CHAPTER V

SUMMARY, CONCLUSION AND SUGGESTIONS

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SUMMARY, CONCLUSION AND SUGGESTIONS

5.1 The study in retrospect

The present investigation was undertaken to study the motor abilities and functional academic skills of children with cerebral palsy.

5.2 Objectives of the study were

1. To identify the extent of gross motor and fine motor abilities of children with cerebral palsy.
2. To find out the relation between gross motor and fine motor abilities of children with cerebral palsy.
3. To identify the extent of functional academic skills present in children with cerebral palsy.
4. To analyze the functional academic skills of children with cerebral palsy with respect to gross motor abilities.
5. To analyze the functional academic skills of children with cerebral palsy with respect to fine motor abilities.
6. To analyze the functional academic skills of children with cerebral palsy with respect to certain child related and parent related variables.
5.3 Hypotheses

The hypotheses were

1. There is no statistically significant relation between the gross motor and fine motor abilities of children with cerebral palsy.

2. There is no statistically significant relation between the functional academic skills and gross motor abilities of children with cerebral palsy.

3. There is no statistically significant difference in the functional academic skills of children with cerebral palsy with respect to difference in their gross motor abilities.

4. There is no statistically significant relation between the functional academic skills and fine motor abilities of children with cerebral palsy.

5. There is no statistically significant difference in the functional academic skills of children with cerebral palsy with respect to difference in their fine motor abilities.

6. The functional academic skills of children with cerebral palsy do not vary with respect to certain selected child related and parent related variables.
5.4 Methodology in brief

This study is conducted on a sample of 100 children with cerebral palsy studying in two special schools, one from Kottayam and one from Ernakulum district. The tools used for the collection of data are

- Case record sheet
- Gross motor function classification system (GMFCS)
- Gross motor function measure-88 (GMFM-88)
- Manual ability classification system (MACS)
- Behavioral assessment scales for Indian children with mental retardation (BASIC-MR) part- A

The data collected are analyzed using “t” test, analysis of variance; Bonferroni test, Spearman’s rank correlation coefficient, multiple regression etc. The results obtained are interpreted accordingly.

5.5 Major findings of the study

The major findings that have emerged from the study are given below under separate heads.

I. The gross motor functions and fine motor functions of children with cerebral palsy are correlated with each other

The conclusion is supported by the following findings.
a) The children with cerebral palsy who participated in the study were 61.68% functional in their gross motor activities as measured by GMFM-88.

b) Highly significant positive correlation was obtained between scores of GMFM-88 and levels in gross motor function classification system (GMFCS) (rho= 0.97, p<0.01).

c) Significant positive correlation was obtained between scores of GMFM-88 and levels in manual ability classification system (MACS) (rho= 0.55, p<0.01).

d) Significant positive correlation was obtained between the levels of GMFCS and MACS (rho=0.56, p<0.01). This reveals that the gross motor and fine motor functions are correlated with each other.

II. **Functional academic skills of children with cerebral palsy are varied according to their gross motor and fine motor abilities.**

This conclusion is supported by the following findings of the study.

a) Arithmetic mean of functional academic skills scores of children with cerebral palsy is 344.88 which comes under poor functional category (range 240 – 359) scores. Frequency wise analysis revealed that only 7% of the children belonged to functional category, while 52% were in moderately functional level. 18% of the children had poor functional academics while 19% were in very poor category and 4% of the children were nonfunctional in their functional academic skills.
b) Gross motor functional level wise analysis indicated that 35% children belonged to GMFCS I with mean functional academic skills scores of 439.80, 24% children in level II with mean score of 378.25, 15% children in level III with mean score of 360.13, 14% children in level IV with mean score 210.43 and 12% children in level V with mean value 139.08. Further, the result shows that the five groups on the basis of gross motor function classification system are significantly different in the functional academic skills ($F_{4,95}=111.85$, $p<0.01$). From the findings it can be seen that as gross motor function decreases, functional academic skills also reduces.

c) Fine motor ability wise analysis reveals that 47% children comes under MACS level I with mean value of functional academic skills scores of 418.15, 25% children in level II with mean score of 373.88, 12% children in level III with mean score of 241.75, 7% children in level IV with mean score of 155.29 and 9% children in level V with mean score of 166.67. This results also shows a generalized decrease in functional academic skills as fine motor ability decreases and the level wise comparison is significant at 0.01 level ($F_{4,95}=55.24$, $p<0.01$).

d) The mean functional receptive language skills score of children with cerebral palsy is 67.02 (range 0-100) which comes in the moderately
functional level. The level wise comparison of functional receptive language skills with respect to gross motor and fine motor abilities found to be statistically significant at 0.01 level ($F_{4,95}=37.13$ & $F_{4,95}=13.77$ respectively).

e) The mean functional expressive language skills scores of children with cerebral palsy is 64.92 (range 0-100). This also comes in the moderately functional level of academic skills. The level wise comparison of functional expressive language skills with respect to gross motor and fine motor abilities found to be statistically significant at 0.01 level ($F_{4,95}=91.10$ & $F_{4,95}=14.47$ respectively).

f) The mean functional reading skills score of children with cerebral palsy is 53.10 (range 0-100) indicating that these children had moderately functional level skills in their reading activities. The level wise comparison of functional reading skills with respect to gross motor and fine motor abilities found to be statistically significant at 0.01 level ($F_{4,95}=89.70$ and $F_{4,95}=50.43$ respectively).

g) The mean functional writing skills score of children with cerebral palsy is 45.52 (range 0-100). This value reveals that these children had poor level of functional abilities in writing skills. The level wise comparison of functional writing skills with respect to gross motor and fine motor
abilities found to be statistically significant at 0.01 level (F_{4,95}=79.49 & F_{4,95}= 70.43 respectively).

h) The mean functional number skills score of children with cerebral palsy is 57.00 (range 0-100) which comes in the poor functional category. The level wise comparison of functional number skills with respect to gross motor and fine motor abilities found to be statistically significant at 0.01 level (F_{4,95}=103.01 and F_{4,95}=44.16 respectively).

i) The mean functional time skills score of children with cerebral palsy is 57.30 (range 0-100). This also comes in the poor level of functioning. The level wise comparison of functional time skills with respect to gross motor and fine motor abilities found to be statistically significant at 0.01 level (F_{4,95}=74.51 & F_{4,95}=47.93 respectively).

j) Significant positive correlation was obtained between the functional academic skills scores and different levels in the gross motor abilities. ( rho=0.85, p< 0.01).

k) Significant positive correlation was obtained between the functional academic skills scores and different levels in the fine motor abilities. ( rho=0.0.74, p< 0.01).

III. Child related variables such as age, topographical type, level of intelligence, presence of visual impairment, presence of speech impairment, presence of hearing impairment, presence of behavioural problems, epileptic attacks are found to produce significant effect on the functional academic skills of children with cerebral palsy.
This conclusion is supported by the following findings:

a) The study revealed that age of the children with cerebral palsy is an influencing factor on the functional academic skills of children with cerebral palsy (t=4.18, df=98, p<0.01).

b) The test of significance revealed that topographical type of cerebral palsy is found to have an effect on the functional academic skills of children with cerebral palsy (F_{2,97}=5.88, p<0.01).

c) The difference in the level of intelligence in children with CP is found to have a significant effect on the functional academic skills of children with cerebral palsy (F_{3,96}=53.91, p<0.01).

d) The study also revealed that the presence or absence of visual impairment, speech impairment, hearing impairment, behavioural problems, epileptic attacks have significant effect on the functional academic skills of children with cerebral palsy at 0.01 level (t= 3.70; t=10.49; t =4.48; t=7.09 and t=11.66 respectively).

e) Stepwise multiple regression analysis of these child related variables revealed that the presence of mental retardation, speech impairment, epileptic attacks and behavioural problems have 83.6% predictable impact on the functional academic skills of children with cerebral palsy (F_{11,88}=46.88, p<0.01).
IV. Other child related variables such as gender, motor type of cerebral palsy, religion, birth order and duration of schooling, have no impact on the functional academic skills of children with cerebral palsy.

This conclusion is supported by the following findings.

a) The study revealed that gender of the children with cerebral palsy is not an influencing factor on the functional academic skills of children with cerebral palsy (t =0.93, df=98, p>0.05).

b) The study also revealed that there is no significant difference on the functional academic skills of children with cerebral palsy with respect to the different motor type of cerebral palsy (t=1.74, df=95, p>0.05).

c) The religion of the children with cerebral palsy did not influence the functional academic skills of children with cerebral palsy (F_{2,97} =0.47, p>0.05).

d) The difference in the birth order of children with cerebral palsy did not make any significant difference in the functional academic skills of children with cerebral palsy (F_{2.97}=1.65, p>0.05).

e) The years of schooling of children with cerebral palsy did not influence the functional academic skills of children with cerebral palsy (t=1.92, df=98, p>0.05).
V. Parent related variables such as monthly income of the family, age and occupation of father are found to have significant impact on the functional academic skills of children with cerebral palsy.

This conclusion is supported by the following findings.

a) Age of the father is found to have a significant effect on the functional academic skills of children with cerebral palsy (t=2.07, df=98, p<0.05).

b) Test of significance revealed that there is a significant difference on the functional academic skills of children with CP with respect to the difference in the occupational status of fathers (F_{2,97} = 5.39, p<0.01).

c) Further, the study revealed that the functional academic skills of children with CP vary with difference in monthly income of parents (F_{2,97}=5.75, p<0.01).

VI. Other parent related variables such as place of residence, type of family, age and occupation of mother, educational qualification of father and mother do not significantly influence the functional academic skills of children with cerebral palsy.

This conclusion is supported by the following findings

a) It is revealed that the functional academic skills of children with cerebral palsy does not show any significant difference with respect to the place of residence (t=0.07, df=98, p>0.05).

b) The test of significance revealed that there is no significant difference in the functional academic skills of children with cerebral palsy with respect to the type of family (t= 0.39, df=98, p>0.05).
c) The study also revealed that the age and occupation of mothers are not influencing factors on the functional academic skills of children with cerebral palsy ($t=0.12$, $df=98$, $p>0.05$ and $F_{2,97} = 2.42$, $p>0.05$ respectively).

d) Further, the study revealed that the educational qualification of father and mother are not a significant predictor on the functional academic skills of children with cerebral palsy ($F_{2,97}=0.89$, $p>0.05$ and $F_{2,97}=0.43$, $p>0.05$ respectively).

5.6. **Tenability of the hypotheses**

Based on the findings of the study, the null hypotheses are generally rejected.

1. There is a statistically significant positive correlation between the gross motor abilities and fine motor abilities of children with cerebral palsy. Therefore the null hypothesis 1 is rejected.

2. There is statistically significant positive correlation between the gross motor abilities and functional academic skills of children with cerebral palsy. Therefore the null hypothesis 2 is rejected.

3. The study revealed that the functional academic skills of children with cerebral palsy varied according to their gross motor abilities. Therefore the null hypothesis 3 is rejected.
4. There is statistically significant positive correlation between the fine motor abilities and functional academic skills of children with cerebral palsy. Therefore the null hypothesis 4 is rejected.

5. The functional academic skills of children with cerebral palsy varied with fine motor abilities. Therefore hypothesis 5 is rejected.

6. Child related variables such as motor type, gender, religion, years of schooling, birth order have no significant influence on the functional academic skills of children with cerebral palsy. Whereas age of the child, topographical type, level of intelligence, presence of visual impairment, speech impairment, hearing impairment, epileptic attacks, and behavioural problems have significant influence on functional academic skills. Therefore the null hypothesis 6 is partially rejected and partially accepted.

7. Parent related variables such as age of father, monthly income of family and occupation of father are found to have statistically significant influence on the functional academic skills of children with cerebral palsy. While age of mother, education of parents, occupation of mother, place of residence, type of family have no significant effect on functional academic skills of children with cerebral palsy. Therefore the null hypothesis 6 is partially accepted and partially rejected.
5.7. Conclusion

The study was carried out to find out the gross motor and fine motor abilities of children with cerebral palsy and how the functional academic skills of these children varied according to their motor abilities. 100 children with cerebral palsy, who attended Jyothis special school from Kottayam and Adarsh special school from Ernakulam, were selected for the study. The gross motor and fine motor abilities were assessed using Gross motor function classification system (GMFCS), Gross motor function measure–88 (GMFM-88) and Manual ability classification system (MACS). The functional academic skills were assessed using Behavioural assessment check list for Indian children with mental retardation, part A (BASIC-MR). From this scale, the receptive language, expressive language, reading, writing, number and time skills were taken and together considered as functional academic skills. After the analysis of data using t-test, ANOVA, Spearman’s correlation coefficient, etc the following conclusions were made.

The functional academic skills of children with cerebral palsy is found to be at poor level. Among the different skills studied, the functional writing skills are found to be most affected in these children and the functional receptive skills are found to be the more developed skill in these children. From the findings of the study, it can be also concluded that that gross motor abilities of children with cerebral palsy are positively correlated with the
functional academic skills and as the gross motor ability reduces, the functional academic skills also reduces. Similarly the fine motor abilities of the children with cerebral palsy are also positively correlated with the functional academic skills. Here also as the fine motor ability reduces, the functional academic skills also reduce. The study also revealed that the gross motor and fine motor abilities of these children are positively correlated with each other.

From the analysis of the data, it can also be concluded that the child related variables such as age, topographical type, level of intelligence, presence of visual, speech, hearing impairments, presence of behavioural problems and epileptic attacks are found to have significant impact on the functional academic skills of children with cerebral palsy. Similarly certain parent related variables such as monthly income of the family, age and occupation of the father are found to produce significant impact in the functional academic skills of these children.

Other child related variables such as gender, motor type, religion, birth order and years of schooling and certain parent related variables such as place of residence, type of family, age and occupation of mother, educational qualification of father and mother, have no impact on the functional academic skills of children with cerebral palsy.
5.8. Implications of the study

The present study probes into the motor abilities and functional academic skills of children with cerebral palsy. The study reveals that the gross motor and fine motor abilities varied among different types of cerebral palsy and the functional academic skills of children with cerebral palsy are found to be at poor level. However, their functional language skills are found to be moderately functional while most affected skill is the functional writing skill. The results of the study also indicated that the gross motor and fine motor abilities are positively correlated with functional academic skills.

The study has got wider implications especially in the area of special education and in other rehabilitation services. These are discussed below.

Cerebral palsy, basically being a motor problem, the rehabilitation services mainly concentrates on the motor aspects. To mediate with the day-to-day activities, they need good functional academic skills. The skills such as expressive language skills, receptive language skills, reading skills, writing skills, number skills and time skills are very essential in attaining independent social life of the child with cerebral palsy. In this study, these skills are found to be at poor level. That means these skills varied between 20 to 40% of the total functional academic skills. A child who achieves more than 80% of the total functional academic skills is said to be functional. So these children are far away from the functional level. Even though these children are
studying in these special schools for so many years, why they are not attaining the functional level in the functional academic skills? This question demands detailed cross examination of the present strategies in this field.

In the special schools, the early diagnosed cases of cerebral palsy generally below 3 years, are placed in the early intervention class rooms. Here the training mainly concentrates for achieving developmental milestones such as rolling, crawling, creeping, sitting and standing activities. As their developmental age and chronological age advances, they are placed in the next level classrooms. Here more time is spent in teaching the curriculum activities and in between, the therapeutic needs of the children are handled.

In this study, the researcher assessed the functional academic skills of children with cerebral palsy aged between 6 to 14 years and in order to analyze why they achieved only poor level of functional academic skills, the following aspects have to be discussed.

Whether, the aims and objectives of the education of children with cerebral palsy are properly stated and understood by the parents, special teachers and other professionals? Whether the abilities and possibilities of these children are well understood or underestimated? Whether the curriculum followed in the special schools for these children are need based, future oriented and based on the strength and weakness of them? Whether
unique, individualized and effective teaching strategies are employed? Whether the teachers are really specially trained to effectively deal with the unique needs of children with cerebral palsy? Are they capable enough to deal with the multiphacial needs of these children? What is the nature and level of motivation and involvement of parents with respect to the education and training of these children? Whether the motor problems of these children are well addressed? Questions like these are to be answered properly for a scientific explanation of the educational status of children with cerebral palsy.

Among the different skills analyzed, the functional language skills needs special attention. Based on the brain pathology, the development of physical abilities and the functional academic skills can have limitations in severely affected children with cerebral palsy. In these cases, the ability of the child to communicate with the environment to express his/her needs and the requirements are highly essential to fulfill the goals of rehabilitation. In this study, the functional language skills are found to be the more developed skill but still at a moderate level of function. So discussion has to be made whether the current curriculum and teaching methods are really intended to explore their functional language skills to the maximum level. And the need for the speech therapy from the early stages of life of the child with cerebral palsy is also high lightened.
The most affected skill in these children with cerebral palsy is the functional writing skill. It is understood that due to the variations in the tone of the muscles and due to the diskinetic movements of the upper limb, the ability of the child with cerebral palsy to grasp the pen or pencil for writing purpose is extremely difficult. The use of alternative devices such as computer-aided device is said to be ideal in developing the functional writing skills in these children. It is high time that the special educators think and act in this direction.

The study also analyzed the gross motor and the fine motor abilities of children with cerebral palsy using GMFCS, GMFM-88 and MACS levels. The results of the study revealed that these children are functional at 61.68% in their gross motor abilities and 23% of the children with cerebral palsy are independent in their gross motor and fine motor activities. The study also provides the evidence that the gross motor and fine motor abilities are positively correlated with each other and also positively correlated with the functional academic skills. So any type of therapies intended to improve the gross motor and fine motor abilities can directly improve the functional academic skills. But is it possible to change a child with cerebral palsy from low levels of GMFCS and MACS to higher levels by providing therapies or are these children arrested in their physical developments in certain levels in
GMFCS and MACS? More research studies are needed to answer such questions.

Presence of other disabilities such as mental retardation, speech impairment, hearing impairment, visual impairment, behavioural problem, epileptic attacks etc are found to have significant effect on the functional academic skills. So as soon as a child is diagnosed as cerebral palsyed, early identification has to be made to find out the presence of these associated problems and early interventions with multi-disciplinary approach have to be done to control their impact on the child. This in turn can help the child with cerebral palsy to achieve the maximum functional academic skills in later stages of life.

Monthly income of the family has got a significant effect on the functional academic skills of children with cerebral palsy. So measures have to be taken to provide financial support to those children with cerebral palsy who are from poor family background. In this study 59% of children with cerebral palsy belonged to this category. The financial support can be mobilized either from the government level or from non-governmental organizations so that the families can spent money for undergoing orthopedic surgeries, Botoxin injection for reduction of spasticity, or even for buying devices at home such as sitting chairs, standing frames or for modifying the home for a barrier free environment.
During the period of interactions with the faculty of the special schools, the researcher felt that the assessment of children with cerebral palsy needed a lot of changes according to the present international approaches. In these special schools, the conventional assessment is followed for each child and is kept as his/her case record. In this aspect, the new internationally accepted assessment format such as GMFCS, MACS, GMFM-88 are very useful in grouping the children into different levels according to their physical abilities. This will allow the faculties of these schools to monitor the physical development of the child in a qualitative and quantitative manner.

Regarding the assessment of the academic skills of these children, the scales such as BASIC-MR, MDPS, FACP etc which are basically developed for children with mental retardation are used in these schools. Even though different levels of mental retardation can be seen in children with cerebral palsy, the assessment of writing skills of these children using this types of scales will be difficult due to the motor involvement of the muscles of upper limb. Since no scales are available for measuring the academic skills of children with cerebral palsy, the researcher also used BASIC-MR for assessing the functional academic skills of these children. But definitely, steps have to taken to develop a functional academic scale exclusively for children with cerebral palsy.
The schools in which the researcher conducted the study follows conductive education methods in which, training is mainly given to these children in the forms of songs, stories along with physical activities. The mother or caretaker of the child with cerebral palsy is directed to accompany the child during school timings. The researcher feels that this can create many problems in the family of these children. The mother who has to look after the needs of her husband and siblings of the disabled child, is pulled back from that duties as she has to spent major time with the disabled child. The researcher has met so many mothers who have quit their jobs for the caring of these children with disability. So change in this situation has to be made by providing more family friendly service provisions. In these provisions, vocational training and even vocational centers can be started.

As per the new policy, the child with cerebral palsy has to be placed in a near by regular school itself. The practical difficulties that can be felt while implementing this policy will be at different levels. The teachers of regular schools have to be trained to satisfy the special needs of these children and the school has to provide a barrier free environment to these children.

Thus concluding this section, it can be stated that the theoretical, practical and research implications discussed here will have significant impact on the rehabilitation services for children with cerebral palsy and it is hoped that serious discussions related to this will be made by rehabilitation
professionals in this field in a common platform related to children with cerebral palsy

5.8. Limitations of the study

Even though the investigator was cautious enough to make the present study as scientific as possible, certain limitations could not be avoided, which are inevitable in survey studies of this type. The following limitations should be taken care of while generalizing the results.

1. The sample of the study constitutes only 100 children with cerebral palsy from special schools, one from Kottayam and one from Ernakulam district. A larger sample selected from all districts of the state could have given the scope for wider generalization of the findings. But special schools for cerebral palsy are very limited in the state of Kerala and in these schools, they are following different methods of assessments and treatment strategies. Moreover the sample does not include the children with cerebral palsy who are not attending the special schools. Difficulties involved in identifying and collecting data from them prevented the investigator from such an attempt. Similarly, children with cerebral palsy who are studying in regular schools, even though very less in number, could not be included in the study due to the difficulty in identification.
2. Even though the variables, gross motor function, the fine motor function and functional academic skills are evaluated and measured by the researcher himself, the other variables such as level of intelligence, presence of visual, speech and hearing impairments, epileptic attacks, behavioural problems etc are taken into account based on the school records. This area could have been made more scientific, if standardized evaluation procedures were administered by the competent authorities during the period of data collection.

3. The scale used for measuring the functional academic skills was BASIC-MR which is basically designed for children with mental retardation. In Kerala or even in India, no scale has been developed so far for checking the functional academic skills of children with cerebral palsy. Therefore the researcher had no other choice than to select one from the scales designed for children with mental retardation.

4. Even though the study focuses on the motor abilities of children with cerebral palsy, the variables such as spasticity, muscle power, chorea athetosis, synergy patterns, ataxia, voluntary control, postural control, primitive reflexes etc are not taken for this study. These are basically assessed to categorize the children into different types of cerebral palsy.
Despite all these limitations, it is hoped that the results of the study would be of much practical utility.

5.9 Suggestions of the study

On the basis of the findings of the present study, interactions with the children with cerebral palsy, their care takers, teachers, other rehabilitation professionals and from his experience, the investigator gives the following important suggestions:

1. As the functional academic skills of the children with cerebral palsy varied according to their gross motor and fine motor abilities, measures have to be taken to improve these abilities to the maximum level. Regular physiotherapy and occupational therapy are very essential to achieve this goal. As soon as a child is diagnosed as cerebral palsy, these interventions have to be started. Parents of the child with cerebral palsy have to learn the basic treatment techniques from the therapists so that they can do the exercise regularly even at home.

2. Since the gross motor and fine motor abilities are correlated with each other, it is very necessary to assess these abilities with GMFCS, GMFM - 88 and MACS as these scales give the qualitative and quantitative assessments of the gross motor and fine motor functions. Assessment using GMFM-88 is extremely important in these children because this scale gives the percentage wise gross motor ability of child.
So that periodic assessment will exactly give the percentage wise improvement in the gross motor function. The new version of GMFM-88, known as GMFM-66 is much more useful tool as it has got a software programming so that graphical representation of each child’s gross motor ability can be chartered and kept as a baseline record and the periodic changes in the gross motor ability can be easily identified from the graph.

3. The study points out that the functional academic skills of the children with cerebral palsy are at poor level. So measures have to be taken to analyze why these children are at poor level of functional academic skills. The content of the curriculum, the assessment tool used, the qualification of the teachers in this field, the teaching methods etc have to be analyzed in detail.

4. Among different skills, the functional language skills are the most important skills that have to be developed in these children so that even with impact of physical disability, they can intervene with the environment successfully. So speech therapy is indicated to train the basic skills needed for the development of functional language skills.

5. Due to the involvement of the motor system, the functional writing skills are the most affected skills in these children. If training in this area is less effective, particularly in pen holding activities, a change from the
traditional method to that of computer-aided devices can be started from the early classes itself.

6. Presence of other problems such as visual impairment, hearing impairment etc can adversely affect the functional academic skills. So early identification of these problems and proper interventions with multidisciplinary approach have to be started as early as possible.

7. Epileptic attacks in children with cerebral palsy needs a special attention as it produces severe negative impact on the child. This produces frequent hospitalization of the child and even the deterioration of the already achieved skills. So proper medical management of this condition is very important and in Kerala, Sree Chitra Thirunal Institute for Medical Science, Thiruvananthapuram is the referral center for the management of this condition. So parents and rehabilitation professional in this field can utilize this center for managing this problem.

8. Children with cerebral palsy exhibit different forms of behavioral problems, which in turn can adversely affect the functional academic skills. So identification of these problems and proper treatment of the problem by the clinical psychologist is indicated.

9. Different levels of mental retardation are the major associated problem seen in children with cerebral palsy. As per the present scenario, along with the physical disability, the level of intelligence is the key factor,
which decides whether the child has to be sent to the special school or to the regular school. But now the policy is getting changed and irrespective of the disability, the child has to be sent to the nearby regular school. However, the assessment of intelligence is very important in these children with cerebral palsy to decide the educational interventions.

10. Since income of the family has a significant effect on the functional academic skills, measures has to be taken to provide financial support to those children who are from poor family. Special school authorities can play a key role in providing financial support to these children either in the form of grant from government or from non-governmental organizations.

11. For the successful rehabilitation of child with cerebral palsy, the parental involvement and a positive parental attitude towards the rehabilitation services are highly essential. The association for the parents of children with cerebral palsy as we have at the national level, has to be formulated in the state level too. Periodic training programme, counseling, awareness and solution to the changing problems and needs of children with cerebral palsy, awareness about the rights and legal support given by government of India to these children and their parents etc can be carried out within the platform of these associations.
12. Even though the special schools for children with cerebral palsy are rare in the state of Kerala, a common register for these schools has to be prepared. Government has to take measures to start at least one residential school for cerebral palsy in each district, even though the changing policies can interfere with this matter.

13. Universities have to take initiative to start diploma or B.Ed courses in special education in cerebral palsy so that shortage of man power in this area can be corrected.

14. Functional assessment scale purely for children with cerebral palsy to measure their academic skills has to be developed and standardized.

15. Continuing educational programmes have to be given to the teachers and therapists who are in this field regarding the recent trends in this field including the administration of new assessment scales.

16. The conductive education given to the children with cerebral palsy in these special schools forces the mother or caretaker of the child to accompany him/her during the school timings. The researcher feels that this can create problems in the family of these children, as the mother has to sacrifice so many needs of the other members of the family. The researcher strongly supports the idea of starting of residential schools for cerebral palsy in each district at government sector even though this is against the new policy.
17. The study was done in children with cerebral palsy who are attending special schools. But there are so many cases of children with cerebral palsy who are kept as neglected cases by the family members at home. So measures has to be taken to identify these children and proper guidelines and counseling have to be given to the family members by the primary health workers for taking these children to the mainstream.

18. The media has to take up, the issues related to children with cerebral palsy in a serious manner and appropriate coverage have to be given at periodic level so that the public interest in field can be maintained. Stories of successful persons with cerebral palsy either from the international level or from national level can be given wide publicity so that it can act as a boosting event to the children with cerebral palsy and their parents.

5.10. Suggestions for further research

In the light of the findings of the present study and the valuable experience gained by conducting this investigation, the following topics are suggested for further research.

1. The present study was conducted on a sample of 100 children with cerebral palsy attending special schools, one from Kottayam and one from Ernakulam district. The same study may be conducted with a
large sample drawn from all districts of the state, so that more generalisable findings could be obtained.

2. A comparative study of motor problems and functional academic skills of children with cerebral palsy attending special schools, regular schools, and in clinics can be undertaken.

3. Longitudinal study may be conducted to find out the changes in motor functions and functional academic skills in children with cerebral palsy.

4. Experimental study can be conducted to identify the effectiveness of planned educational and motor training programmes on functional academic skills of children with cerebral palsy.

5. An attempt may be made to standardize a new scale for the assessment of functional academic skills of children with cerebral palsy.

6. Studies can be conducted to compare the functional academic skills of children with cerebral palsy who are attending the residential type of special schools and day schools.

7. Further studies can be done to find out the factors influencing the academic skills development of children with cerebral palsy.
8. Studies can be carried out to find out the effectiveness of different teaching strategies on the development of functional academic skills of children with cerebral palsy.

9. Research activities can be done to identify the problems and needs of special schools for children with cerebral palsy.

10. Attitude of normal school teachers towards the inclusion of children with cerebral palsy can be studied.

11. Studies can be done to reveal the attitude of the public in the rehabilitation of children with cerebral palsy.

12. Awareness of the legislative members towards the rehabilitation of children with cerebral palsy can be studied.

13. Parental involvement in the rehabilitation of children with cerebral palsy can be studied.

14. Parental attitude towards the educational aspects of children with cerebral palsy can be studied.

15. Attitude of the siblings of children with cerebral palsy towards the rehabilitation of the children with cerebral palsy can be studied.

16. Studies can be done to find out the effectiveness of the present curriculum on the development of the functional academic skills of children with cerebral palsy.
17. Studies can be done to find out the effectiveness of the present curriculum on the vocational aspects of children with cerebral palsy.

18. There are many children with cerebral palsy who attend the special schools for children with mental retardation. So studies can be done to analyze the functional academic skills of these children.