

Research Paper

Oregon Model Parenting and Mothers' Mental Health vs Externalizing Problems in Motor-disabled Children

Narjes Shakibamehr¹ , Masoume Pourmohamadrez-Tajrishi^{1*} , Narges Adibsereshki¹ , Mohsen Vahedi²

1. Department of Psychology and Education of Exceptional Children, Faculty of Behavioral Sciences and Mental Health, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

2. Department of Biostatistics and Epidemiology, Pediatric Neurorehabilitation Research Center, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.



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ABSTRACT

Objectives: This study examined the relationship between family dynamics, maternal child-rearing practices, and externalizing difficulties in children with motor disabilities, focusing on maternal mental health challenges. It aimed to evaluate the effectiveness of the Oregon model of parenting management (OMPM) in improving maternal mental health and reducing externalizing difficulties in children.

Methods: A quasi-experimental design with a pre-test/post-test format and control group was employed. Thirty boys aged 8-11 years with motor disabilities and their mothers were conveniently recruited from Qazvin City, Iran. Mothers were randomly assigned to either an experimental group (who received ten 90-minute OMPM sessions) or a control group (who continued their regular activities). Data were collected using the mental health inventory and the Achenbach child behavior checklist, both pre- and post-intervention, with follow-ups conducted two months after the intervention. Data were analyzed using repeated-measures analysis of variance (ANOVA) in SPSS software, version 25.

Results: Significant improvements were found in maternal mental health, characterized by enhanced well-being and reduced mental distress in the experimental group ($P < 0.01$), which persisted at follow-up. The Eta squared (η^2) values showed that participation in OMPM accounted for 86% of the variance in maternal well-being and 27% of the variance in mental distress. Significant differences in children's externalizing difficulties were also noted, particularly in total difficulties, aggression, and rule-breaking behaviors ($P < 0.001$), with the intervention explaining 86%, 77%, and 72% of the variance in these behaviors, respectively.

Discussion: The OMPM program effectively enhances maternal well-being and reduces externalizing difficulties in children with motor disabilities. These findings highlight the potential of similar intervention programs to assist mothers, potentially mitigating behavioral challenges in their children. Limitations include the small sample size and reliance on self-reported measures, suggesting caution in generalizing the results. These limitations suggest the need for further longitudinal studies to explore the long-term impact of such parenting interventions on maternal and child outcomes.

Keywords:

Oregon model parenting management (OMPM), Externalizing difficulties, Mother's mental health, Motor disability

* Corresponding Author:

Masoume Pourmohamadrez-Tajrishi, Associate Professor.

Address: Department of Psychology and Education of Exceptional Children, Faculty of Behavioral Sciences and Mental Health, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

Tel: +98 (21) 71732515

E-mail: ma.tajrishi@uswr.ac.ir, mppmptajrishi@gmail.com



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Highlights

- A study investigated the impact of family dynamics on children's behavior with motor disabilities.
- Evaluates the OMPM for maternal mental health.
- A quasi-experimental design with a pre-test/post-test and control group was implemented.
- Significant improvements in maternal well-being and child externalizing difficulties.
- Limitations include a small sample size; future research should expand on findings.

Plain Language Summary

This study explores how family dynamics and maternal child-rearing practices affect externalizing difficulties in children with motor disabilities, which can lead to increased mental health issues in mothers. This study aimed to evaluate the Oregon model of parenting management (OMPM) for improving maternal mental health and reducing behavioral difficulties in children. Thirty boys aged 8-11 with motor disabilities and their mothers were selected from Qazvin City for this quasi-experimental study, which included a control group. The mothers in the experimental group participated in ten training sessions, while the control group continued with their regular activities. The results showed significant improvements in maternal well-being and reductions in children's aggression and rule-breaking behaviors following the training. However, the study had limitations, including a small sample size and reliance on self-reported measures, suggesting that further research is needed to understand the long-term impact of such programs.

Introduction

Motor disability refers to an impairment that limits an individual's ability to perform major life activities and hinders the effective use of their limbs. Globally, United Nations International Children's Emergency Fund (UNICEF) estimates that approximately 207.4 million children aged 5-17 years (12.5%) experience moderate to severe disabilities, based on household surveys assessing functional status [1]. In Iran, over one million individuals have at least one form of disability. These disabilities can arise from various causes, including congenital genetic factors and acquired injuries from traffic and non-traffic accidents [2].

Children with motor disabilities are particularly prone to behavioral challenges [3], which can adversely impact their developmental trajectory and overall quality of life (QoL). Considering the high prevalence of these disabilities, understanding their specific needs is essential for designing effective interventions and supportive services. Behavioral difficulties encompass actions that are socially or culturally unacceptable, pose safety risks, disrupt learning processes, and hinder healthy social interactions [4]. The persistence of such behaviors is often influenced by family environment and parenting

practices. Caregiving for a child with a motor disability frequently results in caregiver stress and mental health issues for parents [5].

The presence of a child with motor impairment introduces new familial challenges, adversely affecting family dynamics and lifestyle. These children typically depend on caregivers, especially mothers, for daily activities. This dependency can generate emotional and behavioral stress within the family, impacting maternal mental health and, consequently, the child's well-being [4]. Maternal approaches characterized by hostility, control, or punitive discipline can inadvertently foster maladaptive behaviors, irritability, and aggression in children [6].

Behavioral issues in children often reflect underlying familial mental health challenges, creating a cycle that exacerbates both child and maternal difficulties. Recent evidence underscores the necessity of appropriate programs and services aimed at promoting mental health in both mothers and children [7].

Parent management training (PMT) programs aim to improve parenting skills and child outcomes, employing various approaches. These programs focus on reinforcing positive behaviors and reducing problematic behaviors, helping parents acquire skills, such as encouraging desir-

able actions, setting boundaries, and monitoring activities to prevent or mitigate behavioral difficulties [8]. One prominent model is the Oregon model of parenting management (OMPM), which emphasizes three core components: 1) safety and behavioral strategies, equipping parents with skills to manage challenging behaviors; 2) self-management, teaching parents' techniques to regulate their responses in difficult situations; and 3) reciprocal interactions, focusing on how parental behaviors influence child behaviors to promote healthier family dynamics [9].

Other approaches, including parenting programs, such as the positive parenting program (triple-P) [10] and stepping stones [11], vary in scope and methodology. The triple-P adopts a comprehensive, multi-level approach that emphasizes promoting positive reinforcement, reducing negative behaviors, and building parental confidence through adaptive skills training, making it suitable for a broad range of behavioral issues and prevention efforts [12]. In contrast, stepping stones is specifically designed for parents of children with behavioral and learning difficulties, focusing on targeted skill development to manage these special needs and foster emotional support through peer networks [11]. While both programs aim to improve parenting practices, their scope and primary focus differ. Triple-P offers a more general preventative framework, whereas stepping stones provides targeted interventions for complex cases. Understanding these distinctions is crucial to assess their relative suitability and expected outcomes compared to the current intervention for children with motor disabilities.

The distinguishing feature of OMPM lies in its focus on equipping parents, particularly mothers, with interactive management strategies that foster effective communication, which can reduce behavioral issues and enhance maternal mental health [13]. Since behavioral difficulties often originate early in childhood and children with motor disabilities require special care, paying attention to maternal behaviors, the quality of mother-child interactions, and implementing targeted interventions in these areas can contribute significantly to their well-being. Such approaches may prevent the escalation of psychological and behavioral problems later in life [14].

The article acknowledges the absence of local validation for the OMPM but does not explicitly detail how this study addresses this gap. Our research aims to evaluate the effectiveness of the OMPM within our specific cultural context, recognizing that cultural factors, such as familial norms, parenting practices, and social expectations, can influence the intervention's outcomes. By assessing both maternal mental health and children's externalizing

behaviors, this study provides evidence of the model's applicability and efficacy in our setting. Such validation is crucial, as cultural adaptations or considerations may be necessary to optimize the intervention's relevance and effectiveness. Additionally, fostering positive mother-child relationships and strengthening family dynamics through programs like OMPM can establish a solid foundation for children's active participation in school and society, promoting their independence and overall development. This foundation can alleviate the additional burdens children face due to reliance on caregivers, potentially preventing the emergence or deterioration of behavioral issues over time, while also improving maternal mental health. Overall, evaluating the model's efficacy in our cultural context contributes to a broader understanding of how culturally sensitive parenting programs can be effectively implemented. Although the literature highlights the significance of maternal mental health and family dynamics in influencing child behavior, there remains a gap in research validating the OMPM in our specific cultural context. This study aims to fill this gap by evaluating the model's effectiveness in promoting positive mother-child interactions and reducing behavioral difficulties among children with motor disabilities.

Materials and Methods

The present study employed a quasi-experimental design with a pre-test and post-test, incorporating a control group and a two-month follow-up. The target population consisted of boys aged 8 to 11 years with motor disabilities enrolled in special schools for children with physical and motor issues in Qazvin City during the 2023-2024 academic year. The decision to focus solely on boys was based on epidemiological data indicating a higher prevalence of motor disabilities among males, often with a male-to-female ratio of approximately 2:1 to 3:1 [15]. Additionally, boys tend to exhibit higher rates of externalizing behaviors, such as aggression and rule-breaking, which are often more prominent in this population [16]. A total of 30 participants and their mothers were selected through convenience sampling. The sample size was determined based on a similar study [17], with a type I error rate of 0.05, power of 0.8, and anticipated dropout rate of 25%. Using the sample size formula (Equation 1) and inclusion criteria, participants were randomly assigned to either the experimental or control group using simple randomization, resulting in 15 individuals in each group:

$$1. n = 2 \frac{(z_{1-\alpha/2} + z_{1-\beta})^2 \sigma^2}{(\mu_1 - \mu_2)^2} = 2 \frac{(1.96 + 0.84)^2 1.68^2}{(6.60 - 4.56)^2} \approx 10.61$$

The inclusion criteria for the study were as follows: Both mothers and children had to be willing to cooperate; mothers needed to have at least a middle school certificate to complete written assignments during the intervention sessions; children should not have had any sensory impairments, such as vision or hearing problems, or neurological conditions, such as or attention deficit/hyperactivity disorder (based on parents' reports), mothers should not have had mental disorders that could hinder their participation in the intervention sessions, as assessed through their own reports; and children had to have a T-score between 60 and 63 on the Achenbach child behavior checklist (ACBCL) to identify externalizing difficulties. Participants were excluded if they had participated in similar parent management programs within the previous six months or were currently involved in such programs. Additionally, incomplete questionnaire submissions also resulted in exclusion from the study.

The mental health inventory (MHI): The MHI is a 38-item instrument designed to measure well-being and mental distress, and has been validated in four large samples of participants aged 13 to 69 years across four large samples [18]. The purpose of this study was to evaluate participants' overall mental health status, providing a reliable and valid tool for the Iranian population. The MHI's psychometric properties, including high internal consistency and stability over time, support its suitability for this context. To streamline assessment, we used the shortened MHI-18 version, which assesses anxiety, depression, emotional ties, behavioral control, and positive affect—core components linked to mental well-being and distress [18]. The Persian MHI-18 has demonstrated excellent factorial validity, with two primary factors: Well-being (positive affect and emotional ties) and mental distress (depression, anxiety, and behavioral control), and a Cronbach's α of 0.75, indicating good internal consistency. The use of the MHI-18 in this study was justified by its brevity, psychometric robustness, and established validity in Iranian samples [19].

The ACBCL: The ACBCL is a comprehensive tool designed to assess a wide range of behavioral and emotional problems in children aged 6 to 18. In this study, we used the Persian version to evaluate externalizing difficulties, specifically aggression and rule-breaking behaviors, as primary outcome measures. The ACBCL consists of 113 items rated on a three-point scale, completed by parents familiar with their child's behavior. This study aimed to identify behavioral problems associated with internalizing and externalizing disorders, focusing on externalizing difficulties relevant to our intervention. The ACBCL has demonstrated good psychometric properties in the

Iranian population, with reliability coefficients ranging from 0.48 to 0.85 for subscales [20]. The items cover various domains, such as withdrawal/depression, anxiety/depression, somatic complaints, social problems, thought problems, rule-breaking, attention problems, and aggressive behaviors. Factor analysis by Achenbach identified eight factors, with withdrawal, anxiety/depression, and somatic complaints reflecting internalizing difficulties, and rule-breaking and aggression indicating externalizing problems. Cronbach's α for the scales ranged between 0.65 and 0.85, and for the eight subscales, it ranged from 0.48 to 0.75 [20]. In our study, we focused on evaluating externalizing difficulties, specifically aggression and rule-breaking behaviors, as these are crucial markers of outward behavioral issues. The Persian version of the ACBCL has been validated, with established cutoff scores of 60-63 and 63 and higher to identify borderline or clinical levels of these problems. The temporal stability of the scales was assessed using coefficients ranging from 0.32 to 0.67. In this study, only externalizing difficulties and their factors (aggression and rule-breaking behaviors) were evaluated as the primary outcome measures [21].

OMPM: The OMPM program is a type of therapeutic training that includes weekly sessions in which a therapist works with the parents of a family. The children do not participate in these sessions, and the intervention aims to replace parents' coercive parenting methods with effective parenting strategies. Role-playing is an essential mechanism in the sessions, with the therapist using it to demonstrate good and bad examples and identify which parenting skills require attention, training, and practice. Once parents have practiced the parenting skills sufficiently, the therapist and parents select a specific situation for the next session, during which parents try to apply the newly acquired skills at home. Between sessions, the therapist contacted the parents to provide support and answer their questions. The duration of therapy depends on the family's needs and progress during treatment, but it typically lasts for 10-15 weekly sessions. In the present study, parents received the intervention from two certified therapists who had completed a comprehensive 10-session parent management program [9] (Table 1).

Research procedure

After obtaining ethical approval, an introductory letter was prepared for the Exceptional Education Organization in Qazvin City. A meeting with relevant officials facilitated the identification of an educational center specializing in children with motor disabilities, and permission was obtained to access the facility. Following

Table 1. Summary of the oregon PMT program content by session

Session	Objective	Content	Assignment
1 st	Introduce session structure	Welcome mothers and outline participation rules	Reflect on child's behavioral issues and create a list
2 nd	Understand externalizing difficulties	Define externalizing difficulties issues; teach observation skills	Record child's behavioral issues during the interval
3 rd	Reinforcement techniques	Optimize maternal involvement and break activities into steps	Consistently apply small reinforcements
4 th	Apply non-coercive discipline	Strategies for discipline without coercion	Reinforce acceptable social behaviors
5 th	Manage difficult behaviors	Introduce new skills for addressing externalizing difficulties	Identify difficult behaviors and apply reward rules
6 th	Regulate emotions	Teach proper emotional expression in response to behaviors	Document child activities and maternal emotional responses
7 th	Develop problem-solving skills	Appropriate responses to difficult behaviors	Explore and choose effective solutions to arising issues
8 th	Foster positive maternal involvement	Build positive relationships with the child	Observe child's social interactions with peers
9 th	Encourage enjoyable activities	Engage in recreational activities with the child	Practice fun activities in appropriate contexts
10 th	Summarize and evaluate	Review learned skills and experiential exercises	Implement training content across various situations

an explanation of the study's objectives and procedures, written informed consent was obtained from mothers willing to participate. The mothers completed the ACBCL, and from the pool of children scoring between 60 and 63, 30 children were randomly selected and assigned to either the experimental or control group, with 15 children in each. To minimize measurement bias, assessors responsible for administering and scoring the questionnaires were blinded to the group assignments. The experimental group received the OMPM intervention in 10 training sessions, each lasting 90 minutes. Conversely, the control group participated in routine family education sessions at the center, designed to provide foundational parenting guidance without focusing on the specific content of the experimental program. The control group's sessions, conducted over seven weekly meetings of approximately 30 minutes, covered topics, such as child growth and development, communication strategies, discipline techniques, and emotional support. The sessions combined lectures, interactive discussions, and informational resources to enhance general parenting skills. All mothers completed the MHI and the ACBCL at three intervals: pre-intervention, post-intervention, and two months after the intervention. The collected data were analyzed using chi-square tests, t-tests, and repeated-measures analysis of variance (ANOVA) in SPSS software, version 25.

Results

The participants' Mean±SD ages 33.27±2.73 years for mothers and 9.70±0.87 years for children. The ages of children in the experimental and control groups were 9.77±0.85 and 9.63±0.89 years, respectively. Table 2 presents the demographic characteristics.

As indicated in Table 2, the statistical analyses revealed no significant differences between the experimental and control groups concerning mothers' educational levels, employment status, duration of marriage, family economic status, or children's age ($P>0.05$).

Table 3 presents descriptive statistics (Mean±SD) for the mental health factors (well-being and mental distress) of mothers and externalizing difficulties and their factors (aggression and rule-breaking behaviors) in children with motor disabilities, differentiated by the experimental and control groups at the pre-test, post-test, and follow-up stages.

Table 3 presents the descriptive statistics, Mean±SD for maternal mental health factors (well-being and mental distress) and children's externalizing difficulties (including aggression and rule-breaking behaviors) across pre-test, post-test, and follow-up assessments, differentiated by group. The data indicated that the experimental group experienced significant improvements in maternal well-being and reductions in mental distress. Specifi-

Table 2. Frequency and percentage of participants' demographic variables among experimental and control groups

Variables	Level	No. (%)		Statistics	P
		Experimental Group	Control Group		
Mother's education (degree)	Middle school	29(13.3)	1(6.7)	0.861	0.396
	Diploma	4(26.7)	4(26.7)		
	Under graduate	8(53.3)	7(46.7)		
	≥Post graduate	1(6.7)	3(20)		
Employment (mothers)	Housewife	5(33.3)	5(33.3)	-1.213	0.235
	Clerk	5(33.3)	7(46.7)		
	Self-employment	5(33.3)	3(20)		
Marriage duration (y)	5-10	4(26.7)	7(46.7)	-1.122	0.271
	≥10	11(73.3)	8(53.3)		
Economic situation	Low	5(33.3)	3(20)	1.143	0.263
	Moderate	6(40)	5(33.3)		
	High	4(26.7)	7(46.7)		
Child's age (y)	8-9	4 (26.7)	5 (33.3)	-0.301	0.766
	9-10	3 (20)	3 (20)		
	10-11	8 (53.3)	7 (46.7)		

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cally, maternal well-being scores increased from a pre-intervention Mean±SD of 32.8±5.199 to 38.93±6.112 at post-test, while mental distress scores decreased correspondingly. The control group showed no significant changes over time. Similarly, externalizing difficulties in children, particularly aggression, showed marked improvement: mean scores declined from 29.4±5.829 pre-intervention to 22.47±5.125 at follow-up in the experimental group, whereas the control group's scores remained relatively stable. These results underscore the positive impact of the intervention on both maternal mental health and children's behavioral issues.

The assumptions underlying repeated-measures ANOVA, normal distribution, and absence of outliers, were verified, with no violations detected. Mauchly's sphericity test indicated violations for some variables, necessitating the use of Greenhouse-Geisser corrections (Table 4).

Table 4 presents the results of the chi-square test conducted to evaluate Mauchly's sphericity assumption for

mothers' mental health factors, including well-being, mental distress, general mental health, as well as externalizing difficulties among children, focusing on aggression and rule-breaking. The findings indicate statistically significant results across various factors, with $P < 0.001$ for well-being, mental distress, and general mental health, while rule-breaking showed a significant P of 0.002. The results of the chi-square test suggest that the variables exhibited significant differences that warranted the use of repeated-measures ANOVA to compare general mental health indicators and total externalizing difficulties between the experimental and control groups over the assessed time points (pre-test, post-test, and follow-up) (Table 5).

Table 5 summarizes the findings from repeated-measures ANOVA, indicating significant effects of time and group on maternal mental health (well-being and mental distress) and children's externalizing behaviors. The experimental group demonstrated significant improvements over time: Such as, well-being ($F [1, df], P < 0.001$,

Table 3. Descriptive statistics of mothers' mental health and distress and children's externalizing difficulties (Pre, Post, Follow-Up)

Factors		Mean±SD					
		Experimental Group			Control Group		
		Pre-test	Post-test	Follow-Up	Pre-test	Post-test	Follow-up
Mental health	Well-being	32.8±5.199	38.53±6.49	38.93±6.112	32.33±3.773	31.4±3.641	31.53±3.543
	Mental distress	45.33±5.802	38.07±4.276	38±4.123	45±4.359	45.93±6.829	46.47±6.457
	General mental health	78.13±8.999	76.6±8.14	76.93±7.116	77.33±6.532	77.33±5.912	78±6.662
Externalizing difficulties	Aggression	29.4±5.829	22.53±4.955	22.47±5.125	30.13±5.357	30.53±4.969	31.27±4.511
	Rule-breaking	29.47±2.825	21.6±2.92	21.67±3.579	28.4±2.667	29.13±2.416	28.07±3.105
	Total externalizing	58.87±7.08	44.2±6.625	44.13±7.15	58.53±5.792	59.67±5.381	59.33±5.314

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$\eta^2=0.861$) and reduction in mental distress ($F [1, df]$, $P<0.016$, $\eta^2=0.266$). Similarly, there were significant decreases in aggression ($F [1, df]$, $P<0.001$, $\eta^2=0.771$) and rule-breaking behaviors ($F [1, df]$, $P<0.001$, $\eta^2=0.722$). The effect sizes indicate a strong impact of the intervention on these outcomes.

Finally, Table 6 presents independent t-tests comparing the groups at each time point. Pre-test comparisons across groups showed no statistically significant differences in any measure ($P>0.05$), with effect sizes being minimal (Cohen's $d\approx 0.1$ to 0.13), indicating negligible baseline differences in mental health and externalizing behaviors. However, at post-test, the experimental group demonstrated substantial improvements across most variables, with effect sizes ranging from large to very large: Well-being ($d\approx 1.36$; 95% CI supporting this magnitude), total externalizing behaviors ($d\approx 2.56$), aggression ($d\approx 1.61$), and rule-breaking ($d\approx 2.79$). These effect

sizes, exceeding the threshold for large effects ($d\geq 0.8$), indicate meaningful and practically significant changes. Furthermore, the effect persisted at follow-up, with effect sizes remaining large ($d>1.9$), underscoring the durable impact of the intervention on enhancing children's mental health and reducing externalizing difficulties.

Discussion

This study investigated the effectiveness of the OMPM program on the mental health of Iranian mothers caring for children with motor disabilities and externalizing behavioral difficulties. The primary hypothesis was that the OMPM would enhance effective parenting skills, thereby alleviating maternal mental health problems and reducing externalizing behaviors in children.

Table 4. Chi-square test results for Mauchly's sphericity (mothers' mental health and distress; children's externalizing)

Factors		Mauchly's Sphericity	χ^2	df	P	Epsilon		
						Greenhouse-Geisser	Greenhouse-Geisser	Greenhouse-Geisser
Mental health	Well-being	0.558	15.761	2	<0.001	0.693	0.744	0.5
	Mental distress	0.123	56.607	2	<0.001	0.533	0.556	0.5
	General mental health	0.346	28.65	2	<0.001	0.605	0.64	0.5
Externalizing difficulties	Aggression	0.917	2.33	2	0.312	0.924	1	0.5
	Rule-breaking	0.625	12.696	2	0.002	0.727	0.784	0.5
	Total externalizing	0.558	15.761	2	<0.001	0.693	0.744	0.50

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Table 5. Repeated measures anova-mental health and externalizing (experimental vs control)

Variables		Source of Change	SS	df	MS	F	P	η^2	Power of Test
Mental health	Well-being	Time	943.622	1.387	680.44	133.742	<0.001	0.827	1.000
		Group	1227.489	1.387	885.134	173.975	<0.001	0.861	1.000
	Mental distress	Time	207.756	1.065	194.991	6.281	0.016	0.83	0.697
		Group	334.822	1.065	314.251	10.123	0.003	0.266	0.882
	General mental health	Time	9.089	1.209	7.516	0.188	0.714	0.007	0.072
		Group	14.867	1.209	12.294	0.308	0.625	0.011	0.087
Externalizing difficulties	Aggression	Time	189.756	1.847	102.721	60.407	<0.001	0.683	1.000
		Group	296.289	1.847	160.391	94.321	<0.001	0.771	1.000
	Rule-breaking	Time	8293.067	1.454	201.503	65.822	<0.001	0.702	1.000
		Group	324.267	1.454	222.955	72.83	<0.001	0.722	1.000
	Total externalizing	Time	943.622	1.387	680.44	133.742	<0.001	0.827	1.000
		Group	1227.489	1.387	885.134	173.975	<0.001	0.861	1.000

Abbreviations: SS: Sum of squares; df: Degrees of freedom; MS: Mean of squares.

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Initial findings demonstrated that participation in the OMPM significantly improved maternal well-being and decreased mental distress, with these benefits maintained at two-month follow-up. These results are consistent with prior research [5, 17, 22], suggesting that the program enhances emotional awareness, enabling mothers to respond more consciously and calmly to their children's challenging behaviors. Such improvements facilitate closer mother-child interactions, promote emotional regulation, and diminish impulsive reactions rooted in prior stressors [22, 23].

The mechanisms underlying these outcomes involve mothers learning strategies that help them disengage from automatic, reactive responses, thereby encouraging more rational decision-making amid emotionally charged situations. As mothers become more aware of their emotional reactions, they tend to regulate their responses more effectively, which enhances both their emotional well-being and capacity to cope with daily stressors [3]. Increased emotional awareness further fosters empathy for children's feelings, encourages reflective pauses before reacting, and contributes to sustained improvements in maternal mental health [5].

Although the intervention successfully mitigated maternal mental distress, it did not significantly influence broader measures of mental health. This aligns with ex-

isting literature emphasizing the complex bidirectional relationship between maternal mental health and child behavioral challenges. Maternal depressive symptoms and low self-efficacy are associated with greater behavioral issues in children [24]. However, these factors are influenced by persistent mental health challenges that may not be entirely alleviated through brief intervention alone. It should be noted that this study relied on self-report measures, which, while valuable, may be subject to bias and may not fully capture the nuanced dynamics of maternal mental health. Future interventions should aim to include targeted mental health support alongside parenting programs to foster more comprehensive improvements. It is also important to acknowledge that this study relied on self-reported assessments of mental well-being and distress from the mothers involved. While these self-reported measures may reveal positive therapeutic effects, improvements in mental health could be attributed to various factors outside the intervention itself. Nonetheless, it is plausible to argue that the mental health inventory utilized in this study sufficiently captured mothers' health-related responses and experiences [25]. Future interventions should focus on enhancing maternal skills to better support mothers facing significant mental distress, rather than expecting that participation in the OMPM program alone will yield substantial improvements in general mental health outcomes.

Table 6. Results of the independent t-test comparing mental health and externalizing difficulties across time points in experimental and control groups

Variables	Time	Statistics	df	P	Mean Difference	95% CI for Mean Difference		Cohen's d
						Low Level	High Level	
General mental health	Pre-test	-0.279	28	0.783	-0.8	-0.817	0.615	-0.102
	Post-test	0.282	25.555	0.780	0.733	-0.614	0.818	0.103
	Follow-up	0.425	28	0.674	1.067	-0.563	0.871	0.155
Well-being	Pre-test	-0.281	28	0.781	-0.467	-0.818	0.614	-0.103
	Post-test	-3.712	22.018	0.001	-7.133	-2.144	-0.548	-1.356
	Follow-up	-4.057	28	<0.001	-7.4	-2.284	-0.658	-1.481
Mental distress	Pre-test	-0.178	28	0.860	-0.333	-0.78	0.651	-0.065
	Post-test	3.858	24.739	0.001	7.533	0.594	2.203	1.409
	Follow-up	4.393	28	<0.001	8.133	0.765	2.422	1.604
Total externalizing	Pre-test	-0.141	28	0.889	-0.333	-0.767	0.665	-0.052
	Post-test	7.019	26.871	<0.001	15.467	1.571	3.529	2.563
	Follow-up	6.608	28	<0.001	15.2	1.448	3.353	2.413
Aggression	Pre-test	0.359	28	0.722	0.733	-0.587	0.846	0.131
	Post-test	4.415	28	<0.001	8	0.771	2.431	1.612
	Follow-up	4.992	28	<0.001	8.8	0.952	2.67	1.823
Rule-breaking	Pre-test	-1.063	28	0.297	-1.067	-1.108	0.338	-0.388
	Post-test	7.631	27.054	<0.001	7.467	1.754	3.793	2.786
	Follow-up	5.232	28	<0.001	6.4	1.027	2.771	1.91

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Regarding children's externalizing behaviors, the OMPM yielded significant reductions in aggression, rule-breaking, and overall externalizing difficulties, consistent with previous literature findings [26]. The intervention appeared to primarily influence behaviors within the home environment, as teachers did not report similar improvements, indicating possible contextual limitations of generalizability outside the family setting.

The core premise of the OMPM suggests that improvements in maternal parenting skills translate into decreased externalizing difficulties. Mothers learn to avoid negative reactions and employ more effective discipline strategies, which are critical in managing externalizing problems [10, 24]. Effect size analyses indicated that reductions in aggression, rule-breaking, and total externalizing behaviors were meaningful, although the small

sample size limited subgroup analyses, particularly for children with more severe issues. It is plausible that children with higher initial severity may benefit the most from such interventions [25].

To elucidate potential mediators, factors, such as maternal education, consistency in parenting practices, and children's emotional regulation should be explored in future research [27]. The sustained improvement observed at follow-up suggests that mothers felt more confident and effective post-intervention, which may have created a positive feedback loop, improving both their mental health and their children's behaviors [28].

Despite these encouraging results, several limitations must be considered. The small sample size of 30 participants (15 per group), recruited via convenience sampling,

constrains the statistical power and limits the generalizability of the results to broader populations. This sampling approach may also introduce selection bias, further affecting the external validity. Although the sample size was comparable to prior research [17], further studies should aim for larger, randomly selected samples to facilitate more comprehensive subgroup analyses and confirm the robustness of these findings. It is important to note that this study focused exclusively on boys, primarily because epidemiological data indicate a higher prevalence of motor disabilities among males and the tendency for boys to exhibit more externalizing behaviors, such as aggression, which are often linked to such disabilities. While this focus provides valuable insights into this subgroup, it limits the applicability of the findings to girls. Including both genders in future research would enhance the generalizability and allow exploration of potential gender-specific responses to interventions. A notable limitation of this study is the reliance on self-report questionnaires to assess maternal mental health and child behavior. This method is susceptible to various biases, such as social desirability and recall bias, which can affect data accuracy. Furthermore, the quasi-experimental design lacking randomization restricts causal inferences, and the absence of long-term follow-up prevents evaluation of the sustainability of intervention effects over time. To address these limitations, future research should incorporate larger, more diverse samples, utilize objective assessment measures alongside self-reports, and adopt longitudinal designs. Including data from fathers and other caregivers may also provide a more comprehensive understanding of familial influences on child outcomes.

Conclusion

Based on the findings, it can be concluded that OMPM intervention has a positive impact on the two factors of mental health (well-being and mental distress) of mothers and externalizing difficulties in children with motor disabilities, with effects persisting even after a two-month follow-up. As OMPM is a cost-effective approach, policymakers and therapists can utilize the results of this study to inform decisions that benefit children with motor disabilities and their families. Given the individual, familial, and societal costs associated with externalizing difficulties in childhood, there has been increasing attention on risk factors for the development of these difficulties and the effectiveness of intervention services. Parenting management programs are well-established based on theories and research highlighting the link between ineffective parenting and children's externalizing difficulties. However, many children with externalizing difficulties are also clinically challenged by internalizing problems that may manifest as externalizing difficulties.

This area of research—whether (PMT) programs addressing ineffective parenting practices also positively affect childhood internalizing issues—has received less attention. Nonetheless, based on the current findings, several hypotheses can be proposed. First, designing and implementing PMT programs that include changes in warmth, hostility, and behavior control may effectively address both externalizing and internalizing difficulties. Therefore, concurrently examining internalizing issues in children is recommended, given the complex interactions among parenting behaviors, internalizing, and externalizing difficulties. Second, there is a strong association between maternal hostility and child behavioral outcomes, suggesting that non-hostile maternal behavior should be explicitly targeted in management programs, despite being indirectly addressed in most interventions. Third, mothers alone cannot fully resolve or reduce their children's externalizing difficulties (as indicated by effect sizes); thus, interventions must be broader than just mother management training, incorporating elements, such as teaching self-regulation to children and reducing family stress.

Ethical Considerations

Compliance with ethical guidelines

The study was approved by the Research Ethics Committee of [University of Social Welfare and Rehabilitation Sciences](#), Tehran, Iran (Code: IR.USWR.REC.1401.132). Informed consent was obtained from all mothers of children included in the study.

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Authors' contributions

Conceptualization: Narjes Shakibamehr, Masoume Pourmohamadrez-Tajrishi, and Mohsen Vahedi; Supervision, methodology, validation, analysis and writing the original draft: Masoume Pourmohamadrez-Tajrishi and Mohsen Vahedi; Investigation: Narjes Shakibamehr; Review and editing: Masoume Pourmohamadrez-Tajrishi.

Conflict of interest

The authors declared no conflict of interest.

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