E-ISSN 2250-0944
ISSN 2250-1150
doi: 10.31838/ijprt/16.02.971

Research Article

Strengthening Primary School Teachers' Capacity for Early Identification and Classroom Management of Children with Specific Learning Disabilities: A Quasi-Experimental Study

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ABSTRACT
Background: Specific Learning Disabilities (SLD), including dyslexia, dysgraphia and dyscalculia, can affect children's academic performance and classroom participation. Primary school teachers play an important role in recognising early warning signs and providing appropriate classroom support. However, inadequate knowledge and limited training may affect their preparedness to identify and manage learning difficulties.
Aim: To evaluate the effectiveness of a structured educational programme on primary school teachers' knowledge regarding the early identification and classroom management of children with Specific Learning Disabilities in selected schools of Kolkata, West Bengal.
Methods: A quantitative quasi-experimental pre-test and post-test control-group design was adopted. A total of 100 primary school teachers were selected using non-probability purposive sampling and allocated into experimental and control groups, with 50 participants in each group, using the lottery method. Data were collected using a structured questionnaire consisting of socio-demographic information and 30 multiple-choice knowledge items. The experimental group received a structured educational programme for one hour daily over three consecutive days, while the control group continued routine activities. Post-test assessment was conducted in both groups seven days after completion of the intervention. Data were analysed using descriptive and inferential statistics.
Results: The mean knowledge score of the experimental group increased from 12.60 ± 3.10 in the pre-test to 22.80 ± 2.70 in the post-test (mean difference 10.20; paired $t = 18.50$, $df = 49$, $p < 0.001$). The post-test mean score was significantly higher in the experimental group than in the control group (22.80 ± 2.70 vs. 13.10 ± 3.05; $t = 16.84$, $df = 98$, $p < 0.001$). Pre-test knowledge was significantly associated with teaching experience ($p = 0.024$), previous exposure to SLD-related information ($p = 0.007$) and previous training in learning disabilities ($p = 0.002$).
Conclusion: A structured educational programme may be a useful approach to improving primary school teachers' knowledge regarding the early identification and classroom management of children with SLD. Regular educational and training initiatives may strengthen teachers' preparedness to recognise learning difficulties and facilitate appropriate educational support and timely referral.

Keywords: Specific Learning Disabilities; Primary School Teachers; Structured Educational Programme; Early Identification; Classroom Management; Knowledge; Quasi-Experimental Study.

BACKGROUND OF THE STUDY

Education plays an important role in children's academic, social and personal development. However, children differ in their learning abilities, and some experience persistent difficulties in acquiring essential academic skills despite having appropriate learning opportunities. Specific Learning

Disorder (SLD) is a neurodevelopmental condition characterised by difficulties in acquiring and using academic skills, particularly reading, written expression and mathematics. Its commonly recognised forms include dyslexia, dysgraphia and dyscalculia[1,2].

These difficulties may become apparent during the early years of schooling and can affect a child's academic performance, classroom participation and self-confidence. Children whose learning difficulties remain unidentified may be misunderstood as inattentive, careless or less capable than their peers. Appropriate assessment and timely educational support are therefore essential to address their individual learning needs and reduce the academic and psychosocial consequences associated with SLD[2,3].

Primary school teachers have an important role in recognising possible signs of SLD because they regularly observe children's academic performance, learning patterns and classroom behaviour. Adequate knowledge helps teachers identify persistent difficulties in reading, spelling, handwriting and mathematical activities. Teachers can support these children through clear instructions, repeated practice, multisensory teaching, individual attention, additional learning time and positive reinforcement. Their classroom observations can also help parents seek appropriate professional assessment and specialised educational support[3,4].

The importance of planned interventions in school settings has also been demonstrated in Indian research. Tripathy conducted a quasi-experimental pre-test and post-test control-group study among 50 schoolchildren in Damana, Bhubaneswar, and reported a significant reduction in school-phobia scores following a structured intervention ($p<0.001$)[5]. Although this study focused on school phobia rather than SLD, it provides a relevant example of how structured interventions can address specific educational and psychosocial concerns among schoolchildren.

Despite the important role of teachers, limited awareness and inadequate training may affect their ability to recognise learning difficulties and provide appropriate classroom support. Strengthening teachers' knowledge through structured educational programmes may help improve early recognition, appropriate referral and supportive classroom management practices.

Therefore, the present study was undertaken to evaluate the effectiveness of a structured educational programme on primary school teachers' knowledge regarding the early identification and classroom management of children with Specific Learning Disabilities in selected schools of Kolkata.

NEED FOR THE STUDY

Specific Learning Disability is an important educational concern because persistent difficulties in reading, writing and mathematics can affect children's academic progress and overall school experience. A global systematic review and meta-analysis estimated the pooled prevalence of developmental dyslexia among primary school children at 7.10% (95% CI: 6.27–7.97%)[6]. In India, a systematic review and meta-analysis involving 8,133 children reported a pooled prevalence of SLD of 8% (95% CI: 4–11%)[7]. These findings highlight the importance of recognising learning difficulties and ensuring appropriate educational support during the school years.

Teachers' understanding of learning disabilities is particularly important because they are in a position to observe children's learning patterns and academic progress regularly. However, Indian studies have reported gaps in teachers' knowledge and awareness. Lingeswaran assessed the knowledge of primary school teachers in Puducherry and reported a mean knowledge score of 14.50 ± 9 out of 50, indicating the need for improved teacher education regarding SLD[8]. Similarly, a cross-sectional study conducted among schoolteachers in Vellore identified differences in knowledge and perceptions regarding learning disabilities, highlighting the importance of strengthening teachers' preparedness for early identification[9].

The effectiveness of educational interventions in improving teachers' knowledge has also been demonstrated in different Indian settings. Ali et al. conducted an awareness lecture among 709 primary school teachers in Malappuram district, Kerala, and reported a significant improvement in knowledge following the programme ($p<0.001$)[10]. Dani et al. evaluated a training intervention among 150 teachers

and found that overall knowledge increased from 24.7% at baseline to 76% following the intervention ($p<0.001$)[11]. In West Bengal, Roy et al. conducted an awareness programme among 72 primary school teachers in Nadia district and reported a significant improvement in post-test knowledge scores ($t=38.52$, $p<0.001$)[12]. These findings indicate that planned educational interventions can contribute to improving teachers' understanding of learning disabilities.

The need for early identification and appropriate educational support is also recognised by national policies and guidelines. The Rights of Persons with Disabilities Act, 2016, recognises Specific Learning Disability as a specified disability and requires educational institutions to detect SLD at the earliest and provide suitable pedagogical measures[13]. The National Education Policy 2020 further emphasises inclusive education and the need to prepare teachers to address the diverse learning requirements of children[14]. In addition, the National Council of Educational Research and Training (NCERT), through its Central Institute of Educational Technology, has undertaken teacher-oriented training initiatives on understanding SLD, recognising early signs and developing appropriate classroom support strategies[15].

Although previous studies have examined teachers' awareness and the effectiveness of educational interventions in different parts of India, further evaluation among primary school teachers in selected schools of Kolkata is warranted. Assessing their existing knowledge and evaluating the effect of a structured educational programme may provide useful evidence regarding the preparedness of teachers to recognise and support children with SLD.

Therefore, the present study was undertaken to evaluate the effectiveness of a structured educational programme on primary school teachers' knowledge regarding the early identification and classroom management of children with Specific Learning Disabilities in selected schools of Kolkata.

OBJECTIVES OF THE STUDY

General Objective

To evaluate the effectiveness of a structured educational programme on primary school teachers' knowledge regarding early identification and classroom management of children with Specific Learning Disabilities in selected schools of Kolkata.

Specific Objectives

1. To assess the pre-test level of knowledge regarding early identification and classroom management of children with Specific Learning Disabilities among primary school teachers in the experimental and control groups.
2. To evaluate the effectiveness of a structured educational programme by comparing the pre-test and post-test knowledge scores of primary school teachers in the experimental group.
3. To compare the post-test knowledge scores of primary school teachers between the experimental and control groups.
4. To determine the association between the pre-test knowledge scores of primary school teachers and selected demographic variables.

HYPOTHESES

The following hypotheses are formulated to be tested at the 0.05 level of significance:

H_1: There will be a statistically significant difference between the pre-test and post-test knowledge scores of primary school teachers in the experimental group regarding early identification and classroom management of children with Specific Learning Disabilities.

H_2: There will be a statistically significant difference in the post-test knowledge scores between primary school teachers in the experimental and control groups.

H_3: There will be a statistically significant association between the pre-test knowledge scores of primary school teachers and selected demographic variables.

MATERIALS AND METHODS

Research Approach

A quantitative research approach was adopted to evaluate the effectiveness of a structured educational programme on primary school teachers' knowledge regarding early identification and classroom management of children with Specific Learning Disabilities.

Research Design

A quasi-experimental pre-test and post-test control group design was proposed for the study. The design included an experimental group and a control group. Both groups were

assessed before the intervention, while the structured educational programme was administered only to the experimental group. Post-test assessment was conducted in both groups to determine the effectiveness of the intervention.

Table 1. Design representation

Group	Pre-test	Intervention	Post-test
Experimental group (n=50)	O_1	X	O_2
Control group (n=50)	O_1	—	O_2

Where:

- O_1 = Pre-test assessment of knowledge.
- X = Structured educational programme.
- O_2 = Post-test assessment of knowledge.

Setting of the Study

The study was conducted in selected primary schools in Kolkata, West Bengal, India.

Population

The target population comprised primary school teachers working in primary schools. The accessible population consisted of primary school teachers available in the selected schools of Kolkata during the period of data collection.

Sample Size and Distribution

A total of 100 primary school teachers participated in the study. They were divided into two groups:

- Experimental group: 50 primary school teachers.
- Control group: 50 primary school teachers.

Sampling Technique

A total of 100 primary school teachers who fulfilled the predetermined inclusion criteria were selected from the selected primary schools in Kolkata using a non-probability purposive sampling technique. Following participant selection, the teachers were allocated into two groups using the lottery method. Each participant was assigned a unique identification number, and corresponding identical slips were prepared and mixed thoroughly. Fifty slips were drawn to form the experimental group, while the remaining 50 participants were assigned to the control group. Thus, both groups consisted of 50 teachers each.

Description of the Intervention

The intervention consisted of a structured educational programme developed to improve primary school teachers' knowledge regarding the early identification and classroom management of children with Specific Learning Disabilities (SLD). The programme was developed based on relevant literature, educational guidelines and the learning needs of primary school teachers.

The educational content covered the following areas:

1. **Introduction to Specific Learning Disabilities:** Meaning, definition, types and common characteristics of SLD, including dyslexia, dysgraphia and dyscalculia.
2. **Early identification:** Common warning signs, learning difficulties, behavioural indicators and academic problems that may suggest SLD among primary school children.
3. **Risk factors and associated difficulties:** Contributing factors, common misconceptions and the academic, emotional and social challenges experienced by children with SLD.
4. **Role of teachers in identification:** Classroom observation, recognition of learning difficulties, documentation of children's progress and appropriate referral for professional assessment.
5. **Classroom management strategies:** Individualised teaching approaches, multisensory learning, activity-based instruction, positive reinforcement and supportive classroom practices.
6. **Educational support and inclusion:** Appropriate learning adaptations, additional support, collaboration with parents and coordination with special educators and other professionals.

The structured educational programme was administered to the experimental group for one hour daily over three consecutive days. The sessions were conducted using appropriate teaching-learning materials, explanations, examples and interactive discussions. The programme was delivered systematically to enhance teachers' understanding and facilitate the application of appropriate classroom strategies.

The control group did not receive the structured educational programme during the study period and continued with their

routine activities. Both groups underwent pre-test and post-test assessments using the same structured knowledge questionnaire.

Description of the Data Collection Tool

Data were collected using a structured data collection tool consisting of two parts:

Part A: Socio-demographic Data

This section included items related to the selected socio-demographic characteristics of the primary school teachers, such as age, gender, educational qualification, teaching experience, type of school, previous exposure to information about Specific Learning Disabilities (SLD), and participation in any previous training related to learning disabilities.

Part B: Structured Knowledge Questionnaire

This section consisted of 30 multiple-choice questions designed to assess teachers' knowledge regarding the early identification and classroom management of children with Specific Learning Disabilities (SLD). The questions covered the meaning, types, characteristics, early warning signs, identification, referral procedures and classroom management strategies related to SLD.

Each correct response was awarded one mark, while incorrect or unanswered responses received zero marks. The maximum obtainable score was 30, and the minimum was zero. Based on the total knowledge scores, participants were classified into three categories:

- **Inadequate knowledge:** 0–14 (below 50%)
- **Moderately adequate knowledge:** 15–22 (50–74%)
- **Adequate knowledge:** 23–30 (75–100%)

A higher score indicated a better level of knowledge regarding the early identification and classroom management of children with SLD.

Validity and Reliability of the Tool

The content validity of the structured knowledge questionnaire was established through expert evaluation. The tool was reviewed by five experts from the field of nursing, specialising in Child Health Nursing, and one expert in statistics. Their suggestions and recommendations were considered, and necessary modifications were incorporated to improve the clarity, relevance and appropriateness of the questionnaire items.

The reliability of the structured knowledge questionnaire was assessed using Cronbach's alpha coefficient. The reliability coefficient was found to be 0.92, indicating high internal consistency of the tool.

Data Collection Procedure

After obtaining formal permission from the concerned school authorities, the investigator approached the selected primary school teachers and explained the purpose and procedure of the study. Informed consent was obtained from all participants before data collection. Confidentiality and anonymity of the information provided by the participants were maintained.

A total of 100 eligible primary school teachers were included in the study and divided into two groups using the lottery method, with 50 participants in the experimental group and 50 in the control group.

Initially, a pre-test was administered to both groups using the structured knowledge questionnaire to assess their existing knowledge regarding the early identification and classroom management of children with Specific Learning Disabilities (SLD).

Following the pre-test, the experimental group received the structured educational programme for one hour daily over three consecutive days. The programme covered the meaning, types and characteristics of SLD, early warning signs, identification and referral procedures, and appropriate classroom management strategies. The control group did not receive any educational intervention during this period and continued with their routine activities.

After a period of seven days following completion of the educational programme, a post-test was conducted for both the experimental and control groups using the same structured knowledge questionnaire. The responses were collected, checked for completeness, coded and organised for statistical analysis. The pre-test and post-test scores were compared to evaluate the effectiveness of the structured educational programme in improving teachers' knowledge regarding SLD.

Ethical Considerations

Permission was obtained from the concerned authorities before conducting

the study. Informed consent was obtained from all participants. Participation was voluntary, and confidentiality and anonymity of the collected information were maintained. Participants were informed about the purpose of the study and their right to withdraw at any stage without any penalty.

Plan for Data Analysis

The collected data were organised, coded and analysed using appropriate descriptive and inferential statistical methods.

- **Frequency and percentage:** To describe the socio-demographic characteristics of the participants.
- **Mean and standard deviation:** To summarise the pre-test and post-test knowledge scores of the experimental and control groups.
- **Paired t-test:** To compare pre-test and post-test knowledge scores within each group.
- **Independent t-test:** To compare knowledge scores between the experimental and control groups.
- **Chi-square test:** To determine the association between pre-test knowledge levels and selected socio-demographic variables.

A p-value of less than 0.05 was considered statistically significant.

RESULTS

Baseline Socio-demographic Characteristics of the Participants

This section included items related to the selected socio-demographic characteristics of the primary school teachers, such as age, gender, educational qualification, teaching experience, type of school, previous exposure to information about Specific Learning Disabilities (SLD), and participation in any previous training related to learning disabilities.

A total of 100 primary school teachers participated in the study, with 50 in the experimental group and 50 in the control group. The baseline socio-demographic characteristics of the participants are presented in Table 2.

Table 2. Distribution of participants according to baseline socio-demographic characteristics (N=100)

Socio-demographic characteristics	Experimental (n=50) f (%)	Control (n=50) f (%)	Total (N=100) f (%)
Age (years)			
21–30	18 (36%)	16 (32%)	34 (34%)
31–40	17 (34%)	18 (36%)	35 (35%)
41–50	10 (20%)	11 (22%)	21 (21%)
Above 50	5 (10%)	5 (10%)	10 (10%)
Gender			
Male	16 (32%)	18 (36%)	34 (34%)
Female	34 (68%)	32 (64%)	66 (66%)
Educational qualification			
Graduate	28 (56%)	30 (60%)	58 (58%)
Postgraduate	17 (34%)	15 (30%)	32 (32%)
Other professional qualification	5 (10%)	5 (10%)	10 (10%)
Teaching experience (years)			
Below 5	15 (30%)	13 (26%)	28 (28%)
5–10	18 (36%)	19 (38%)	37 (37%)
11–15	10 (20%)	11 (22%)	21 (21%)
Above 15	7 (14%)	7 (14%)	14 (14%)
Type of school			
Government	27 (54%)	25 (50%)	52 (52%)
Private	23 (46%)	25 (50%)	48 (48%)
Previous exposure to information about SLD			
Yes	19 (38%)	17 (34%)	36 (36%)
No	31 (62%)	33 (66%)	64 (64%)
Previous training related to learning disabilities			
Yes	12 (24%)	10 (20%)	22 (22%)
No	38 (76%)	40 (80%)	78 (78%)

Socio-demographic characteristics	Experimental (n=50) f (%)	Control (n=50) f (%)	Total (N=100) f (%)
Total	**50 (100%)**	**50 (100%)**	**100 (100%)**

The findings showed that the largest proportion of participants belonged to the 31–40 years age group (35%), followed by 21–30 years (34%). Female teachers constituted 66% of the participants. Regarding educational qualification, 58% were graduates and 32% were postgraduates. In terms of teaching experience, 37% had 5–10 years of experience, while 28% had less than 5 years of experience.

Regarding school type, 52% of the participants were from government schools and 48% from private schools. Only 36% had previous exposure to information about SLD, whereas 64% had no previous exposure. Similarly, 22% had received previous training related to learning disabilities, while 78% had not received such training.

Pre-test Knowledge Regarding Early Identification and Classroom Management of Children with Specific Learning Disabilities

The pre-test knowledge of 100 primary school teachers was assessed using a structured 30-item questionnaire. The findings were analysed separately for the experimental and control groups, with 50 participants in each group. The distribution of participants according to their pre-test knowledge levels is presented in Table 3.

Table 3. Distribution of teachers according to pre-test knowledge level (N=100)

Knowledge level	Experimental group, n (%)	Control group, n (%)	Total, n (%)
Inadequate (0–14)	30 (60%)	29 (58%)	59 (59%)
Moderately adequate (15–22)	17 (34%)	18 (36%)	35 (35%)
Adequate (23–30)	3 (6%)	3 (6%)	6 (6%)
Total	**50 (100%)**	**50 (100%)**	**100 (100%)**

Table 3showed that the majority of teachers in the experimental group (60%) and control group (58%) had inadequate pre-test knowledge regarding Specific Learning Disabilities. Moderately adequate knowledge was observed among 34% of teachers in the experimental group and 36% in the control group. Only 6% of teachers in each group demonstrated adequate knowledge. Overall, 59% of participants had inadequate knowledge before the educational intervention, indicating a need for improved awareness regarding the early identification and classroom management of children with SLD.

Effectiveness of the Structured Educational Programme

The effectiveness of the structured educational programme was evaluated by comparing the pre-test and post-test knowledge scores of teachers in the experimental group.

Table 4. Comparison of pre-test and post-test knowledge scores in the experimental group (N=50)

Assessment	Mean	SD	Mean difference	Paired t-value	p-value
Pre-test	12.60	3.10			
Post-test	**22.80**	**2.70**	10.20	18.50	< 0.001*
Significant at p < 0.05 level (df = 49; table value = 2.01).					

Table 4 showed that the mean post-test knowledge score of teachers in the experimental group (22.80 ± 2.70) was significantly higher than the mean pre-test knowledge score (12.60 ± 3.10), with a mean difference of 10.20. The calculated paired t-value (t = 18.50, df = 49) exceeded the critical table value (2.01) at the 0.05 level of significance (p < 0.001). Therefore, the null hypothesis was rejected, indicating that the structured educational programme was effective in improving teachers' knowledge regarding the early identification and classroom management of children with Specific Learning Disabilities.

Comparison of Post-test Knowledge Between Groups

Post-test knowledge scores were compared between the experimental and control groups using an independent samples *t*-test to determine the difference in knowledge following the intervention.

Table 5. Comparison of post-test knowledge scores between experimental and control groups (N=100)

Group	N	Mean	SD	Mean difference	Independent t-value	p-value
Experimental	50	22.80	2.70	9.70	16.84	< 0.001*
Control	50	13.10	3.05			
**Significant at p < 0.05 level (df = 98; table value = 1.98).*						

As presented in Table 5, teachers in the experimental group obtained a higher mean post-test knowledge score (22.80 ± 2.70) than those in the control group (13.10 ± 3.05). The difference between the group means was 9.70 points. Statistical analysis using the independent t-test yielded a calculated value of 16.84 (df = 98), which was above the critical value of 1.98 at the 5% significance level ($p < 0.001$). Accordingly, the null hypothesis was rejected. The findings indicated that participation in the structured educational programme resulted in significantly better knowledge scores than those observed in the control group.

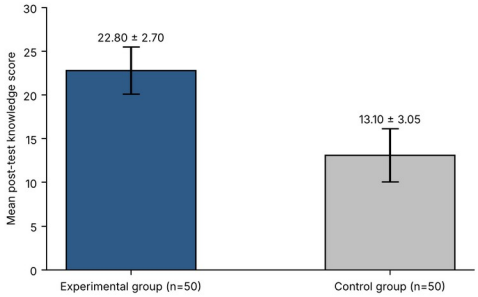


Figure 1. Comparison of post-test knowledge scores between experimental and control groups (N=100)

The association between pre-test knowledge levels and selected socio-demographic variables was examined using the Chi-square test.

Association Between Pre-test Knowledge Level and Selected Socio-demographic Variables

Table 6. Association between pre-test knowledge level and selected socio-demographic variables (N=100)

Socio-demographic variable	(χ^2) value	df	p-value	Association
Age	3.42	6	0.490	Not significant (NS)
Gender	1.18	2	0.554	Not significant (NS)
Educational qualification	8.64	4	0.071	Not significant (NS)
Teaching experience	11.25	4	0.024*	**Significant (S)**
Type of school	2.15	2	0.341	Not significant (NS)
Previous exposure to SLD information	9.82	2	0.007*	**Significant (S)**
Previous training related to learning disabilities	12.46	2	0.002*	**Significant (S)**
Significant at p < 0.05 level (critical values: df = 2, 5.99; df = 4, 9.49).				

Table 6 indicated significant associations between teachers' pre-test knowledge levels and teaching experience ($\chi^2 = 11.25$, df = 4, p = 0.024), previous exposure to SLD-related information ($\chi^2 = 9.82$, df = 2, p = 0.007), and previous training in learning disabilities ($\chi^2 = 12.46$, df = 2, p = 0.002). In contrast, age (p = 0.490), gender (p = 0.554), educational qualification (p = 0.071), and type of school (p = 0.341) did not show statistically significant associations with pre-test knowledge. Thus, the research hypothesis was supported for teaching experience, previous exposure to SLD information, and prior training, whereas the null hypothesis was retained for the other socio-demographic variables.

DISCUSSION

Baseline Socio-demographic Characteristics of the Participants

The study included 100 primary school teachers, equally distributed between the experimental and control groups. Female teachers constituted a larger proportion of the participants (66%). Most teachers belonged to the 31–40 years age group (35%), and 58% had graduate-level educational qualifications. Regarding

teaching experience, the largest proportion had 5–10 years of experience (37%).

An important finding was that 64% of the participants had no previous exposure to information about SLD, while 78% had not received any specific training related to learning disabilities. This indicated limited previous exposure to specialised information among a considerable proportion of the participating teachers. Such findings highlighted the importance of providing opportunities for professional learning on the recognition and educational support of children with SLD.

Pre-test Knowledge Regarding Specific Learning Disabilities

The pre-test assessment showed that inadequate knowledge was the most common category in both groups. In the experimental group, 60% of teachers had inadequate knowledge, compared with 58% in the control group. Only 6% of teachers in each group demonstrated adequate knowledge before the intervention.

These findings suggested that many participating teachers had limited knowledge of SLD, including its characteristics, early warning signs, identification procedures and classroom management approaches. Similar concerns were reported by Lingeswaran, who examined primary school teachers' knowledge of specific learning disabilities in India and identified gaps in their understanding[8].

The findings reinforced the importance of equipping teachers with appropriate knowledge to recognise persistent difficulties in reading, writing and mathematics. Since primary school teachers regularly observe children's academic performance, their understanding of early warning signs may contribute to timely identification and referral for professional assessment.

Effectiveness of the Structured Educational Programme

The findings showed an increase in the mean knowledge score of teachers in the experimental group from 12.60 ± 3.10 in the pre-test to 22.80 ± 2.70 in the post-test. The mean improvement was 10.20 points. The paired t-test demonstrated a statistically significant difference between the two assessments ($t = 18.50$, $df = 49$, $p < 0.001$).

This improvement indicated that the structured educational programme was associated with increased knowledge among teachers regarding the early identification and classroom management of children with SLD.

Comparable findings were reported by Ali et al., who evaluated an awareness lecture among primary school teachers in Kerala and observed a significant improvement in knowledge following the intervention[10]. Dani et al. also reported improved knowledge among teachers following a training programme on the identification of learning disabilities[11]. Similarly, Roy et al. found a significant improvement in teachers' knowledge after implementing an awareness programme in selected schools of West Bengal[12].

The improvement observed in the present study may have been related to the systematic organisation of the educational content, which covered the meaning and types of SLD, early warning signs, identification and referral, classroom management and educational support. The use of teaching-learning materials, explanations, examples and interactive discussions may also have helped teachers understand the subject more effectively.

Comparison of Post-test Knowledge Between Experimental and Control Groups

The comparison of post-test knowledge scores revealed a higher mean score among teachers in the experimental group (22.80 ± 2.70) than among those in the control group (13.10 ± 3.05). The mean difference was 9.70 points. The independent samples t-test showed a statistically significant difference between the groups ($t = 16.84$, $df = 98$, $p < 0.001$).

The higher post-test score in the experimental group suggested that teachers who received the structured educational programme demonstrated better knowledge than those who did not receive the intervention during the study period.

This finding was consistent with previous Indian studies that reported improvements in teachers' knowledge following planned awareness and training interventions[10–12]. The results supported the value of structured educational activities as a means of strengthening teachers' understanding of learning disabilities.

However, the outcome measured in this study was knowledge assessed through a

structured questionnaire. Therefore, the findings reflected improvement in knowledge and did not independently establish changes in teachers' practical classroom skills or actual identification performance.

Association Between Pre-test Knowledge and Selected Socio-demographic Variables

The association analysis indicated statistically significant relationships between pre-test knowledge and teaching experience, previous exposure to SLD-related information, and previous training related to learning disabilities. No statistically significant associations were reported with age, gender, educational qualification or type of school.

The association between previous exposure to information and knowledge suggested that opportunities to access relevant educational information may contribute to teachers' understanding of SLD. Similarly, the association with previous training highlighted the potential importance of professional development in improving awareness of learning disabilities.

Teaching experience was also associated with pre-test knowledge. This finding may reflect differences in teachers' professional exposure to children with diverse academic and learning needs. Nevertheless, teaching experience alone cannot ensure adequate knowledge of SLD, particularly in the absence of specialised training.

These findings highlighted the need to provide learning opportunities to teachers irrespective of their age, gender, educational qualification or type of school. Regular training and continuing professional development may help strengthen their ability to recognise learning difficulties and provide appropriate educational support.

LIMITATIONS

1. The study was conducted among primary school teachers from selected schools in Kolkata, West Bengal; therefore, the findings may not be generalisable to all primary school teachers or other educational settings.
2. A non-probability purposive sampling technique was used, which may have limited the representativeness of the study sample.
3. The study included only 100 teachers, which may restrict the applicability of the findings to a wider population.
4. The post-test was conducted seven days after completion of the structured educational programme; therefore, long-term retention of knowledge could not be established.
5. The study assessed teachers' knowledge through a structured questionnaire and did not evaluate their actual classroom performance or implementation of appropriate strategies for children with SLD.
6. The study did not assess changes in children's academic performance or other educational outcomes following the intervention.

NURSING IMPLICATIONS

Nursing Education: The study highlights the importance of including information about Specific Learning Disabilities in nursing education, particularly in child health nursing and community health nursing. Nursing students should be familiar with the types, early warning signs, identification procedures and support requirements of children with SLD. Such knowledge may strengthen their ability to participate in school health education and collaborate with teachers and parents.

Nursing Practice: Nurses, particularly community health nurses and school health personnel, can contribute to the early recognition of developmental and learning-related concerns among school-aged children. They can provide health education to parents and teachers, encourage timely professional assessment and coordinate with appropriate healthcare and educational professionals to support children with suspected SLD.

Nursing Administration: Nursing administrators may facilitate the organisation of awareness and educational programmes related to childhood developmental and learning difficulties. Collaboration with school authorities, community health services, psychologists and special educators may help strengthen referral pathways and improve access to appropriate support for children with SLD.

Nursing Research: The study may provide a basis for further research on awareness and educational interventions related to SLD. Future investigations may examine teachers' practical competencies, classroom management practices and long-term application of acquired knowledge.

Research involving larger samples and multiple educational settings may provide additional evidence regarding effective approaches to teacher education.

RECOMMENDATIONS

1. Similar studies may be conducted among larger groups of primary school teachers in different rural and urban settings.
2. Further studies may be undertaken in multiple schools and geographical areas to improve the generalisability of findings.
3. Follow-up assessments may be conducted at longer intervals to evaluate the retention of knowledge after the educational programme.
4. Future research may assess teachers' actual classroom practices and their ability to apply appropriate strategies for children with SLD.
5. Comparative studies may be conducted to evaluate the effectiveness of different educational approaches, including workshops, demonstrations, case-based learning and digital learning programmes.
6. Regular awareness and training programmes may be organised for teachers to strengthen early recognition, appropriate classroom support and timely referral of children with SLD.

CONCLUSION

The present study was undertaken to evaluate the effectiveness of a structured educational programme on knowledge regarding the early identification and classroom management of children with Specific Learning Disabilities among primary school teachers in selected schools of Kolkata, West Bengal.

The study findings, as presented in the results, indicated an improvement in knowledge scores among teachers in the experimental group following the structured educational programme. The post-test knowledge scores were also higher in the experimental group than in the control group. These findings suggest that a planned educational intervention may be a useful approach for improving teachers' understanding of SLD, its early warning signs, identification procedures and appropriate classroom management strategies.

The study also highlights the importance of strengthening teachers' awareness of learning disabilities so that children experiencing persistent learning difficulties can receive appropriate support and timely referral for professional assessment. Community health nurses, school health personnel and other healthcare professionals may contribute to this process through health education and collaboration with teachers, parents and educational specialists.

Overall, structured educational programmes may support teachers in creating more inclusive and supportive classroom environments for children with SLD. Continued teacher education and further research are important for strengthening early identification and educational support for these children.

DECLARATIONS

Ethical Approval

Necessary administrative permission was obtained from the concerned school authorities. The study was conducted in accordance with applicable ethical principles for research involving human participants. Confidentiality, privacy and anonymity of participants were maintained throughout the study.

Informed Consent

Written informed consent was obtained from all participating teachers before data collection. The purpose and procedures of the study were explained to the participants. Participation was voluntary, and participants were informed of their right to withdraw from the study without any adverse consequences.

Conflict of Interest

The authors declare that they have no conflict of interest related to this study.

Funding

No external financial support was received for conducting this study or preparing the manuscript.

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Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to appropriate ethical and confidentiality requirements.

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