

# Reinforcement Behavior Therapy by Kindergarten Teachers on Preschool Children's Aggression: A Randomized Controlled Trial

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**ABSTRACT**

**Background:** Aggression is a kind of behavior that causes damage or harm to others. The prevalence of aggression is 8–20% in 3–6 years old children. The present study aimed to assess the effect of training kindergarten teachers regarding reinforcement behavior therapy on preschoolers' aggression.

**Methods:** In this cluster randomized control trial, 14 out of 35 kindergarten and preschool centers of Mohr city, Iran, were chosen using random cluster sampling and then randomly assigned to an intervention and a control group. All 370 kindergarten and preschool children in 14 kindergarten were assessed by preschoolers' aggression questionnaire and 60 children who obtained a minimum aggression score of 117.48 for girls and 125.77 for boys were randomly selected. The teachers in the intervention group participated in 4 educational sessions on behavior therapy and then practiced this technique under the supervision of the researcher for two months. Preschoolers' aggression questionnaire was computed in both intervention and control groups before and after a two-month period.

**Results:** The results demonstrated a significant statistical difference in the total aggression score ( $P=0.01$ ), verbal ( $P=0.02$ ) and physical ( $P=0.01$ ) aggression subscales scores in the intervention group in comparison to the control group after the intervention. But the scores of relational aggression ( $P=0.09$ ) and impulsive anger ( $P=0.08$ ) subscales were not statistically different in the intervention group compared to the controls.

**Conclusion:** This study highlighted the importance of teaching reinforcement behavior therapy by kindergarten teachers in decreasing verbal and physical aggression in preschoolers.

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**KEYWORDS:** Aggression; Behavior Therapy; Child; Mental health

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## INTRODUCTION

Aggressive behavior makes up a great number of all children seeking psychological services.<sup>1</sup> The prevalence of aggression is 8-20% in three- to six-year-old children.<sup>2</sup> Aggression is a kind of behavior that causes damage or harm to others.<sup>3</sup> One type of aggression that occurs during early preschool years is hostile aggression.<sup>4-6</sup> Biological and genetic factors, environmental learning, cognitive processing and personal stimuli or motives are some important causes of aggression.<sup>7</sup>

Treatment of aggressive behavior at an early age is very important, as aggression in early years of life sets the ground for many problems in personal and interpersonal areas of the lives of aggressive children. For instance, it can lead to a weak self-concept,<sup>8</sup> being rejected by peers,<sup>6</sup> poor academic performance<sup>9</sup> and can serve as a predictor of delinquency, depression, academic failure, substance abuse,<sup>10</sup> more inappropriate and aggressive reaction to social issues, and choosing more aggressive solutions for solving problems later in life.<sup>11,12</sup> On the other hand, childhood exposure to aggression may also influence life-long health through biological mechanisms.<sup>13</sup> Also, the economic costs imposed on the community due to youth aggression, bullying and violence are extremely high.<sup>14</sup>

Yet, social-learning theorists contend that environmental factors are responsible for learning aggressive behaviors and continuing them.<sup>7</sup> Therefore, the children who learn aggressive behaviors are able to avoid such behaviors<sup>15</sup> by means of reinforcement behavior therapy.<sup>7</sup>

Reinforcement behavior therapy is defined as the “employment of reinforcement and extinction in order to increase the occurrence of desirable behaviors and decrease the incidence of behaviors that interfere with intended behavior”.<sup>16</sup> Khazaie et al. (2011) compared the effectiveness of two methods, namely reinforcement and reward behavioral therapy and Ellis’s cognitive therapy, in the

degree of aggression among 89 parentless children. The reinforcement and reward behavioral therapy method led to a significant reduction in aggression mean score before and after applying the procedure, whereas Ellis’s cognitive therapy technique did not show any significant impact on lowering aggression.<sup>17</sup>

The study of Khazaie and colleagues did suggest the effectiveness of behavioral therapy in aggression; however, it was carried out by a psychotherapist.<sup>17</sup> In many countries, factors, such as insufficient number of professional psychotherapists or expenses of the procedure, restrict many families’ access to a psychotherapist. Therefore, training kindergarten and day-care centers’ teachers can be an appropriate alternative for offering proper interventions under the supervision of a therapist, so that a greater number of preschool children can benefit from such procedures. Teachers can promote students’ health and potentially reduce violence and other aggressive behaviors.<sup>18</sup> School environment interventions that impact on a range of health risk behaviors, including aggression, are likely to be one of the most efficient ways of modifying population-level risk.<sup>19</sup>

Schools’ approaches to discipline, behavior management and aggression prevention vary widely and are rarely evidence-based, and that further resources and research are urgently needed to combat aggressive behaviors.<sup>19</sup> Although a large number of studies have so far been conducted on the effectiveness of complimentary therapies in reducing children’s aggression, most of them have fundamental limitations.<sup>20-22</sup> Some such limitations include a greater focus on aggressive boys than girls,<sup>23</sup> more emphasis on overt forms of aggression in comparison to more subtle forms like relational aggression.<sup>24</sup> Another treatment alternative is family therapy which, although very effective in children’s behavioral problems,<sup>25</sup> is quite costly and time-consuming. Also, most of them were performed by psychotherapists. Such limitations clearly show the necessity for applying new interventions.<sup>26</sup>

There is, therefore, a pressing need to determine which interventions are effective in addressing aggression in preschoolers, and if the intervention can apply effectively by kindergarten teachers to scale up such interventions across local and national school networks especially in developing countries. Since children spend a great part of their active hours in kindergarten in close contact with their teachers, training the teachers can make a significant contribution to the elimination of aggressive behaviors. Moreover, given the fact that each teacher is in charge of several children, providing teachers with trainings will result in saving the time and cost. In addition, the existing studies have addressed almost all forms of aggression except for impulsive anger. Therefore, the present study has focused on all forms of aggression and aims to identify the effect of reinforcement behavior therapy by kindergarten teachers on all types of aggressive behavior among kindergarten and preschool children.

## MATERIALS AND METHODS

It was a cluster randomized control trial research with a pretest/post-test design and control group. The study compared two groups of aggressive children, the intervention group receiving reinforcement behavior therapy and routine care by kindergarten teachers and the control group only receiving routine care.

### *Participants*

The study was conducted in 14 kindergarten of Mohr city in 2013-2014. Mohr is located in Iran, in the southernmost part of Fars Province, 360 km away from Shiraz. Currently, there are 8 urban and 27 rural kindergartens and daycare centers in this city and about 1000 children attend these centers.

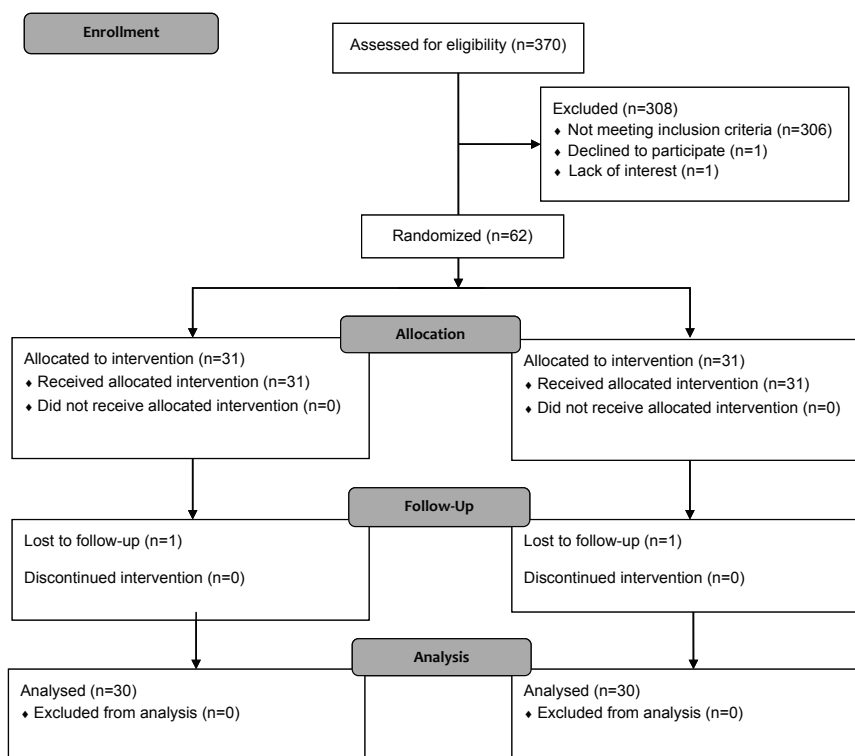
The research population consisted of all three- to six-year-old kindergarten and preschool children in Mohr. The inclusion criteria of the study were parental consent, children's age range of 3-6 years, and obtaining a minimum aggression score of 117.48 for girls

and 125.77 for boys (according to preschoolers' aggression questionnaire constructed by Shahram Vahedi et al.<sup>27</sup> On the other hand, the children or families with emotional crisis during the 2 months of intervention were also excluded from the study.

The study samples were selected using cluster sampling. In doing so, 14 out of the 35 existing kindergartens were selected through cluster random sampling method, as recommended by a demographer. Then, all the 14 kindergartens were randomly allocated into either the intervention (n=7) or the control group (n=7) through block randomization by the researcher's assistant. The preschool aggression scale was distributed among the teachers to complete it for all 3-6 year old children in 14 kindergartens. Using a study entitled "Prevalence of behavioral problems in 3 to 6 year old children in Hamadan city"<sup>22</sup> and based on effect size=0.95, power of 0.8, and  $\alpha=0.05$ , a 54 subject sample size (27 subjects in each group) was determined for the present study. Considering the probable loss in the sample, the number of subjects in each group was increased to 31. Accordingly, 62 aggressive children whose aggression scores were more than 125.77 for boys and more than 117.48 for girls<sup>27</sup> were randomly selected by simple randomization procedure by a table of random numbers from the list of aggressive children and their parents were asked to complete the written informed consent forms. The teachers of the kindergartens (No=14) in the intervention group received 4 educational sessions based on positive reinforcement behavior therapy, but the teachers of kindergartens in the control group did not receive any interventions during the research period. Each teacher in the intervention and control groups had about 15 children in his/her class. During the study, one patient in the control group was withdrawn because of travel to another city. One subject in the intervention group also discontinued the intervention (Figure 1).

$$n = \frac{2(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2 S^2}{d^2}$$

**CONSORT Flow Diagram**



**Figure 1:** CONSORT flow diagram of study participants

*Instruments*

In this study, the data were collected using preschoolers’ aggression questionnaire. The preschoolers’ aggression questionnaire consisted of 43 questions responded through a Likert scale. This questionnaire aimed to evaluate various types of aggression, including verbal aggression, physical aggression, relational aggression, and impulsive anger. The questionnaire was filled out by the teachers. The reliability and validity of preschool aggression scale was studied by Shahram Vahedi et al. (2007) in a research on evaluation of aggression in preschool children of Urmia, Iran.<sup>27</sup> The Cronbach’s alpha was estimated to be 0.98 for the whole scale, 0.93 for verbal aggression, 0.92 for physical aggression, 0.94 for relational aggression, and 0.88 for impulsive anger. A factor analysis of this scale using principal component analysis with Varimax rotation resulted in four elements of verbal aggression, physical aggression, relational aggression, and impulsive anger, which was indicative of

the construct validity of the scale. Therefore, this aggression measurement scale can be used as a valid and reliable instrument in educational and clinical settings. In this 43-item questionnaire, the first 14 questions are related to verbal aggression and the next 13 are about physical aggression; also, there are 9 questions on relational aggression, and the last 7 items deal with impulsive anger. This questionnaire was filled out by the teacher using 5 options (0=never, 1=rarely, 2=once a month, 3=once a week, and 4=often). The scores of verbal aggression, physical aggression, relational aggression, and impulsive anger were between 0 and 56, 0 and 52, 0 and 36, and 0 and 28, respectively. Thus, the scores of the whole test could range from 0 to 168. The children whose aggression scores were two standard deviations above the mean (117.47 for girls and 125.77 for boys) were diagnosed as aggressive.<sup>27</sup>

*Procedure*

Four training sessions, each lasting for two

hours, were planned for the teachers in the intervention group who were ready to take part in the study by an interventionist who was unaware of the aim of the study and was professional in behavior therapy. In the first session, the teachers were given some information about mental, psychological, and physical characteristics of the preschool children, and gained an understanding of how to deal with them properly. In the second session, the teachers learned about aggression in children, its types, causes, importance of early treatment of aggressive children, and general treatment techniques and methods. The third session intended to make teachers familiar with behavioral therapy and its various techniques, with a focus on reinforcement behavior therapy. The fourth and final session was entitled “Practical Work on Reinforcement and Reward Behavior Therapy”, and aimed to demonstrate how this technique works in practice, how to write down the details, and how to prepare an anecdotal record. The teachers were also given a written and practical test on proper practice of the technique.

Then, the teachers were asked to practice what they had already learned during their four sessions of training for aggressive children in the intervention group for 8 weeks. They were also asked to complete anecdotal record for every aggressive event in children, so that the researcher could follow up any changes in the aggressive children as well as the way the teachers implemented the procedure. In these forms, the teachers were asked to describe their reactions towards the children’s aggressive behaviors in details and free from any judgment. Then, in his weekly visits to the kindergartens, the researcher would review these forms and discuss them together with teachers. Afterwards, if necessary, the teacher’s reactions were modified and the required instructions were given.

The control group, however, received no interventions throughout the course of research. Yet, the demographic information questionnaire and the preschoolers’ aggression

questionnaire were filled out by the teachers.

After this project was carried out for two months, the teachers were asked to complete the same preschoolers’ aggression questionnaire for the children in both intervention and control groups for the second time and the results were evaluated by the researcher.

The outcome measures in this study included the children’s scores in the preschoolers’ aggression.

The study data were collected by kindergarten teachers before and after the eighth week of the intervention. The teachers completed a demographic information questionnaire and the preschoolers’ aggression questionnaire. In this study, the statistician who performed the data analysis was kept blinded to the allocation.

#### *Data Analysis*

The data were analyzed using Statistical Package for the Social Sciences (version 15, SPSS Inc, Chicago, IL). To evaluate the homogeneity of the participants’ characteristics in the intervention and control groups, Chi-square, Fisher exact test and Student’s t test were applied. Kolmogorov—Smirnov test, paired t test and student’s t-test were used for statistical analysis, as well. Besides,  $P < 0.05$  was considered as statistically significant.

#### *Ethical Considerations*

The study was conducted in accordance with the human subjects’ protection principles (Declaration of Helsinki). Ethics committee approval was obtained from the research ethics committee of Shiraz University of Medical Sciences. The permission was obtained from the Welfare Department of Mohr city. A written informed consent was obtained from the teachers and family of children for participation in the study. It provided the subjects with some information about the study, such as the purpose, e procedure, possibility of sharing the study results after completion, and promised anonymity in the event of publication of the

study results. In addition, the subjects were assured that participation/non-participation would not affect their received care. The participants were allowed to withdraw from the research at any stage of the process if they or their parents were unwilling to continue their cooperation. Moreover, after completion of the study, a handbook was prepared and given to the teachers and parents of the control group children.

## RESULTS

The two groups were compared in terms of the children's age, both parents' age, both parents' level of education, both parents' occupation, and family income; they were similar regarding all the features, except for father's age. The mean (SD) age of the children was 4.51 (0.83). The majority of the subjects were male (n=33, 55%). The means (SD) of aggression score in boys and girls were compared and shown in Table 2. All of the teachers were female between 20-35 years old and most of them had a BS degree (n=20, 72%); 28% of them had high school diploma level of education (n=8). Characteristics of the intervention and control groups are presented in Tables 1 and 2.

Moreover, no significant difference was

found between the two groups regarding the total aggression score (P=0.55) as well as the scores of the four subscales prior to the intervention (Table 4) The mean score of aggression after the intervention showed a statistically significant difference between the two groups in this regard (P=0.01) (Table 3). Thus, the results supported the study hypothesis. Moreover, a statistically significant change was observed in the intervention group's mean score of aggression after the intervention (P<0.02); also, such a difference was found in the control group (P<0.023), but the results showed that the mean score of aggression in the control group was increased in the post-test compared to the pre-test. Furthermore, the results revealed a decrease in the mean scores of verbal aggression, physical aggression, relational aggression, and impulsive anger in the intervention group after the intervention. Yet, the difference between the intervention and control groups was statistically significant only for physical and verbal aggression subscales (P=0.02, P<0.01) (Table 4).

## DISCUSSION

The present study aimed to investigate the effect

**Table 1:** Comparison of the demographic characteristics in the control and intervention groups

Variable	Intervention group	Control group	P value
	Mean±SD	Mean±SD	
Child's Age (years)	4.56±0.89	4.46±0.77	t=0.462 P=0.646
Mother's Age (years)	32.6±5.44	30.16±4.80	t=0.393 P=0.072
Father's Age (years)	36.3±4.08	33.56±4.66	t=0.01 P=0.034

t=Student t test

**Table 2:** Mean±SD scores of aggression among boys and girls in both groups

Type of Aggression	Boys	Girls	t, P value
	Mean±SD	Mean±SD	
Verbal	49.66±4.30	45.56±3.10	t=0.85, P<0.01
Physical	48.30±4.37	43.88±4.33	t=0.74, P<0.01
Relational	32.27±1.66	31.88±2.77	t=1.20, P=0.51
Impulsive	17.75±6.50	20.33±5.37	t=1.89, P=0.10
Total aggression	146.03±13.55	141.67±10.94	t=1.46, P=0.18

**Table 3:** Comparison of the frequency distribution of the participants in the intervention and control groups based on demographic characteristics

Variable	Intervention group		Control group		P value
	Frequency	Percentage	Frequency	Percentage	
Sex of child					
Male	17	5.66	16	53.33	X <sup>2</sup> =0.55
Female	13	4.34	14	46.67	P=0.79
Mother's level of education					
High school diploma	23	76.7	23	76.7	F=0.486
Associate's degree	4	13.3	3	10	P=1
Bachelor's degree	3	10	4	13.3	
Fathers level of education					
High school diploma	16	53.3	18	60	F=0.873
Associate's degree	7	23.3	6	20	P=1
Bachelor's degree	7	23.3	6	20	
Mother's occupation					
Homemaker	27	90	26	86.7	X <sup>2</sup> =0.162
Employee	3	10	4	13.3	P=1
Father's occupation					
Employee	18	60	22	73.3	X <sup>2</sup> =1.29
Self-employed	11	36.7	7	23.3	P=0.7
Unemployed	1	3.3	1	3.3	

X<sup>2</sup>=Chi-square; F=Fisher exact test**Table 4:** Comparison of the changes in the mean scores of various types of aggression in the preschoolers in the intervention and control groups before and after the intervention

Aggression	Pre-test Mean±SD	Post-test Mean±SD	Mean change	Paired t-test, P value
Total Aggression				
G1 <sup>a</sup>	147.16±10.31	133.1±21.2	14.06	t=1.68, P<0.002
G2 <sup>b</sup>	140.96±13.91	148.03±9.79	7.06	t=3.45, P=0.023
Between group analysis; P* student t-test	t=1.96; P=0.55	t=-3.50; P=0.01		
Verbal aggression				
G1	48.6 (4.33)	43.90 (7.45)	4.70	t=1.55, P=0.006
G2	47.03 (4.20)	49 (3.75)	1.90	t=2.9, P=0.034
Between group analysis; P* student t-test	t=1.42, P=0.16	t=-3/34, P=0.02		
Physical aggression				
G1	46.76±4.82	41.73±6.53	5.03	t=0.865, P=0.002
G2	45.86±4.92	47.26±4.00	1.40	t=3.50, P=0.242
Between group analysis; P* student t-test	t=0.71, P=0.47	t=-3.95, p<0.01		
Relational aggression				
G1	32.00±2.18	30.06±5.13	2.80	t=1.82, P=0.068
G2	32.00±2.28	31.83±2.47	1.60	t=1.63, P=0.765
Between group analysis; P* student t-test	t=0.34, P=0.73	t=-1.93, P=0.097		
Impulsive anger				
G1	19.90±5.59	18.16±6.63	1.73	t=2.65, P=0.285
G2	17.93±6.56	19.83±5.27	1.90	t=0.715, P=0.159
Between group analysis; P* student t-test	t=1.24, P=0.21	t=-1.76, p=0.083		

<sup>a</sup>Intervention group; <sup>b</sup>Control group; \*Student t-test

of training kindergarten teachers regarding reinforcement behavior therapy on reducing different forms of aggression in preschool children. The study findings indicated that using reinforcement behavior therapy by kindergarten teachers resulted in a significant decrease in the total aggression, verbal and physical aggression, scores in the intervention group compared to the control group. It did alleviate the children's covert aggression, including relational aggression and impulsive anger, as well, but this change was not statistically significant. This finding supported the results of a study that indicated the effectiveness of reinforcement behavior therapy on abatement of childhood aggression.<sup>21</sup> Since children spend a long time at kindergartens in close contact with their teachers, it is possible to reform, or even eliminate, many behaviors that are possibly shaped at home. In this regard, a meta-analysis was performed by Smeets et al, (2014), on Twenty-five studies to identify predictors of treatment response regarding CBT. These study results suggest that CBT is effective in reducing maladaptive aggression. Furthermore, the treatment setting and duration did not seem to influence the treatment effect, which shows the need for development of more cost-effective and less-invasive interventions.<sup>28</sup> This finding approves that CBT can be applied in other settings such as schools.

There are limited studies that show the effect of behavior therapy by kindergarten teachers but to support the effectiveness of behavior therapy on the children's aggression, both verbal and physical, several studies have been conducted; their results are all consistent with the present research.<sup>29-34</sup>

Verbally and physically aggressive children can be detected more easily. Since preventing this form of aggression has its roots in religion and national culture and it is forbidden in tradition. Parents are more sensitive and try to rectify the child's behavior and even seek help and advice from teachers. These attempts all help the problem be diagnosed and solved in time.<sup>5</sup>

The children who display relational aggression are less responsive to psychological

treatments because of the nature of relational aggression compared to other types and the deeper mechanisms involved in it.<sup>33</sup> Relationally, aggressive children were popular among their peers, causing short-term treatments not to have noticeable effects. The place these children gain among their peers because of their behavior makes them more resistant to medium-term psychological treatments.<sup>5,34,35</sup>

The results of the present study demonstrated a decrease in impulsive anger after the intervention; however, this reduction was not statistically significant. This can be due to the fact that impulsive anger is a covert form of aggression and, consequently, it is sometimes not considered as aggression at all.<sup>22</sup> The study by Rajabpour et al. (2012) showed that group therapy using parent-child relationship also did not have any significant effects on covert aggression.<sup>36</sup> School violence prevention also requires school nurse interventions. Utilizing a primary, secondary and tertiary intervention model from the public health perspective can help the organization to address violence in each of these three domains.<sup>37</sup> In the absence of school nurses in kindergartens, the teachers are the best choice for working with aggressive children. In this regard, the psychiatric mental health nurses in their community based approach can arrange educational programs for teachers to facilitate and improve their ability in providing psychiatric interventions such as reinforcement behavior therapy.<sup>38</sup>

Short duration of treatment, small sample size, all female teachers, potential contamination across schools and the fact that evaluation of children's aggression at home is not possible were some major limitations of the present study. Filling out the questionnaire by teachers can affect the result.

## CONCLUSION

In conclusion, the results of this research emphasized the effectiveness of reinforcement behavior therapy in reducing physical and verbal



aggression in preschool children. Nevertheless, it was shown that this technique was not sufficient to alleviate relational aggression and impulsive anger. This reminds us of the necessity for continuation of the treatment or designing another type of intervention which is more appropriate for these types of behavioral problems in children. In this study, positive reinforcement therapy by teachers was evaluated in the aggressive preschooler children. Therefore, using other psychological interventions in aggressive children is suggested to be used in future studies. Studying the effect of positive reinforcement therapy on aggression and its sub-scales for more than 8 weeks is also recommended. Moreover, qualitative studies are recommended to be performed on aggression in preschoolers in future. To improve evidence-based nursing, further studies on the impact of this intervention are recommended, as well.

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**Conflict of Interest:** None declared.

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