

## EFFICACY OF COMPUTER BASED DEVELOPMENTAL PEDIATRIC SCREENING (CBDPS)

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### ABSTRACT

**Background:** Computer has provided a broad spectrum of its applications in medical science including documentation, data management, data analysis as well as research and development. However, long term physiotherapy and its follow up in clinical practice, documentation of assessment of patients is one of the most common requirements for physiotherapists. To meet this requirement, computer has shown meaningful application in assessment in physiotherapy practice. However, traditional paper based assessment practice is even well established and challenging computer based assessment practice. The availability of such software will ease the pediatric physiotherapy practice. Computer based software is available for pediatric screening, but the challenge is - does the software serves as equal to paper based screening. Therefore, we would like to test the efficiency of computer based DPS software as compared to traditional PBDPS.

**Materials and Methods:** Developmental pediatric screening software, laptop, developmental pediatric assessment form, and feedback form. Study Design: Observational cross sectional study. Inclusion criteria: Physiotherapists practicing pediatric physiotherapy since last one year. Procedure: In the context of the expert group, 60 therapists were well explained about the assessment of paper and computer based method (training of the software was given) with feedback process. Physiotherapists required to assess the patients by paper and computer based assessment and fill up the feedback form for their valuable responses.

**Result and discussion:** On analyzing the scores from feedback form, we have observed that administration (1.68 out of 3) and time taken (1.7 out of 3) has shown less impact for CBDPS as compared to PBDPS. Whereas, data analysis (2.45 out of 3), data storage (2.53 out of 3), transferring and editing data (2.63 out of 3), reviewing the condition periodically (2.65 out of 3) has shown efficient scores. Mean years of experience of the physiotherapists is 1.6 years.

**Conclusion:** In context to broad spectrum of computer applications in medical science and availing advantages of information and technology, CBDPS – a model must be taken into consideration for prospective studies in physiotherapy practice.

**KEY WORDS:** Paper based assessment, Computer based assessment, Developmental pediatric screening.

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### INTRODUCTION

Computers play a key role in almost every aspect of our lives. They facilitate storage of huge amounts of data. Owing to their intelligence and speed, computers function on a level close to that of the human brain. Computers can hence be employed in different fields like engineering,

data processing and storage, planning, networking, education as well as health and medicine. There are various uses of computer in the medical field as it plays a vital role in every medical office. It contributes a lot to the hospital administration where all the administrative processes are computerized. It

is useful when it comes to recording the medical history of the patients, such as, previous treatments, tests, diagnosis and symptoms.

The document cannot be electronically shared or stored when saved in the traditional way. Almost every industry is now computerized for data retrieval and analysis. It is much easier to retrieve and track patient data using Electronic Health Record (EHR) than to use labor intensive paper chart review. Computers are widely used as in form of EHR – to keep records. With EHR, transferring and sharing data becomes very easy.

The computer has provided a broad spectrum of its applications in medical science including documentation, data management, data analysis as well as research and development. However, long term physiotherapy and its follow up in clinical practice, documentation of assessment of patients is one of the most common requirements for physiotherapists. To meet this requirements computer has shown meaningful application in assessment in physiotherapy practice. However, traditional paper based assessment practice is even well established and challenging computer based assessment practice.

Several weaknesses of the paper based records have been identified, such as illegible handwriting, poor availability and incomplete data. In addition, paper records often become bulky with time, which leads to lack of overview. Because paper records still represent the usual medium for collecting and recording patient data, these weaknesses could impede the continuity and quality of care. During the last years, the significance of evaluation studies as well as the interest in adequate methods and approaches for evaluation has grown in medical informatics [1-6]. There has been interesting developments in evaluation research in the last 20 years. For example, there has been a strong shift from medical journals to medical informatics journals [1]. Electronic medical record (EMR) systems that were originally designed for use in adult care are now available to pediatricians [7-9]. National and International organizations are defining standards for recording, storage and transmission of patient data [10, 11]. General attributes of computer-

based patient records described by the Institute of Medicine are all vital for pediatric records. This includes growth data; age based normal range, time of birth, immunization, prescription of medicine etc. The ability to calculate, displays, and compare a child's growth percentiles and body mass index with normal ranges are vital. Normal ranges for vital signs and other physiologic parameters change with a child's age. Pediatric EMR systems can allow the user to easily compare a patient's vital signs with age-based normal ranges [7].

Use of computer in form of assessment is done in very less amount. If this happens, storage and data preservation will become easy. However, an electronic system means less manpower, time and physical storage space are needed. [12]. Pediatric screening software (CBDPS) is available. But the question is does this software serves as equal to paper based method. So we wanted to check its efficacy compared to paper based method.

Aim of the study is to find out the efficacy of CBDPS software as compared to PBDPS in physiotherapy practice and to provide suggestion from feedback taken from physiotherapists for the use of paper verses computer based pediatric screening software under following objectives:

- To evolve new area of computerized paediatric screening.
- Use of computer in physiotherapy practice.

**Review of Related Literatures:** Jolt [13] had observed that Open SDE (Structured electronic entry) seems to be a promising application for the support of physician data entry in general pediatrics.

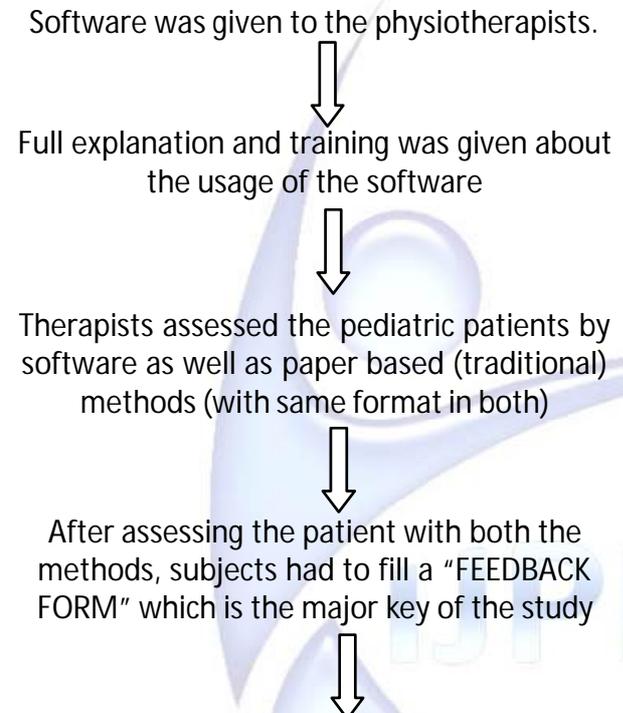
Bushnell [14] has concluded that almost 70% of subjects chose the electronic version of the questionnaire compared to paper based questionnaire in his study. James [7] observed that Electronic medical record (EMR) systems must perform certain functions to be useful in pediatric care e.g. immunization tracking and pediatric dosage calculations.

## MATERIALS AND METHODS

This was an observational cross sectional study which included 60 physiotherapists as subjects.

This study was done at different physiotherapy clinics where pediatric patients were available. 60 Physiotherapists practicing pediatric physiotherapy since last one year were included in this study.

**Flow Chart 1:** Procedure of the study and data collection.



Advantages and disadvantages of both the methods from 20 pediatric physiotherapists were taken after making them to practice computer and paper based screening and then the feedback form was prepared.

Software was given to the physiotherapists. Full explanation and training was given about the usage of the software.

Therapists assessed the pediatric patients by software as well as paper based (traditional) methods (with same format in both)

After assessing the patient with both the methods, subjects had to fill a "FEEDBACK FORM" which is the major key of the study

Advantages and disadvantages of both the methods from 20 pediatric physiotherapists were taken after making them to practice computer and paper based screening and then the feedback form was prepared.

**Data Analysis:** The feedback form includes 9 questions regarding the usage of CBDPS. The components are feasibility, reassessment, time, cost effectiveness, administration, use in

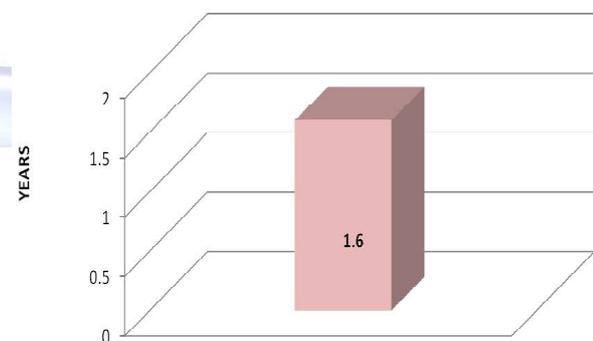
research purpose etc. Scoring was,  
 1: Satisfactory (not good as paper based method)  
 2: Good (same as paper based method)  
 3: Better (better than paper based method)  
 Mean of each question was taken.

**Table 1:** Mean value of individual questions from CBDPS feedback form.

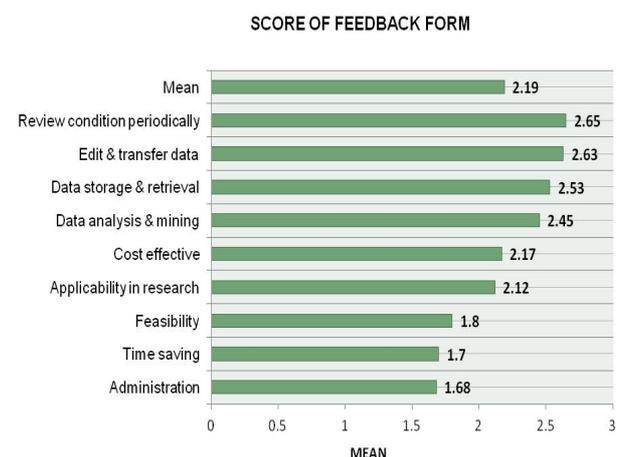
AREAS OF FEEDBACK	MEAN (out of 3)
To ease the administration	1.68
To have time effectiveness - saving	1.7
Feasibility of use	1.8
To have an applicability in research	2.12
To have cost effective – saving	2.17
To have data analysis and data mining	2.45
To have data storage and retrieval	2.53
To be able to edit and transfer the data	2.63
Ability to review the condition periodically	2.65
Mean	<b>2.19</b>

This table contains areas of feedback form and their mean scores. The total mean score is 2.19, which suggest that overall CBDPS is slightly better than PBDPS. Mean years of experience of the physiotherapists is 1.6 years. Minimum age included is 1 year and maximum is 4 years.

**Graph 1:** Mean years of experience.



**Graph 2:** Mean value of individual questions from CBDPS feedback form



## RESULTS

On analyzing the scores from feedback form, we have observed that data analysis (2.45 out of 3), data storage (2.53 out of 3), transferring and editing data (2.63 out of 3), reviewing the condition periodically (2.65 out of 3) has shown efficient scores whereas administration (1.68 out of 3) and time taken (1.7 out of 3) has shown less impact for CBDPS as compared to PBDPS.

## DISCUSSION

The traditional assessment method is a paper based method. It is the Gold standard method. But this method has some drawbacks. The reassessment takes longer time to fill full assessment form. The transferring and editing is another restriction.

Recently, new Pediatric developmental screening software has been developed by Pediatric physiotherapist. In order to find its feasibility and effectiveness, with the guidance of the expert members in physiotherapy, we had developed a "FEEDBACK FORM" to evaluate efficacy of Computer Based Developmental Pediatric Screening Software. We had taken 60 physiotherapists to check the efficacy of CBDPS and after that they filled the feedback form.

Data editing – transfer, data analysis – mining, data storage and reviewing the condition periodically have more impact of CBDPS.

It is difficult to reassess and edit in the same pediatric assessment form. Merely it is really beneficial to edit the data and to reassess the same patient with CBDPS. We can reassess only those components which we desire to focus on treatment. Hence no need to fill whole assessment form. In this way it also saves time. It is very difficult to transfer the paper based assessment form. We need more labor work and it is also more time consuming. Meanwhile, by using CBDPS, we can directly e-mail the assessment form and save time. So it is beneficial to use CBDPS.

The scales give numerical output as a result. So it is easy to compare the prognosis. Calculation of scale in traditional method is very lengthy and time consuming, While CBDPS automatically calculates and gives the result.

On the other hand, administration, feasibility and time consumption has less impact of CBDPS. So these components are easily fulfilled by paper based assessment method. For using the CBDPS, need of laptop is must. The basic knowledge of computer usage is necessary. Initially it is very time consuming to use CBDPS. Not all the therapists are using the scales we have included. Also, it is difficult to assess the patient and enter the data in CBDPS at the same time.

Average mean scores of the total are 2.19 which suggest that overall CBDPS is comparatively better than paper based method of assessment. So we can conclude that CBDPS is a new and advanced technique for pediatric screening.

## CONCLUSION

Based on the findings in this study, CBDPS has an advantage over PBDPS. On analyzing the scores, the administration and time taken has shown less impact for CBDPS as compared to PBDPS. Whereas, transferring and editing data, data analysis, data storage, and reviewing the condition periodically has shown efficient score. In the context of a broad spectrum of computer applications in medical science and availing advantages of information and technology, CBDPS – a model must be taken into consideration for prospective studies in physiotherapy practice.

**Future Scope:** Further study can be done in context to mean working hours and number of the patients assessed per day/week/month. Even the treatment can also be added in the software.

**Conflicts of interest: None**

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