to be borne under the CMCHIS scheme.

It remained a costly affair for many people due to the expense. The inclusion of the therapy into the CMCHIS may help several economically weaker section people to get access to the therapy in the private centres. Under CMCHIS, sum insured for beneficiaries remained Rs 1 lakh for one policy year per family. The package rate for autism is Rs 1 lakh (per year) and it will be a cash less therapy.

The scheme laid down certain criteria for the therapy centres to get empanelled under the insurance scheme. Autism centres should be recognized by rehabilitation council of India and commissioner for differently abled of Tamil Nadu government. There would be some relaxations in the norms to remotely located institutions.

Minimum criteria for empanelment would be to ensure minimum infrastructure and quality therapies such as special education, occupational therapy, developmental therapy, speech and language therapy, psychologic and psychiatric therapy, physiotherapy, music, sport and outdoor therapy.

A holistic team comprising of psychiatrist, psychologist, paediatrician, occupational therapist, physiotherapist, speech therapist, developmental therapist and social worker should be appointed in the centres.

The centre should also maintain daily attendance of the patients, video evidence of counselling to prevent fraud. They should submit periodic assessments and progress reports to the scheme for payments. Feedback from parents will also be obtained to ascertain the progress of the patients. Different internationally accepted scales of autism and IQ assessment will be used for assessment.

Medical auditors of scheme will make surprise visits to the centres. Additional director for CMCHIS, Tamil Nadu, Dr. Selvavinayagam in Chennai appealed to the people to make use of the therapy.

<https://m.timesofindia.com/city/trichy/autism-therapy-at-private-centres-too-brought-under-cms-insurance/articleshow/61679551.cms>

## Database Software for Allied and Healthcare Professionals

A meeting was convened on request of Department of Health and Family Welfare, Government of India at Nirman Bhavan, New Delhi on Dec. 15, 2017 with stakeholders representing occupational therapy, physiotherapy and other health related professionals. It was regarding the database portal for voluntary enrollment by allied and healthcare professionals by uploading their personal and professional data into the portal <http://a2hp.mohfw.gov.in>. Meeting was convened by Kavita Narayan, FACHE, Technical Advisor, HRH/Skills for Health, National HRH cell, MoHFW. President AIOTA Dr. Anil Srivastava with EC Members Dr. R. K. Sharma and Dr. Lalit Narayan attended the meeting.

AIOTA strongly resented the structure of Database Software for Allied & Healthcare Professionals, on the reasons that occupational therapy profession has been ignored in its totality therefore AIOTA will withdraw itself from this database. Neither the specialty areas of occupational therapy: were specified nor the names of institutions signified occupational therapy as was specified for physiotherapy are found there in the portal. AIOTA also objected the name of 'Database Software for Allied and Healthcare Professionals' and suggested the name as 'Database Software for Occupational Therapy & Physiotherapy and Healthcare Professionals' or/else there should be separate database for Occupational Therapy and Physiotherapy professions in place of the existing one, which has clubbed these professions with heterogeneous group of large no. of Health related services.

Technical Advisor National HRH Cell has responded positively and assured that, most of the issues raised by AIOTA will be addressed and necessary changes will soon be made in the database portal with an information to AIOTA for enrollment.

## Book Release on World OT Day 2017

Department of Occupational Therapy of School of Allied Health Sciences, Manipal University, Manipal released the book Concepts in 'Occupational Therapy: Understanding Southern Perspectives' in presence of dignitaries of the University on the occasion of World OT Day 2017. The book editors include Dr. Sebastina Anita Dsouza, Prof & Head, Department of Occupational Therapy, SOAHS, MU and Dr. Roshan Galvaan and Dr. Elelwani Ramugondo, of the Division of Occupational Therapy, University of Cape Town South Africa. The book is published by Manipal University Press. President AIOTA Dr. Anil Srivastava has written the review of the book.

## Presentation from India in APOTS2017, Taiwan

Dr. Ramakrishna Masilamani, occupational therapist at JIPMER, Pondicherry presented following papers in the first Asia Pacific OT Symposium (APOTS-2017) held at Chang Gung University, Taoyuan City, Taiwan from 20th Oct. to 22nd Oct. 2017.

- The Effectiveness of Stress Management Technics on Alcoholic Patients'
- To Compare the Effectiveness of Simplified Teaching Method on Improving Pre-writing skills in Kindergarten and Mild Intellectual Disability Children'

Contextualizing Occupational Therapy: Research, Practice and Education' was the theme of this well organized event.

## Wheelchair Stakeholder Meeting in Bangalore

World Learning, on behalf of the United States Agency for International Development (USAID), and in partnership with the International Society

of Wheelchair Professionals, is organizing the Wheelchair Stakeholders Meeting at Mobility India in Bangalore from Jan.15-18, 2018. The purpose of this gathering is to convene partners and sector experts who work in wheelchair provision in less-resourced settings to define the future priorities for the sector. On behest of WFOT, AIOTA nominated its EC Member Dr. Amitabh Dwivedi (Jaipur) who is an expert and certified wheelchair trainer to participate in this significant meeting.

## Events:

**Sept.9, 2017:** Dr. Anant kumar (MOT) & Dr. Rosalin Nath (MOT) were the key speaker in Caregivers training program at SPARK India-Lucknow in association with UPAIOTA. Information: [anant19851985@gmail.com](mailto:anant19851985@gmail.com)

**Oct.15, 2017:** President AIOTA Dr. Anil Srivastava inaugurated Rosalin Child Development & Rehabilitation Centre in Gomtinagar, Lucknow on 15th October 2017. Centre is dedicated to Neuro-Pediatric Rehabilitation with facilities of Occupational Therapy, Physiotherapy, Speech Therapy & Clinical Psychologist.

**Nov.24, 2017:** Cardiac Risk Assessment & Geriatric Care Camp was arranged by OT School & Center G.S. Medical College Mumbai in collaboration with Mumbai Branch of AIOTA at Maharashtra Kalyan Mandal Naigaon. 26 senior citizens were assessed and appropriately advised.

**Nov. 28-30, 2017:** Workshop on Neurodevelopmental Care in NICU was jointly organized by OT School & Center and Neonatology Department of Seth G.S. Medical College, Mumbai

**Dec. 15-17, 2017:** Advanced Certificate Course on Physical Agent Modalities: As an Adjunct to OT was organized By UPAIOTA in collaboration with ACOT and Santosh OT College, Ghaziabad at New Delhi with 45 participants. President AIOTA Dr. Anil Srivastava inaugurated the COTE and Dr. Jyothika Bijlani Dean ACOT presided over the valedictory function. Dr. R.K. Sharma was the organizing Convener.

**Dec. 26, 2017 :** Students of OT School & Center Government Medical College, Nagpur gave an awareness program in form of a role play to handle autistic children at Airport and in flight at the Nagpur Airport. Information: Dr. Sofia Azad email-[sofiaazad2000@yahoo.co.in](mailto:sofiaazad2000@yahoo.co.in)

**Jan. 5-6, 2018:** Seminar on Play and Narrative Development from Childhood to Adolescence is being organized by Connect & Communicate LLP, Singapore. Dr. Carol Westby, the developer of the Westby Play Scale, used extensively in the US and other countries. The workshop is open to professionals - namely Speech-Language Therapists, Occupational Therapists, Psychologists, Counselors, Special Education teachers, Allied Educators and Mainstream Teachers and others. Chithra Kathiresan Clinical Director-Connect & Communicate may be contacted for more details on [connectandcommunicate.com.sg](http://connectandcommunicate.com.sg)

**Feb.26-27, 2018:** International Conference on "Evidence in Global Disability and Health" is being organized by Indian Institute of Public Health, Hyderabad and The International Centre for Evidence in Disability, London school of Hygiene and Tropical Medicine. This conference seeks to bring together Researchers, Activists, Practitioners and Academicians to discuss new research findings and debate academic and policy issues related to global disability and health. May write to Dr. Suresh Kumar, Assistant Professor Indian Institute of Public Health - Hyderabad ( [suresh.kumar@iiphh.org](mailto:suresh.kumar@iiphh.org) )

**March 9-10, 2018:** Dubai International Musculoskeletal Medicine Congress is open for PMR physicians, occupational therapists, physiotherapists, neurologists & neurosurgeons, pediatricians and others related professionals. Feb. 5,2018 is the deadline for submission of abstracts. Information: [info@dimmc.com](mailto:info@dimmc.com)

# ALL INDIA OCCUPATIONAL THERAPISTS' ASSOCIATION

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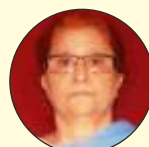
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