

ORIGINAL ARTICLE

Medicine Science 2025;14(4):1251-8

The effectiveness of the de-escalation model in simple form in an inpatient psychiatric unit: A quasi-experimental study

Didem Ayhan¹, Duygu Hicdurmaz Aslan²¹Bandırma Onyedi Eylül University, Faculty of Health Sciences, Department of Mental Health and Psychiatry Nursing, Balıkesir, Türkiye²Hacettepe University, Faculty of Nursing, Department of Psychiatric Nursing, Ankara, Türkiye

Received 02 July 2025; Accepted 04 August 2025

Available online 29 November 2025 with doi: 10.5455/medscience.2025.07.183

Content of this journal is licensed under a Creative Commons Attribution-NonCommercial-NonDerivatives 4.0 International License.



Abstract

The de-escalation model is designed to ensure a safe clinical environment and effectively address aggression in the long term by transforming the clinical climate. This study evaluated the effectiveness of the De-escalation Model in Simple Form for aggression management in psychiatric services. The research used a pre-test–post-test control group experimental design involving 128 persons displaying aggressive behavior. In the experimental group, implementation of the model reduced the rate of verbal aggression from 98.4% to 84.4%, physical aggression from 25% to 10.9%, and the need for chemical restraint from 64.2% to 48.4%, while completely eliminating the need for mechanical restraint. The mean verbal aggression score was 8.16 ± 5.67 in the intervention group and 9.73 ± 7.39 in the control group, with no statistically significant difference. However, the mean physical aggression score was 0.64 ± 1.41 in the intervention group and 2.39 ± 3.88 in the control group; the mean chemical restraint score was 2.52 ± 3.20 in the intervention group and 6.91 ± 5.07 in the control group. These differences were significant. The model is an effective method for managing aggression.

Keywords: De-escalation model, aggressive patient, aggression management, verbal de-escalation

Introduction

Aggression, which can manifest in various forms (verbal, physical, etc.) in psychiatric services, is a common and complex issue that threatens the safety of both patients and healthcare staff [1]. These aggressive behaviors can be explained in four categories: verbal aggression is yelling, threatening language, or abusive remarks directed at staff or peers, physical aggression is hitting, kicking, biting, or throwing objects, reactive aggression is impulsive actions in response to perceived provocation or frustration, instrumental aggression is calculated actions intended to achieve a specific outcome, such as refusing medication in exchange for a demand being met. Knowing the types of aggressive behavior is crucial for its management and for staff to understand patients [1-3]. Managing aggressive behaviors is a challenging task for staff working in psychiatric clinics and often leads to the use of classical methods such as physical restraint

[use of physical force by staff to restrict movement (e.g., holding a patient down)], mechanical restraint [use of devices to restrict movement (e.g., wrist restraints, restraint chair)], chemical restraint [using drugs to induce sedation (e.g., haloperidol, benzodiazepine)] and seclusion [Containing the patient for specific periods in specially designed soft rooms] [2]. The classical methods used in aggression management are coercive and restrictive in nature, potentially causing emotional and physical harm [3]. Furthermore, Lanthén et al. reported in their study that the necessity and frequency of restraint and seclusion during interventions for aggressive behaviors reduce the success of treatment [4]. Despite general criticisms, coercive-restrictive methods are widely preferred due to healthcare workers' need to establish full control over the patient and to prevent harm to themselves and others as quickly as possible [5,6]. However, coercive measures can have negative effects on patients, staff, and the overall treatment environment [7,8]. Restrictive practices

CITATION

Ayhan D, Hicdurmaz Aslan D. The effectiveness of the de-escalation model in simple form in an inpatient psychiatric unit: A quasi-experimental study. Med Science. 2025;14(4):1251-8.



Corresponding Author: Didem Ayhan, Bandırma Onyedi Eylül University, Faculty of Health Sciences, Department of Mental Health and Psychiatry Nursing, Balıkesir, Türkiye
Email: kose.didem@gmail.com

may lead to patients being traumatized, reduced adherence to treatment, and prolonged hospital stays [4]. For these reasons, increasing emphasis is being placed on proactive de-escalation techniques aimed at preventing aggression from escalating into violence [9].

De-escalation involves a set of non-physical, psychosocial strategies aimed at calming anger and preventing aggression [9,10]. These techniques encompass verbal and non-verbal communication skills, self-regulation, assessment, and maintaining safety [11]. Effective de-escalation can facilitate positive therapeutic collaboration, support patient engagement in treatment, and reduce the need for restrictive interventions [12,13].

Although de-escalation is increasingly recognized as a critical component in aggression management, evidence supporting its effectiveness remains limited [6,10]. However, studies consistently highlight that de-escalation training reduces the use of physical restraints [14-17]. A Cochrane review by Du et al. emphasizes the lack of studies evaluating the effectiveness of de-escalation techniques for aggression or agitation caused by psychosis [10]. This review notes that while de-escalation is considered good clinical practice, it is not supported by evidence derived from experimental research [10]. A recent behavior change theory-focused analysis by Price et al. highlights the essential elements required to enhance de-escalation in acute mental health settings [18]. These elements include emotional self-regulation skills, reducing social distance, validating autonomy, setting boundaries, and problem-solving. The literature also features various de-escalation models, including the "De-escalation Model in Simple Form" developed by Len Bowers [19]. Bowers' model conceptualizes de-escalation as a linear process involving stages such as containing the situation, clarifying the patient's issue, and resolving the problem. This model emphasizes that the de-escalator should maintain control over their own emotions and demonstrate respect and empathy toward the patient at every stage [11,19]. On the other hand, Hallett & Dickens define de-escalation as a series of interwoven staff interventions that include verbal and non-verbal communication, self-regulation, assessment, actions, and safety measures [11].

The tension and other negative emotions experienced during instances of aggression are highly challenging for both patients and the psychiatric healthcare team. In such situations, the sense of urgency and anxiety often drive both parties toward quick and frequently habitual responses. However, it becomes evident that de-escalation is not merely a response to moments of aggression but rather an approach aimed at transforming the clinical culture. De-escalation deeply influences the psychiatric clinical environment to create a humane, safe, therapeutic, team-oriented, and patient-centered culture [18]. In this context, clinically testing the advancements promised by de-escalation models is becoming increasingly important. Unfortunately, the number of studies in this field remains quite limited.

This study aims to evaluate the effectiveness of the De-escalation Model in the Simple Form (DMSF) developed by Bowers. The research seeks to contribute to the evidence base for de-escalation strategies in managing aggression in psychiatric settings.

Material and Methods

Design

This research, conducted to evaluate the effectiveness of the DMSF on patients exhibiting aggressive behavior, is a quasi-experimental study with a pre-test and post-test design and a control group.

Population and Sample

The population of the study consisted of patients exhibiting aggressive behavior who were hospitalized in a closed adult psychiatric clinic. The closed psychiatry unit is a specially equipped psychiatric ward established for adults, especially for patients who are at risk of harming themselves or their environment during an attack, lack insight, and refuse treatment. The sample size was calculated using the G Power 3.1 program. Based on Cohen's recommendation of a medium effect size of 0.5 for the independent groups t-test, a 5% margin of error, and a 95% confidence interval [20], the sample size was determined to be 64 for the intervention group and 64 for the control group, totaling 128 participants. Patients aged 18 and over, admitted to an adult closed psychiatric ward, and exhibiting any aggressive behavior were included in the study.

Data collection

Patient Information Form: consists of 8 questions aimed at obtaining information such as the patients' age, gender, marital status, education level, economic status, employment status, who they live with, and their psychiatric diagnosis.

Aggression Assessment Form Before the Implementation Form: This form was developed by the researchers through a review of the relevant literature [21-24] to obtain information such as whether the patient exhibited verbal aggression toward staff or other patients, whether the patient exhibited physical aggression toward staff or other patients, whether chemical restraint was needed as a result of the patient's aggression, and whether mechanical restraint was needed as a result of the patient's aggression.

Aggression Assessment Form After the Implementation Form: This form was developed by the researchers based on the relevant literature [21-24] to collect data such as the number of verbal aggressions by the patient toward staff or other patients, the number of physical aggressions by the patient toward staff or other patients, the number of times chemical restraint was needed as a result of the patient's aggression, and the number of mechanical restraints applied due to the patient's aggression.

Implementation of the Research

In the study, since the approaches implemented within the scope of the model would affect the environment, the team, and the patients, the control group patients were initially included in the

study. For the first aggressive patient, the "Patient Information Form" and the "Aggression Assessment Form Before the Implementation" were completed. Following this, the classical-traditional approaches anticipated by the team were continued, and after the patient regained composure, the "Aggression Assessment Form After the Implementation" was completed. This procedure was repeated until the patient was discharged. After reaching the target of 64 patients in the control group, a five-session training program on the DMSF was conducted for clinical nurses. The purpose of training is to prepare them. During this training program, nurses were provided with detailed information on aggression, factors influencing aggression, the emotions, thoughts, and behaviors of healthcare staff when faced with persons displaying aggressive behavior, nursing approaches to persons displaying aggressive behavior, and Bowers' model. Nurses were also asked to apply the model to a sample case. A summary of the model is presented in Figure 1. for a detailed explanation of the model [1,18,25].

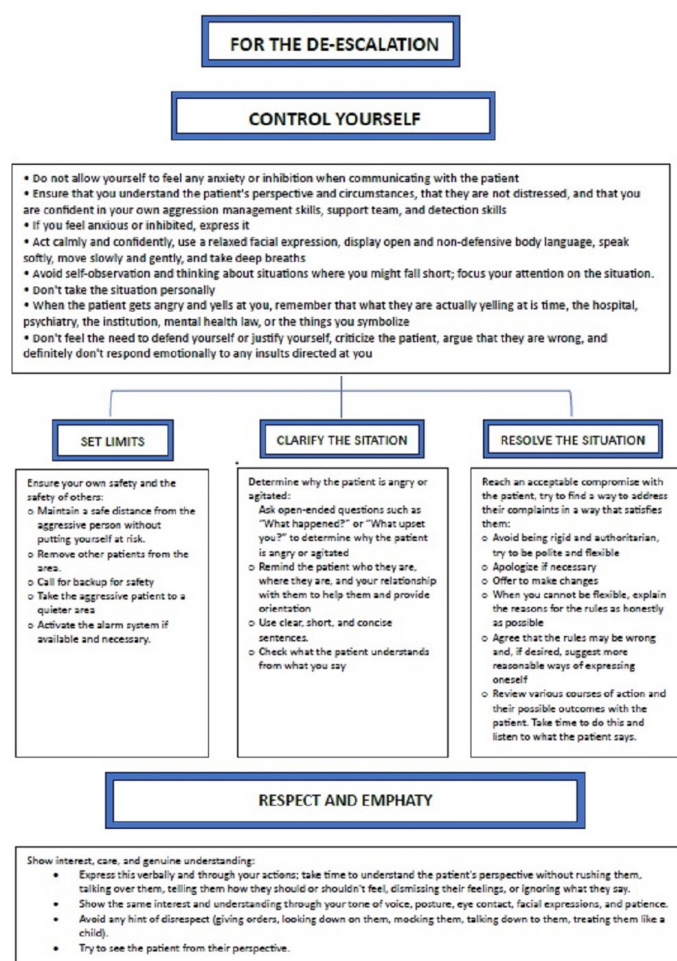


Figure 1. Summary of the de-escalation model in simple form

After completing the training, patients in the intervention group began to be included in the study. For each aggressive patient in the intervention group, the "Patient Information Form" and the "Aggression Assessment Form Before the Implementation"

were completed. Following this, the approaches recommended by the "De-escalation Model in the Simple Form" (Figure 1) were implemented, and efforts were made to create the therapeutic environment suggested by the model in the clinic. After implementing the model, the "Aggression Assessment Form After the Implementation" was completed for each patient. The application of the model continued until 64 patients were reached in the intervention group. Although clinical nurses were trained on the nature of aggression and the DMSF, only the patients for whom the researcher personally applied the model were included in the study, as the researcher did not have the opportunity to observe the nurses during every instance of aggression management.

For both the control and intervention groups, the researcher recorded every aggressive behavior exhibited by the patients and the type and number of interventions used to manage their aggression. Both the model and clinical routine applications were implemented by a single and same person, and therapeutic differences that varied depending on the practitioner were excluded within the two groups. Thus, the aim of the study was to be achieved more clearly. The flowchart of the study's implementation process is presented below in Figure 2.

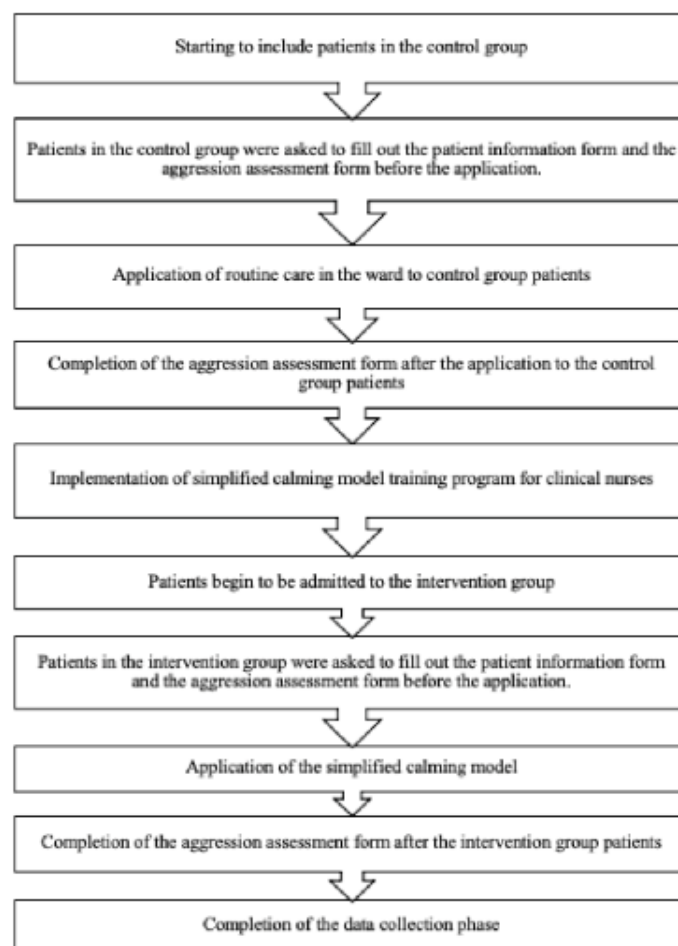


Figure 2. Consort flow diagram

Data Analysis

The Statistical Package for the Social Sciences was used for statistical analysis in this study. The Chi-Square Test, Fisher's Exact Test, and Odds Ratio Test were used to compare the differences. The Kolmogorov-Smirnov test was conducted to assess the normality of the data distribution. Since the data did not follow a normal distribution, the Mann-Whitney U test was applied to compare post-implementation aggression frequencies between the intervention and control groups.

Ethical Approval

The Gülhane Military Medical Academy Ethics Committee approved the study with decision number 368, dated September 3, 2015. The data were collected by the researcher in person, in accordance with the Helsinki Declaration.

Results

The sociodemographic characteristics of the experimental and control groups show that there is no significant difference between the groups (Table 1).

When the pre-test and post-test measurements of the intervention and control groups were compared, it was observed that the verbal aggression rate in the intervention group was 98.4% before the implementation of the DMSF, but this rate significantly decreased to 84.4% after the implementation (OR: 11.66; $p<0.05$). The physical aggression rate, which was 25%

before the implementation, significantly dropped to 10.9% after the implementation (OR: 2.75; $p<0.05$). The need for chemical restraint due to aggression was 64.2% before the implementation of the DMSF, but this rate significantly decreased to 48.4% after the implementation (OR: 2.18; $p<0.05$). The rate of mechanical restraint in persons displaying aggressive behavior was 6.3% before the implementation of the model, and after the implementation, no patient required mechanical restraint, which was significant ($p<0.05$). In the intervention group, there were no injuries in the clinic before or after the implementation, and no incidents of patients causing harm or injury to staff or other patients occurred as a result of aggression (OR: 0.00; $p=1.00$) (Table 2).

When the pre- and post-implementation aggression levels of the control group patients were compared, the verbal aggression rate was 96.9% before the routine clinical practices, and this rate decreased to 93.7% after the routine practices (OR: 2.06; $p>0.05$). The physical aggression rate was 46.9% before the routine practices and decreased to 42.2% after the routine practices (OR: 1.20; $p>0.05$). The rate of chemical restraint due to aggression was 98.4% initially, and this rate decreased to 93.7% after the routine clinical practices (OR: 1.33; $p>0.05$). The rate of mechanical restraint due to aggression was 28.1% before the routine interventions, and this rate decreased to 25% after the interventions (OR: 1.18; $p>0.05$). The changes observed in the control group were not significant (Table 2).

Table 1. Comparison of descriptive characteristics of experimental and control group patients

		Experimental group (n=64)		Control group (n=64)		p
		n	%	n	%	
*Diagnosis	Anxiety disorder	10	15.6	13	20.3	X2 : 1.847 0.623
	Schizophrenia	25	39.1	21	32.8	
	Bipolar	22	34.4	19	29.7	
	Depressive disorder	7	10.9	11	17.2	
Gender	Female	13	20.3	11	17.2	X2 : 0.205 0.651
	Male	51	79.7	53	82.8	
Marital status	Married	19	29.7	12	18.8	X2 : 2.086 0.149
	Single	45	70.3	52	81.2	
Working status	Yes	31	48.4	24	37.5	X2: 1.562 0.211
	No	33	51.6	40	62.5	
Economic situation	Bad	22	34.4	18	28.1	X2 : 1.553 * 0.473
	Middle	25	39.1	32	50.0	
	Good	17	26.6	14	21.9	
Who does she/he live with?	Alone	10	15.6	6	9.4	X2 : 1.143 0.285
	With his family	54	84.4	58	90.6	
Place of residence	Rural Area	28	43.8	29	45.3	X2 : 0.320 0.859
	Urban area	36	56.2	35	54.7	
Age		$\bar{x} \pm sd = 30.53 \pm 10.68$		$\bar{x} \pm sd = 29.30 \pm 10.52$		Z: -0.659 0.461

*: Fisher Exact Test

Table 2. Comparison of pre-test and post-test aggression status of experimental and control groups

	Experimental group				Control group			
	There is n (%)	None n (%)	Odds	OR	There is n (%)	None n (%)	Odds	OR
Verbal attacks on staff or other patients (Verbal aggression)								
Pre-test	63 (98.4%)	1(1.6%)	63	11.66*	62 (96.9%)	2 (3.1%)	31	2.06
Post-test	54 (84.4%)	10 (15.6%)	5.4		60 (93.7%)	4 (6.3%)	15	
Physically attacking staff or other patients (Physical aggression)								
Pre-test	16 (25.0%)	48 (75.0%)	0.33	2.75*	30 (46.9%)	34 (53.1%)	0.88	1.20
Post-test	7 (10.9%)	57 (89.1%)	0.12		27 (42.2%)	37 (57.8%)	0.73	
Need for chemical restraint as a result of aggression (Chemical restraint)								
Pre-test	43 (64.2%)	21 (32.8%)	2.05	2.18*	63 (98.4%)	1 (1.6%)	20.3	1.33
Post-test	31 (48.4%)	33 (51.6%)	0.94		60 (93.7%)	4 (6.3%)	15	
Need for mechanical restraint as a result of aggression (Mechanical restraint)								
Pre-test	4 (6.3%)	60 (93.7%)	0.06	-	18 (28.1%)	46 (71.2%)	0.39	1.18
Post-test	0 (%0.0)	64 (%100.0)	0		16 (25.0%)	48 (75.0%)	0.33	
*: p<0.05								

Table 3. Comparison of the numbers of variables related to aggression in the experimental and control groups after the application

Aggressive behavior	Groups	Mean±SD	z	p
Number of verbal attacks on staff or other patients	Control	9.73±7.39	-0.89	0.372
	Experimental	8.16±5.67		
Number of times they physically assaulted staff or other patients	Control	2.39±3.88	-3.09	0.002
	Experimental	0.64±1.41		
Number of times chemical restraint was required as a result of aggression	Control	6.91±5.07	-5.90	0.001
	Experimental	2.52±3.20		
Number of times mechanical restraint was required as a result of aggression	Control	0.73±1.48	-4.54	0.001
	Experimental	0.00±0.00		

After the implementation of the DSMF, the mean number of verbal aggression incidents in the intervention group was 8.16±5.67, while in the control group, following routine clinical practices, it was 9.73±7.39. No statistically significant difference was found between the two groups ($z=-0.89$, $p>0.05$). The mean number of physical aggression incidents in the intervention group after implementing the DMSF was 0.64±1.41, whereas in the control group, it was 2.39±3.88. This difference was significant ($z=-3.09$, $p<0.05$). The mean number of instances requiring chemical restraint due to aggressive behavior was 2.52±3.20 in the intervention group and 6.91±5.07 in the control group. This difference between the two groups was also significant ($z=-5.90$, $p<0.05$). After the implementation, the mean number of instances requiring mechanical restraint in the intervention group was 0.00±0.00, while in the control group, it was 0.73±1.48. This difference was significant as well ($z=-4.54$, $p<0.05$) (Table 3).

Discussion

The de-escalation model is designed to ensure a safe clinical environment and effectively address aggression in the long term by transforming the clinical climate. This study evaluated the impact of the DMSF, developed by Len Bowers, in psychiatric inpatient settings. According to the study results, the verbal aggression rate in the intervention group decreased from 98.4% before implementing the DMSF to 84.4% after the implementation. In the control group, verbal aggression decreased by only 3% between pre- and post-measurements, and this difference was not statistically significant. The restraint uses of chemical (PO, IM, IV medication) and mechanical restraints during the verbal aggression phase in routine clinical practices, with these methods being employed only after agitation escalates, may explain this outcome. The 14% reduction in verbal aggression observed in the intervention group after the implementation supports the applicability of the DMSF in clinical settings. These findings align with other studies in the literature. For instance, a study reported a significant reduction in verbal aggression rates through de-escalation techniques [26]. Similarly, Córcoles Martínez et al. emphasized the effectiveness of verbal de-escalation techniques in reducing aggressive behaviors [13]. Since aggression often begins with verbal expressions, the reduction in verbal aggression in the intervention group suggests that the model may also help reduce physical aggression. Additionally, intervening at the early stages of aggression, such as during verbal aggression, is easier than intervening after agitation has escalated. This is evident in the study, where the physical aggression rate in the intervention group decreased from 25% before the implementation to 10.9% after the implementation. Although there was no significant difference in verbal aggression rates between the intervention and control groups after the implementation, the significant reduction in the physical aggression average in the intervention group compared to the control group appears to be related to this phenomenon. Another factor could be the rapid transition from psychomotor agitation to physical aggression on the aggression scale, making it difficult to detect verbal aggression in between. The findings regarding the impact of the DMSF on physical aggression indicate that the model is effective in reducing aggressive behaviors even after aggression and agitation have escalated. The implementation positively influenced patient behavior and reduced the risk of physical aggression. Similarly, the study reported that de-escalation techniques significantly reduced physical aggression rates [26]. In Bowers' study using the safe wards model [19], a broader version of the DMSF, the model was also found to be effective in reducing physical aggression and other aggressive behaviors. Both the DMSF and the safe wards model identify the root causes and triggers of aggression and work with the patient to resolve the conflict. As a result, once the patient calms down and collaboration is established, their confidence in resolving the situations that upset or anger them increases. In the control group, no significant difference was found in physical aggression rates

before and after routine clinical practices. This may be related to the inability of classical methods to address the root causes of aggression, which leads to the re-emergence of aggressive behavior when triggered by any factor, even if the patient calms down temporarily.

The reduction in the need for chemical restraint due to aggression, from 64.2% before the implementation to 48.4% after the implementation, and the lower number of chemical restraints in the intervention group compared to the control group, demonstrate that the DMSF is effective in reducing the need for chemical restraint. This finding highlights the model's significant contribution to controlling aggressive behaviors and reducing reliance on invasive methods. In a study evaluating the meaning of chemical restraint use for aggression management in psychiatric patients, patients described chemical restraint as sudden and irrational, while staff defined it as a quick intervention to ensure safety [2]. Similarly, the study by Córcoles Martínez et al. reported that verbal de-escalation techniques reduced the need for chemical and mechanical restraints by 50% [13]. Celofiga et al. also emphasized that de-escalation techniques significantly reduced aggressive behaviors and the need for chemical restraint [25]. In the control group, no significant difference was observed in the use of chemical restraint after routine clinical practices. The reduction in the need for chemical restraint in the intervention group, alongside the lack of change in the control group, may be related to the model's ability to effectively reduce verbal and physical aggression, improve clinical compliance among patients, and consequently decrease the need for chemical restraint to manage aggression. The absence of a significant difference in chemical restraint use in routine clinical practices further underscores the effectiveness of the model and can be interpreted as another indicator of its success.

The rate of mechanical restraint in persons displaying aggressive behavior was 6.3% before the implementation of the DMSF, and it was observed that no patient required mechanical restraint after the implementation. When comparing the number of times patients in the intervention and control groups were subjected to mechanical restraint after the implementation, no patient in the intervention group required mechanical restraint following the application of the model, whereas it was still needed in the control group (0.73 ± 1.48). These results demonstrate that the DMSF is effective in eliminating the need for mechanical restraint. The literature emphasizes the importance of establishing a good nurse-patient therapeutic relationship as early as possible and performing timely verbal de-escalation to avoid mechanical restraint [27]. Examined the use of mechanical restraint as a method of managing aggression in psychiatric wards and found that nearly half of the patients subjected to mechanical restraint reported that no verbal de-escalation attempts were made [28]. The same study highlighted that chemical restraint was often applied first to persons displaying aggressive behavior to avoid the need for mechanical restraint. When these findings are considered alongside the results of our study, they underscore

the critical importance of verbal methods, while also drawing attention to how underutilized they are. Mechanical restraint is generally regarded as a traumatic experience for both patients and healthcare staff. Studies have shown that mechanical restraint involves keeping the patient restrained with appropriate tools until they regain composure on their own, often resulting in a longer calming period compared to chemical restraint [29,30]. Therefore, the complete elimination of the need for mechanical restraint can improve both patient satisfaction and staff morale. Additionally, this result demonstrates the feasibility of implementing less restrictive and more humane approaches. The lack of a significant reduction in mechanical restraint rates in the control group may be due to the inability to reapply chemical restraint to patients who do not regain composure with chemical restraint or who become agitated and aggressive again after chemical restraint, as sufficient time must pass before reapplication. In the meantime, mechanical restraint may be used to manage the patient until they regain composure. Consequently, the rate of mechanical restraint in both the intervention and control groups was lower than that of chemical restraint.

Clinical Implications

The positive results of the study regarding the effects of the DMSF on verbal and physical aggression, as well as mechanical and chemical restraint, are consistent with the reported positive impacts of de-escalation approaches in the literature. The findings of our study support the necessity of promoting interventions aimed at enhancing safety, fostering team-oriented and humane approaches, and preventing coercive behaviors in clinical practice. Reducing aggressive behaviors in the clinical environment is critical for staff and patient safety. From this perspective, implementing the DMSF stands out as an effective method.

Limitations

The study's limitations include its being conducted in a single center, the inability to use randomization when selecting patients for the intervention and control groups, and the lack of evaluation of the model's long-term effects. Further studies are needed to explore the long-term effects of the DMSF in aggression management and to assess the sustainability of the model.

Conclusion

This study evaluated the effectiveness of the DMSF, developed by Len Bowers, in managing aggression in psychiatric wards. The results showed that the model significantly reduced verbal and physical aggression rates, as well as the need for chemical and mechanical restraints. In the intervention group, the verbal and physical aggression rate, as well as mechanical restraint, was eliminated entirely. Additionally, the need for chemical restraint decreased. In contrast, routine clinical practices in the control group did not significantly change aggression rates. These findings demonstrate that the DMSF is an effective, humane,

and safe method for aggression management. Implementing the model can enhance patient and staff safety, creating a more positive atmosphere in the clinical environment. Therefore, it is recommended that the use of the DMSF be promoted as an alternative to coercive methods.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

The Gülhane Military Medical Academy Ethics Committee approved the study with decision number 368, dated September 3, 2015. The data were collected by the researcher in person, in accordance with the Helsinki Declaration.

Acknowledgments

This article is derived from Didem Ayhan's doctoral thesis. We sincerely thank all patients and staff for their valuable contributions during the thesis process and the preparation of this article.

References

1. Ayhan D, Hicdurmaz D. De-escalation model in the simple form as aggression management in psychiatric services. *J Psychiatr Nurs.* 2020;11:251-9.
2. Muir-Cochrane E, O'Kane D, Oster C. Fear and blame in mental health nurses' accounts of restrictive practices: Implications for the elimination of seclusion and restraint. *Int J Ment Health Nurs.* 2018;27:1650-60.
3. Oostermeijer S, Brasier C, Harvey C, Hamilton B, Roper C, Martel A, et al. Design features that reduce the use of seclusion and restraint in mental health facilities: A rapid systematic review. *BMJ Open.* 2021;11:e046647.
4. Lanthén K, Rask M, Sunnqvist C. Psychiatric patients' experiences with mechanical restraints: An interview study. *Psychiatry J.* 2015;2015:748392.
5. Fletcher A, Crowe M, Manuel J, Foulds J. Comparison of patients' and staff's perspectives on the causes of violence and aggression in psychiatric inpatient settings: An integrative review. *J Psychiatr Ment Health Nurs.* 2021;28:924-39.
6. Price O, Baker J, Bee P, Lovell K. Learning and performance outcomes of mental health staff training in de-escalation techniques for the management of violence and aggression. *Br J Psychiatry.* 2015;206: 447-55.
7. Cusack P, Cusack FP, McAndrew S, et al. An integrative review exploring the physical and psychological harm inherent in using restraint in mental health inpatient settings. *Int J Ment Health Nurs.* 2018;27:1162-76.
8. Hallett N, Huber JW, Dickens GL. Violence prevention in inpatient psychiatric settings: Systematic review of studies about the perceptions of care staff and patients. *Aggress Violent Behav.* 2014;19: 523-31.
9. National Institute for Health and Care Excellence (NICE). Violence and aggression: short-term management in mental health, health and community settings. 2015; <https://www.nice.org.uk/guidance/ng10> access date 10.02.2025.
10. Du M, Wang X, Yin S, et al. De-escalation techniques for psychosis-induced aggression or agitation. *Cochrane Database Syst Rev.* 2017;1:20.
11. Hallett N, Dickens GL. De-escalation of aggressive behaviour in healthcare settings: Concept analysis. *Int J Nurs Stud.* 2017;19:523-31.
12. Brenig D, Gade P, Voellm B. Is mental health staff training in de-escalation techniques effective in reducing violent incidents in forensic psychiatric settings? - A systematic review of the literature. *BMC Psychiatry.* 2023;23:246.

13. Córcoles Martínez D, Ramos Perdigues S, González Fresnedo AM, et al. Verbal de-escalation to reduce the use of mechanical restraint during nonvoluntary ambulance transfers. *Emergencias*. 2023;35:97-102.
14. Laker C, Gray R, Flach C. Case study evaluating the impact of de-escalation and physical intervention training. *J Psychiatr Ment Health Nurs*. 2010 Apr;17:222-8.
15. Jonikas JA, Cook JA, Rosen C, Laris A, Kim JB. A program to reduce use of physical restraint in psychiatric inpatient facilities. *Psychiatr Serv*. 2004 Jul;55:818-20.
16. Newman J, Paun O, Fogg L. Effects of a Staff Training Intervention on Seclusion Rates on an Adult Inpatient Psychiatric Unit. *J Psychosoc Nurs Ment Health Serv*. 2018 Jun 1;56:23-30.
17. Needham I, Abderhalden C, Halfens RJ, et al. Non-pharmacological interventions for aggressive behaviour in adult acute psychiatric inpatients: A review of the literature. *J Psychiatr Ment Health Nurs*. 2004;11:608-13.
18. Price O, Armitage CJ, Bee P, et al. De-escalating aggression in acute inpatient mental health settings: A behaviour change theory-informed, secondary qualitative analysis of staff and patient perspectives. *BMC Psychiatry*. 2024;24:548
19. Bowers L. A model of de-escalation. *Ment Health Pract*. 2014;17:36-7.
20. Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. Hillsdale (NJ): Lawrence Erlbaum Associates; 1988.
21. Wells J, Bowers L. How prevalent is violence towards nurses working in general hospitals in the UK? *J Adv Nurs*. 2002;39:230-40.
22. McCann T, Baird J, Muir-Cochrane E. Attitudes of clinical staff toward the causes and management of aggression in acute old age psychiatry inpatient units. *BMC Psychiatry*. 2014;14:80.
23. Jansen GJ, Dassen TWN, Jebbink GG. Staff attitudes towards aggression in health care: A review of the literature. *J Psychiatr Ment Health Nurs*. 2005;12:154-62.
24. Bowers L, Allan T, Simpson A, et al. Adverse incidents, patient flow and nursing workforce variables on acute psychiatric wards: The Tompkins Acute Ward Study. *Int J Soc Psychiatry*. 2007; <https://doi.org/10.1177/0020764007075011>
25. Safewards. The Model of Safewards. 2015; <https://www.safewards.net/> access date 3.06.2015.
26. Celofiga A, Kores Plesnicar B, Koprivsek J, Moskon M, Benkovic D, Gregoric Kumperscak H. Effectiveness of de-escalation in reducing aggression and coercion in acute psychiatric units: A cluster randomized study. *Front Psychiatry*. 2022;13:1-14.
27. Kuivalainen S, Vehviläinen-Julkunen K, Louheranta O, et al. De-escalation techniques used, and reasons for seclusion and restraint, in a forensic psychiatric hospital. *Int J Ment Health Nurs*. 2017;26:570-9.
28. Pérez-Toribio A, Moreno-Poyato AR, Lluch-Canut T, et al. Relationship between nurses' use of verbal de-escalation and mechanical restraint in acute inpatient mental health care: A retrospective study. *Int J Ment Health Nurs*. 2022;31:179-88.
29. Berring LL, Pedersen L, Buus N. Discourses of aggression in forensic mental health: a critical discourse analysis of mental health nursing staff records. *Nurs Inq*. 2015 Dec;22:296-305..
30. Myklebust KK, Bjørkly S, Råheim M. Nursing documentation in inpatient psychiatry: The relevance of nurse-patient interactions in progress notes—A focus group study with mental health staff. *J Clin Nurs*. 2018;27:e611-e622.