



## Occupational Therapy

**THE EFFICACY OF TELEMEDICINE IN DELIVERING OCCUPATIONAL THERAPY SERVICES IN AN EARLY INTERVENTION PROGRAMME IN THE AGE GROUP OF 1-9 MONTHS IN THE CIVIL HOSPITALS OF MAHARASHTRA, INDIA.**

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**ABSTRACT** The purpose of this study was to check the efficacy of Telemedicine in delivering Occupational Therapy services in an early intervention programme. A prospective pre and post interventional study was done to test the same over a period of 12 months on 12 infants and toddlers in the age group of 1-9 months. It was found that telemedicine is efficient in delivering Occupational Therapy Services, as significant changes in various aspects of development in a child was the primary outcome measure of this study.

**KEYWORDS :** Telemedicine, Occupational Therapy, Early Intervention, Maharashtra.

**INTRODUCTION:**

With an area of about 3.2 million square kilometres, India is the seventh largest country in the world. This vast South Asian country gifted with ancient historic background is endowed with varied landscapes like mountain regions, deserts, green plains, and the far-flung and hilly areas in the Jammu & Kashmir, Uttaranchal, North Eastern Region and the offshore islands of Andaman's and Lakshadweep. To provide the basic minimum healthcare for India's population which is predominantly rural and distributed across distant geographical locations has been one of the priorities of Health Administration all along. In today's world, despite several advances made in the Medical field, the benefits are still available to the privileged few residing mainly in the urban areas. With the advent of Communication Technology, especially the Satellite Communications (SatCom) combined with Information Technology, we have means to extend the benefits from the advanced medical sciences even to the remote and inaccessible areas. It is known that 75% of the qualified doctors practice in urban centres, whereas the vast majority of India's population lives in the rural areas.

Telemedicine is an emerging field in healthcare arising out of the synergistic convergence of Information Technology with Medical Science having enormous potential in meeting the challenges of healthcare delivery to rural and remote areas besides several other applications in education, training and management in health sector. It may be as simple as two health professionals discussing medical problems of a patient and seeking advice over a simple telephone to as complex as transmission of electronic medical records of clinical information, diagnostic tests such as E.C.G., radiological images etc. and carrying out real time interactive medical video conference with the help of IT based hardware and software, video-conference using broadband telecommunication media provided by satellite and terrestrial network.<sup>(1)</sup>

A field as dynamic as Telemedicine is Early Intervention Services. These are special services for infants and toddlers at risk for developmental delays. These services are de-signed to identify and meet children's needs in five developmental areas. These are physical, cognitive, communication, social or emotional development, sensory and adaptive development. Early intervention includes provision of services to such children and their families for the purpose of lessening the effects of the condition. Early intervention can be remedial or preventive in nature—remediating the existing developmental problems or preventing their occurrence.

Early Intervention Services are effective ways to address the needs of infants and toddlers with developmental delays or disabilities. To ascertain the eligibility of the child for early intervention certain screening and diagnostic measures are adopted. Some children develop more slowly than the others or develop in ways that seem different from other children. Any deviation from the normal development should be dealt with at the earliest as it may lead to a developmental delay or the child may be at risk of developing developmental delays.<sup>(2)</sup>

The combination of Telemedicine and Early Intervention Services can

be a boon to our nation as through the technical reach of Telemedicine the expertise of Early Intervention can reach the future of the nation, the young infants.

**METHODOLOGY:****Study Design**

This was a prospective pre and post interventional study.

**OBJECTIVES:**

- To establish the unit of telemedicine to deliver OT services in an early Intervention programme.
- Screening of children and to deliver OT services.
- To check the efficacy of telemedicine in delivering services.

**PARTICIPANTS**

12 infants and toddlers were recruited after taking appropriate consent in the language best understood from the caregivers from the various district and sub-district hospitals of Maharashtra through Telemedicine based on the following inclusion and exclusion criteria.

**Inclusion Criteria**

- Infants and toddlers in the age group of 1-9 Months along with their caregiver
- High risk infants.
- Pre term babies.
- Paediatrician's reference.
- District hospitals without an Occupational Therapy Department.
- District hospitals with a Telemedicine Department

**Exclusion Criteria**

- Active Skin infections [scabies, fungal infection etc.].
- Severe malnutrition
- Caregiver with a physical or mental handicap.
- Congenital anomalies

**Study Tool**

Ages and Stages Questionnaire- 3

There are five domains to the scale which allows for assessment, Intervention and a means of documentation:

- Communication
- Gross Motor
- Fine Motor
- Problem Solving
- Personal Social

**RESULTS:**

The study was conducted on 12 participants in the age group of 1-9 months who fulfilled the inclusion criteria and followed up for a period of 3 months of intervention.

The data was entered using MS-Excel-2015 and analysed using SPSS Software.

Wilcoxon signed-rank test was used to compare the pre intervention and post intervention scores of the participants. Figures 1 and 2 show the various phases of the study.

**Table1: Tabulated Data After Using Wilcoxon Test On Raw Data**

Domain	Ranks	Number	Mean Rank	Sum Of Ranks	P- Value & Significance
Communication	Negative Ranks	0	0.00	0	0.004 Highly Significant
	Positive Ranks	10	5.50	55.00	
	Ties	2			
	Total	12			
Gross Motor	Negative Ranks	0	0.00	0	0.003 Highly Significant
	Positive Ranks	11	6.00	66.00	
	Ties	1			
	Total	12			
Fine Motor	Negative Ranks	0	0.00	0	0.004 Highly Significant
	Positive Ranks	10			
	Ties	2			
	Total	12			
Problem Solving	Negative Ranks	0	0.00	00	0.003 Highly Significant
	Positive Ranks	11	6.00	66.00	
	Ties	1			
	Total	12			
Personal Social	Negative Ranks	0	0.00	00	0.002 Highly Significant
	Positive Ranks	12	6.50	78.00	
	Ties	0			
	Total	12			



**Fig 1:** In The Above Picture The Occupational Therapist Can Be Seen Conducting A Session Through Whatsapp Video Calling



**Fig 2:** A Child Can Be Seen Doing Supported Standing With The Guidance Of The Occupational Therapist Via Telemedicine

**DISCUSSION:**

Worldwide people living in rural and remote areas struggle to access

timely, quality speciality medical care, primarily because specialist physicians and therapists are more likely to be located in areas of concentrated population that is in the urban areas. Due to innovations in computing and telecommunication technology, many elements of medical practice can be accomplished when the patient and health care provider are geographically separated. Therefore in this study we were studying the efficacy of telemedicine in delivering occupational therapy services in an early intervention programme in the age group of 1-9 months in the civil hospitals of Maharashtra to overcome the barrier of distance and adequate rehabilitation services are made available in the nooks and corners of the state.

The initiation of a unit of Telemedicine to deliver OT services in an early intervention programme, was done by writing a letter to the Dean of the Tertiary Care Hospital where this study was conducted, and seeking their permission to do the same. The initiative was welcomed and the permission was duly acquired. The letter was then forwarded to the Head of Department of Telemedicine for his/her approval, eventually leading to fulfilling of the objective. Similar result was obtained by Sara Movahedazarholigh (2015) at Department of Rehabilitation Management, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran, where she found based on the results of her study it can be anticipated that, in case of implementation of this technology in the field of rehabilitation, an overall positive trend in its acceptance and application by experts can be expected. <sup>(5)</sup>

It can be observed in the table 1 that in the domain of Communication, 10 participants show a positive change after the 3 month long intervention whereas 2 participants showed no change in their scores, the P-value was 0.005 ( $P \leq 0.01$ ). In the domain of Gross Motor 11 participants showed a positive change and 1 was tied at his/her pre intervention score and the P-value was 0.003 ( $P \leq 0.01$ ). In the domain of Fine Motor 10 participants showed a positive change post intervention whereas 2 showed no change and the P-value was 0.004 ( $P \leq 0.01$ ). In the domain of Problem Solving 11 participants showed improvement and 1 participant was the same as before and the P-value was 0.003 ( $P \leq 0.01$ ), finally in the domain of Personal Social all 12 participants showed a positive change and the P-value was 0.002 ( $P \leq 0.01$ ). Highly statistical significant P values are obtained for all five domains of Communication, Gross Motor, Fine Motor, Problem Solving and Personal Social respectively. Thereby it can be stated that telemedicine is efficient in delivering Occupational Therapy Services, as the significant changes in the various aspects of development in a child was the primary outcome measure of this study, similar results were found by in many researches such as:

Jana Cason (2009) at Spalding University, Louisville found Families expressed interest in technology that would enable their children to receive telerehabilitation services within the home environment. Transportation challenges, compromised immune system and prevention of illness, increased comfort level of children in their homes, and availability of objects needed during therapy encounters were sighted as potential benefits of this option. <sup>(4)</sup>

Jana Cason (2011) at Spalding University, Louisville found Telerehabilitation shows promise as an adjunct service delivery model for early intervention services for children birth through two years of age. <sup>(3)</sup>

Jana Cason (2012) at Spalding University, Louisville found a telehealth service delivery model can improve access to services for families of children who qualify for EI services, which in turn will be reflected in improved performance. <sup>(6)</sup>

There were many challenges that were faced by the investigators such as:

**Connectivity:**

Many times connections were lost due to poor internet facilities or buffering would occur and interrupt the therapy session as there were many rural areas that do not have access to high speed internet.

**Attitude of Professionals:**

Many professionals practicing in the interiors of Maharashtra were not aware of the role of Occupational Therapy in early intervention hence were ignorant and did not show active participation due to which less number of children were enrolled in the study, this in turn affected the results obtained.

**Attitude of Parents:**

Most of the parents were not aware of Occupational Therapy, and

initially did not know what to expect in the therapy sessions and how it will benefit their child. Some of them had misconceptions about Occupational Therapy and had unrealistic expectations such as one set of parents thought their child will get start walking with one session of therapy. Therefore a lot of time was consumed in explaining the parents what was to be expected and what can be achieved.

#### **Difficulty In Assessing Finer Aspects:**

Telemedicine was found to very apt to connect to parents and teach them gross body patterns and exercises but when it came to appreciate the finer details like the facial expressions of the child and isolated finger movements it was not very helpful as the video quality was not high enough and zooming in would result in pixelating the video.

#### **Unavailability Of Specialized Therapy Aids:**

As the therapy sessions were mostly taken place in the home environment of the child, many therapy aids such as therapy ball, bolsters etc. couldn't be used in their therapy programs.

Despite the above mentioned challenges telemedicine was found to be a great tool to get connected to areas and people who were not connected with therapists and deliver early intervention. It took time for the parents to understand Occupational Therapy through Telemedicine but, once they understood about it, their attitude was very positive and hopeful. They always looked forward for the next therapy session and were very compliant towards the therapy programme given to them.

It was also noted that the parents and babies were more comfortable in their home environments and the level of co-operation was good. The therapist could guide the parents how they could use their home environment in the best possible therapeutic way for their child [for e.g. a family was taught how they could use a chair which they had at home as a standing frame for their child, another family was taught to use a roll of blankets as a bolster].

#### **CONCLUSION:**

The present study was conducted to check the efficacy of telemedicine in delivering Occupational Therapy Services in an early intervention programme in the age group of 1-9 months in the district hospitals of Maharashtra.

From the results obtained, we may conclude that, Telemedicine is effective in delivering Occupational Therapy Services in an Early Intervention Programme, thereby rejecting the null hypothesis and accepting the alternate hypothesis.

#### **LIMITATIONS:**

- The primary limitation of the study was its small sample size (n=12). A small sample size means that findings derived are not necessarily representative of the whole population, results of this study should be interpreted cautiously
- The study was conducted for a limited duration therefore follow up effect after achieving the set goals of interventions was not studied.

#### **RECOMMENDATIONS:**

- A study with large sample size would increase the ability to extrapolate the findings as it would be representative of the total population i.e. generalization of results can be done.
- A mixed type of study i.e. qualitative and quantitative should be done so as to understand the data in breadth and depth of understanding and corroboration, while offsetting the weaknesses inherent to using each approach by itself.

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