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The moderating role of cognitive reappraisal on the relationship between driving anger and patient/work-related burnout among healthcare professionals

Ayman M. Hamdan-Mansour
University of Jordan
Samir Jabaiti
University of Jordan
Dana M. Al-Laham
Al Istishari Hospital, Amman, Jordan
Ayham R. Al-Qawasmeh
Jordan University Hospital, Amman
Omar L. Al-Jammal
Omar S. Jabaiti
Jordan University Hospital, Amman
Liyan Ghannam
King Hussein Cancer Center
Jumana H. Shehadeh
University of Jordan
Lobna Harazni
Lobna.Harazni@aaup.edu

Arab American University

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Abstract

Objectives

The impact of the emotional regulation and psychological status of healthcare professionals on their ability to provide high-quality care to their patients is a priority for research and practice. This study aimed to examine the moderating role of cognitive reappraisal on the relationship between driving anger and work-and patient-related burnout.

Methods

Using a cross-sectional predictive design, 316 nurses, physicians, and dentists were recruited using a convenience sampling approach. Data were analyzed using IBM SPSS v.27.

Results

The analysis showed that healthcare professionals are experiencing moderate levels of driving anger, anger feelings and impulses, cognitive reappraisals, and work- and patient-related burnout. Driving anger was significantly associated with work- and patient-related burnout and angry feelings ($p < .05$). However, cognitive reappraisals did not moderate the relationship between driving anger and work-related burnout (Interaction: DA x CR, $\beta = 0.112$, $p = .198$), nor patient-related burnout (Interaction: DA x CR, $\beta = 0.096$, $p = .256$).

Conclusion

The findings suggest that healthcare professionals appear to remain capable of fulfilling their professional roles and responsibilities and that they are able to manage driving-related anger effectively before it influences their professional attitudes and behaviors.

1. Introduction

Work-related psychological distress significantly affects healthcare professionals' (HCPs) well-being and the quality of care they provide. Anger may impair effective communication with patients, clinical decision-making, and the ability to meet work-related demands and goals (1). Persistent anger and poor emotional regulation can reduce tolerance for workplace pressures, impair interpersonal interactions, and increase vulnerability to emotional exhaustion and burnout among nurses and physicians (2). Therefore, HCPs require effective psychological resources to manage internal and external pressures.

Indirect factors may also contribute to anger and psychological burden, including driving-related anger. Daily driving stressors such as traffic congestion, delays, reckless driving, and overcrowded roads can provoke irritation and emotional distress. These effects may be particularly relevant to HCPs commuting to duty assignments, responding to emergencies, or working in high-pressure clinical environments. Under such conditions, driving anger may intensify emotional strain, reduce emotional regulation capacity, and contribute to occupational stress and burnout (3). Cognitive reappraisal, an important emotion regulation strategy, may therefore provide cognitive resources that buffer the effects of anger on psychological burden.

Anger has been associated with impaired cognitive control and decision-making (4). It can narrow attention toward perceived threats, increase aggressive interpretations, and reduce flexible thinking, resulting in more impulsive

responses (3). In driving contexts, anger is associated with aggressive driving, risk-taking, and reduced self-regulation, increasing the likelihood of unsafe behaviors (3). For HCPs, effective use of cognitive reappraisal may help prevent the transfer of anger across situations and mitigate work- and patient-related burnout. By promoting adaptive emotional regulation, cognitive reappraisal may also preserve clinical decision-making and patient-provider communication, supporting the quality and safety of care (5).

In occupational and healthcare settings, anger expression and poor emotion regulation are associated with higher burnout. Maladaptive anger expression may contribute to emotional exhaustion, whereas effective emotion regulation can reduce burnout (5). Emotional dysregulation may further weaken coping capacity and increase vulnerability to work-related burnout and related psychological difficulties among HCPs (6).

The literature has emphasized the negative association between work-related burnout and both reduced performance and reduced quality of care. Recent evidence confirms that healthcare workers, particularly nurses and physicians, experience high levels of emotional exhaustion and depersonalization owing to the workload and the emotional demands of care delivery (7). The present study is guided by the Process Model of Emotion Regulation (PMER), which provides a theoretical foundation for explaining how individuals regulate their emotional responses (8, 9). The model suggests that individuals regulate their emotions at several stages before they respond. Applied to this study, the healthcare professional uses cognitive reappraisal as an antecedent-focused strategy to reinterpret the meaning of a driving anger situation by finding an alternative, less threatening, and less stressful interpretation of that situation, thereby reducing the intensity and duration of the anger. Thus, when a healthcare professional encounters a frustrating driving situation, such as aggressive drivers, they do not necessarily experience intense anger automatically; instead, they regulate their emotions through cognitive reappraisal. Consequently, the emotional burden carried into the workplace is reduced, making these individuals less susceptible to burnout arising from working conditions or from providing care to patients. Therefore, this study proposes that cognitive reappraisal functions as a protective psychological resource that moderates the relationship between driving anger and work- and patient-related burnout.

The *purpose* of this study is to examine the moderating role of cognitive reappraisal, as a component of emotion regulation, on the relationship between driving anger and patient- and work-related burnout among healthcare professionals, controlling for selected sociodemographic and driving-related factors.

Hypothesis

Cognitive reappraisal, as a component of emotion regulation, significantly moderates the relationship between driving anger and patient-related and work-related burnout among nurses, physicians, and dentists, such that higher levels of cognitive reappraisal weaken the positive association between anger-related variables and burnout outcomes, controlling for selected sociodemographic and driving-related factors.

2. Materials and Methods

2.1. Design: This study used a descriptive-predictive design. Data were collected from actively working nurses, physicians, and dentists using a structured, self-administered online questionnaire. Data collection took place between March and June 2026.

2.2. Sample & Setting: The target population of this study consists of nurses, physicians, and dentists. The accessible population includes nurses, physicians, and dentists who are actively working in healthcare settings in Jordan and provide direct care to their patients. A convenience sampling technique was used to recruit participants who met the inclusion criteria, including being aged 18 years or older, actively practicing as a nurse, physician, or dentist, and able to

read and write in Arabic, which is the language used in this study. No exclusion criteria were applied in order to maximize participation and ensure greater variation within the study sample.

Data collection: Ethical approval was obtained from The Deanship of Academic Research at the University of Jordan (IRB approval No. 701/2026, approved July 21, 2026) before data collection. Data were collected through a self-administered online questionnaire using Google Forms from nurses, physicians, and dentists who were actively on duty and used a car to commute to work. Participants were recruited through social media, personal contacts, and professional groups and accessed the survey via a link or QR code. The first page provided study information, eligibility criteria, and an electronic informed consent statement addressing confidentiality, anonymity, privacy, and voluntary participation. Participants who consented proceeded to the questionnaire, whereas those who reported not using a car to commute were excluded. No identifying information was collected, and responses were anonymized. Completed surveys were automatically saved and stored in a password-protected computer file accessible only to the research team. The questionnaire required approximately 5–7 minutes to complete.

2.3. Measures

The survey was administered in Arabic, the native language of the participants. For scales that were not available in Arabic, translation and cultural adaptation procedures were conducted following the World Health Organization (WHO) guidelines for translation and adaptation of assessment tools [11]. The questionnaires were translated and back-translated by professional bilingual translators and subsequently reviewed by bilingual health experts to ensure clarity, accuracy, and cultural appropriateness. A pilot test was conducted with a small sample from the target population (n = 10) to evaluate the clarity of the questionnaire items, estimate the time required for completion, and identify any potential issues with the study procedures before the full-scale study was conducted. Participants who took part in the pilot testing were excluded from the final study sample. The survey questionnaire consisted of the following measures:

2.3.1. The Deffenbacher Driving Anger Scale (DAS) [12] was used to assess healthcare professionals' tendency to experience anger while driving. The scale asks respondents to indicate how angry they would feel in a variety of common traffic situations. These situations include traffic congestion, discourteous or inappropriate behavior by other drivers, aggressive gestures, traffic violations, interactions with law enforcement officers, and delays caused by slow-moving vehicles. The present study used the 14-item short version of the DAS. Participants rated their responses using a 5-point Likert scale ranging from 1 (not at all) to 5 (very much). Higher scores indicate a greater tendency to experience driving-related anger. The short-form version has good internal consistency, with Cronbach's alpha of .85 (13). In this study, the scale also showed good internal consistency, with a Cronbach's alpha of. 88.

2.3.2. Work- and patient-related burnout were assessed using the Copenhagen Burnout Inventory **(CBI)** (14). CBI is a self-report instrument that focuses mainly on physical and psychological exhaustion and is widely used among nurses, physicians, and other healthcare providers. The CBI consists of 19 items divided into three subscales: personal burnout (6 items), work-related burnout (7 items), and patient/client-related burnout (6 items). In this study, only the work-related and patient-related domains were used. Work-related burnout assesses exhaustion related to work demands, and patient-related burnout evaluates fatigue associated with caring for patients or clients. Respondents rate each item on a 5-point Likert scale, with higher scores indicating higher levels of burnout (13). The CBI has strong psychometric properties, with Cronbach’s alpha coefficients ranging from .85 to .87 for the three subscales (14). In this study, the scale also showed good internal consistency, with a Cronbach's alpha of .80 for work-related burnout and .88 for client-related burnout.

2.3.3. Cognitive reappraisal of emotion regulation was assessed using domain one of the Emotion Regulation Questionnaire **(ERQ)** (15). The original ERQ is a 10-item scale. Domain 1 measures respondents’ tendency to use

cognitive reappraisal and consists of 6 items. The cognitive reappraisal subscale captures the tendency to reinterpret emotional situations to alter their emotional impact. Participants are asked to rate their responses on a 7-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”), with higher scores indicating greater use of cognitive reappraisal as an emotion regulation strategy. The cognitive reappraisal subscale demonstrated good internal consistency reliability with Cronbach’s alpha values ranging from .79 to .82 (15). In this study, the scale also showed good internal consistency, with a Cronbach's alpha of .88.

2.3.4. Anger was assessed using the Short Anger Measure (SAM) (16). The scale comprises 12 items designed to assess the emotional and behavioral aspects of anger. It consists of two main subscales: angry feelings and aggressive impulses. Each subscale is composed of 6 items. The angry feelings subscale assesses the emotional experience of anger, while the aggressive impulses subscale assesses tendencies toward aggressive reactions and behaviors. Participants are asked to rate their responses on a 7-point Likert-type scale ranging from strongly disagree (1) to strongly agree (7). The scale has good internal consistency, with Cronbach’s alpha of .84 for the Angry Feelings subscale and .82 for the Aggressive Impulses subscale (16). In this study, the scale also showed good internal consistency, with a Cronbach's alpha of .87 for aggressive impulses and .84 for angry feelings.

In addition, demographic and professional information collected included age, gender, years of experience in healthcare services, professional category, work shift type, type of patients cared for, average number of patients cared for per day, number of traffic accidents involved in or caused by, and number of near-miss accidents.

2.4. Data Analysis

3. Data were analyzed using IBM SPSS Statistics version 28. Descriptive statistics, Pearson correlation, t-tests, and ANOVA were used to summarize variables and examine associations and group differences. Assumptions of normality, linearity, multicollinearity, and homoscedasticity were assessed. Hierarchical multiple regression tested moderation, controlling for age, sex, education, profession, and driving-related factors. Covariates were entered in Step 1, driving anger and cognitive reappraisal in Step 2, and their interaction term in Step 3. Work-related and patient-related burnout were analyzed separately. Continuous variables were mean-centered before computing the interaction term. Moderation was considered significant at $P < .05$. Regression coefficients (β), change in explained variance (ΔR^2), and P values were reported using two-tailed tests.

4. Results

4.1. Demographic characteristics

A total of 316 nurses, physicians, and dentists participated in this study. The analysis (see Table 1) showed that participation was nearly equal with respect to sex: 48.9% (n = 155) of participants were female, and 51.1% (n = 161) were male. Age ranged from 22 to 63 years, with a mean of 33.1 years (SD = 8.8). The numbers of single and married participants were also almost equal (single: 48.4%, n = 153; married: 47.8%, n = 151). Most participants were nurses (62.0%, n = 196), followed by medical doctors (29.7%, n = 94) and dentists (8.2%, n = 26). Of the participants, 58.9% (n = 186) held a bachelor’s degree, and 36.4% (n = 115) held a graduate degree. Participants were distributed across different healthcare sectors, including university-affiliated hospitals (10.4%, n = 33) and educational hospitals (32.6%, n = 103), with government (28.2%, n = 89) and private hospitals (28.8%, n = 91) accounting for the remaining 57.0% (n = 180).

Table 1
Descriptive statistics of the socio-demographic characteristics (N = 316).

Variable		n	%
Sex	**Male**	161	51.1
	Female	155	48.9
Marital status	**Single**	153	48.4
	Married	151	47.8
	Divorced	11	3.5
Education	**Diploma**	15	4.7
	Bachelor	186	58.9
	Graduate	115	36.4
Profession	**Nursing**	196	62.0
	Dentistry	26	8.2
	Medicine	94	29.7
Health-sector	**University-affiliated**	33	10.4
	Government	89	28.2
	Private	91	28.8
	Educational hospital	103	32.6
Road traffic accidents did you cause	**Zero accidents**	257	81.3
	1–2 accidents	56	17.7
	4–5 accidents	2	.6
	> 5 accidents	1	.3
Number of near-miss accidents	**Zero accidents**	161	50.9
	1–2 accidents	110	34.8
	4–5 accidents	24	7.6
	> 5 accidents	21	6.6
road traffic accidents where you involved	**Zero accidents**	96	30.4
	1–2 accidents	28	8.9
	4–5 accidents	5	1.6
	> 5 accidents	0	0

Insert Table 1 *here*

4.2. Nature of work: The majority of participants (72.5%, n = 229) cared for all types of patients in terms of age and sex, while only 5.7% cared exclusively for children. Participants varied in shift type: morning shifts accounted for more than one third of the sample (36.1%, n = 114) and rotating shifts for almost one quarter (23.8%, n = 75). The remainder were divided between daytime work (17.1%, n = 54), night shifts (14.9%, n = 47), and evening shifts (8.2%, n = 26).

4.3. Driving-related factors: The analysis showed that participants were mainly victims of road traffic accidents (81.3%, n = 257), while 17.7% (n = 56) had caused an accident. Near-miss incidents were also frequently reported: 50.9% (n = 161) reported no near-miss accidents, 34.8% (n = 110) reported one or two, and 20.0% (n = 63) reported three or more (see Table 1).

4.4. Variables of the study

Driving anger: The analysis showed a mean of 43.0 (SD = 9.9), with scores ranging from 14.0 to 68.0 and a median of 44.0. Using the interquartile method for driving anger, with possible scores ranging from 14.0 to 70.0, an original midpoint of 42.0, and a median of 44.0 (50.0% of the participants had a score of 44.0 or above), the analysis indicates a moderate level of driving anger (see Table 2).

Table 2
Descriptive statistics of the main variables of the study *(N = 316)

Variable	Mean	SD	Min	Max	P_{25}	Md (P_{50})	P_{75}
Total anger	27.9	8.9	12.0	60.0	22.0	26.5	33.0
Angry feelings	16.3	4.7	6.0	30.0	13.0	16.0	19.0
Aggressive impulses	11.6	4.9	6.0	30.0	8.0	10.0	15.0
Driving anger -Total	43.0	9.9	14.0	68.0	37.0	44.0	50.0
Burnout-Total	41.5	9.5	13.0	65.0	35.0	41.0	47.0
Work-related burnout	23.7	5.1	7.0	35.0	20.0	24.0	27.0
Client related burnout	17.8	5.3	6.0	30.0	14.0	18.0	21.0
Cognitive reappraisal	25.2	7.9	6.0	42.0	20.0	26.0	31.0

Anger: With subscale scores ranging from 6.0 to 30.0, the angry feelings and aggressive impulses subscales had mean scores of 16.3 (SD = 4.7) and 11.6 (SD = 4.9), and median scores of 16.0 and 10.0, respectively. For the total anger score, the analysis showed a mean of 27.9 (SD = 8.9), with scores ranging from 12.0 to 60.0 and a median of 26.5. Using the interquartile method for the angry feelings subscale, with possible scores ranging from 6.0 to 30.0, an original midpoint of 15.0, and a median of 16.0 (50.0% of the participants had a score of 16.0 or above), the analysis indicates a moderate level of angry feelings. Regarding aggressive impulses, with the same ranges and a median of 10.0 (50.0% of the participants had a score of 10.0 or less), the analysis indicates a low to moderate level of aggressive impulses (see Table 2).

Burnout: fatigue and exhaustion in relation to patient care: Regarding the work-related subscale, participants had a mean score of 23.7 (SD = 5.1), with scores ranging from 7.0 to 35.0 and a median of 24.0. The patient-related subscale showed a mean score of 17.8 (SD = 5.3), with scores ranging from 6.0 to 30.0 and a median of 18.0.

Using the interquartile method for the work-related subscale, with possible scores ranging from 7.0 to 35.0, an original midpoint of 21.0, and a median of 24.0 (50.0% of the participants had a score of 24.0 or above), the analysis indicates a moderate level of work-related burnout. Regarding the patient-related burnout subscale, with possible scores ranging from 6.0 to 30.0, an original midpoint of 15.0, and a median of 18.0 (50.0% of the participants had a score of 18.0 or above), the analysis indicates a moderate level of patient-related burnout (see Table 2).

Emotion regulation-cognitive reappraisal: The mean cognitive reappraisal subscale score was 25.2 (SD = 7.9), with possible scores ranging from 6.0 to 42.0 and a median of 26.0, while the mean expressive suppression score was 15.8 (SD = 5.4), with observed scores ranging from 4.0 to 28.0 and a median of 16.0. Using the interquartile method for the

cognitive reappraisal subscale, with possible scores ranging from 6.0 to 42.0, an original midpoint of 24.0, and a median of 26.0 (50.0% of the participants had a score of 26.0 or above), the analysis indicates a moderate level of cognitive reappraisal (see Table 2).

Insert Table 2 *here*

4.5. Bivariate analysis

Pearson's correlation analysis was conducted to examine the relationships among the study variables. The analysis showed that the angry feelings subscale was strongly and positively correlated with aggressive impulses ($r = .72$, $p < .001$), and driving anger was positively and moderately correlated with angry feelings ($r = .33$, $p < .001$) and aggressive impulses ($r = .19$, $p < .001$).

The work- and patient-related burnout subscales were positively correlated with driving anger and with the total anger scale and its subscales ($p < .001$). Cognitive reappraisal was positively and weakly correlated with driving anger ($r = .14$, $p < .05$), while it was significantly, negatively, and weakly correlated with aggressive impulses and the total anger scale ($p < .05$). Expressive suppression was positively and weakly correlated with driving anger, angry feelings, and work-related burnout ($p < .05$).

Insert Table 3 *here.*

Table 3
Correlation among the main variables of the study (N = 316)

Driving anger	Driving anger	Angry feelings	Aggressive impulses	Angry scale	Work-related burnout	Client -related burnout
Angry feelings	.33**					
Aggressive impulse	.19**					
Angry scale	.28**					
Work-related burnout	.30**	.51**	.23**	.39**		
Client-related burnout	.36**	.57**	.46**	.56**		
Cognitive reappraisal	.14*	.01	– .22**	– .12*	.09	.03

4.6. Differences in driving anger related to sociodemographics

An independent-samples t-test showed no statistically significant difference in driving anger between males and females ($t_{312} = 0.7$, $p = .506$), although males had a higher mean score (43.4, SD = 9.9) than females (42.7, SD = 10.0). In addition, one-way ANOVAs were conducted to assess differences in driving anger in relation to marital status, education, profession, and type of the health sector. The analysis showed no statistically significant differences in driving anger in relation to marital status, type of health sector, or professional category ($p > .05$).

There was, however, a statistically significant difference by level of education ($F_{2, 311} = 3.2$, $p = .043$); post hoc comparisons (Tukey HSD) showed significantly higher scores among participants with a graduate degree than among those with a bachelor's degree ($p = .047$). With respect to driving-related factors, no significant differences in driving anger were found across their levels ($p > .05$; see Table 4).

Table 4
Differences in driving anger related to selected socio-demographic and driving-related factors (N = 316)

Variable	Mean (SD)	Test statistic	p-value
Sex	Male:43.4 (9.9) Female: 42.7 (10.0)	t (312) = 0.7	0.506
Education	Diploma: 41.0 (11.2) Bachelor: 42.1 (10.0) Graduate: 44.9 (9.6)	F (2,311) = 3.2	0.043
Marital status	Single: 43.6 (9.9) Married: 42.4 (10.2) Divorced: 44.0 (6.9)	F (2,310) = 0.6	0.570
Profession	Nursing: 43.1 (10.3) Dentistry: 44.5 (7.0) Medicine: 42.4 (9.9)	F (2,311) = 0.5	0.616
Health sector	University: 43.1 (10.6) Government: 42.2 (9.3) Private: 43.0 (10.4) Educational: 43.7 (9.9) Aid institutes: 45.0 (12.7)	F (4,309) = 0.3	0.893
Road traffic accidents did you cause	Zero accidents: 42.6 (10.1) 1–2 accidents: 44.9 (9.1) 3–4 accidents: 42.5 (.7) > 5 accidents: 54.0 (0)	F (3,313) = 1.2	.301
Number of near-miss accidents	Zero accident: 41.8 (10.6) 1-2 accident: 43.9 (8.6) 3–4 accidents: 47.0 (11.0) > 5 accident: 43.9 (9.2)	F (3,313) = 2.5	.062
Number of road accident you are involved	Zero accidents: 42.9 (9.6) 1–2 accidents: 45.0 (10.4) 3–4 accidents: 44.2 (9.8)	F (3,313) = .54	.584

Insert Table 4 *here*

4.7. The moderating effect of cognitive reappraisal: Work-related burnout as a dependent factors

A three-step hierarchical linear regression was conducted to examine the moderating effect of cognitive reappraisal on the relationship between driving anger and work-related burnout, controlling for age, sex, education level, profession, accidents caused, near-miss accidents, and accidents involved in. As shown in Table 5, the seven control variables entered in the first step accounted for a significant 17.9% of the variance in work-related burnout (R^2 = 0.179, $F_{(7, 316)}$ = 3.67, p = 0.001). In Step 2, the addition of cognitive reappraisal and driving anger accounted for a significant additional 4.6% of the variance (ΔR^2 = 0.046, $\Delta F_{(2, 316)}$ = 3.41, p = 0.037). However, in Step 3, the addition of the interaction between cognitive reappraisal and driving anger was not statistically significant (ΔR^2 = 0.011, $\Delta F_{(1, 316)}$ = 1.68, p = 0.198, B = 0.006, β = 0.112). Cognitive reappraisal therefore did not moderate the relationship between driving anger and work-related burnout.

Table 5
Testing the moderating effect of cognitive reappraisal on the relationship between driving anger and work-related burnout controlling for sociodemographic and driving related factors (N = 316)

Variables	**Model 1**		**Model 2**		**Model 3**	
	β	***p*- value**	**β**	***p*-value**	**β**	***p*- value**
Age	-0.154	0.079	-0.161	0.063	-0.176	0.044
Sex	0.058	0.507	0.055	0.532	0.038	0.673
Profession	-0.222	0.013	-0.167	0.061	-0.169	0.058
Education	0.089	0.311	0.035	0.694	0.044	0.617
Road traffic accidents you cause	0.069	0.458	0.075	0.413	0.081	0.374
# of near-miss accidents	0.266	0.004	0.233	0.011	0.226	0.013
# of road accident are involved	0.104	0.264	0.088	0.337	0.093	0.310
Driving anger			0.220	0.013	0.246	0.007
Cognitive reappraisal			0.033	0.704	0.040	0.644
Interaction DA*CR					0.112	0.198
Model summary	**R^2**= 0.179,		**R^2**= 0.224,		**R^2**= 0.235,	
	Adj R^2= 0.130		**Adj R^2= 0.164**		**Adj R^2=** 0.169	
	F = 3.669 (p = 0.001)		F = 3.727 (p < 0.001)		F = 3.542 (p < 0.001)	
	-	-	**Δ R^2 = 0.046** (p = 0.037)		**Δ R^2 =** 0.011 (p = 0.198)	

**Interaction of driving anger x cognitive reappraisal*

Insert Table 5 *here*

4.8. The moderating effect of cognitive reappraisal: Patient-related burnout as dependent factor

A three-step hierarchical linear regression was conducted to examine the moderating effect of cognitive reappraisal on the relationship between driving anger and patient-related burnout, controlling for age, sex, education level, profession, accidents caused, near-miss accidents, and accidents involved in. As shown in Table 6, the seven control variables entered in the first step accounted for 9.9% of the variance in patient-related burnout and were not significant (R^2 = 0.099, $F_{(7, 316)}$ = 0.05, p = 0.085). In Step 2, the addition of cognitive reappraisal and driving anger accounted for a significant additional 16.1% of the variance (ΔR^2 = 0.161, $\Delta F_{(2, 316)}$ = 12.57, p < 0.001). However, in Step 3, the addition of the interaction between cognitive reappraisal and driving anger was not statistically significant (ΔR^2 = 0.008, $\Delta F_{(1, 115)}$ = 1.30, p = 0.256, B = 0.006, β = 0.096). Cognitive reappraisal therefore did not moderate the relationship between driving anger and patient-related burnout.

Table 6
Testing the moderating effect of cognitive reappraisal on the relationship between driving anger and patient-related burnout controlling for sociodemographic and driving related factors (N = 316)

Variables	**Model 1**		**Model 2**		**Model 3**	
	β	***p*- value**	**β**	***p*-value**	**β**	***p*- value**
Age	-0.097	0.291	-0.102	0.225	-0.115	0.176
Sex	-0.077	0.400	-0.051	0.554	-0.066	0.448
Profession	-0.090	0.326	0.018	0.834	0.017	0.847
Education	0.057	0.534	-0.032	0.716	-0.023	0.789
Road traffic accidents you cause	0.114	0.245	0.120	0.180	0.126	0.161
# of near-miss accidents	0.211	0.028	0.140	0.114	0.134	0.129
# of road accident are involved	0.079	0.416	0.045	0.610	0.050	0.577
Driving anger			0.430	0.000	0.452	0.000
Cognitive reappraisal			-0.061	0.475	-0.055	0.521
Interaction DA*CR					0.096	0.256
Model summary	**R^2**= 0.099,		**R^2**= 0.259,		**R^2**= 0.267,	
	Adj R^2= 0.045		**Adj R^2= 0.202**		**Adj R^2=** 0.204	
	F = 1.85 (p = 0.085)		F = 4.51 (p < 0.001)		F= 4. 20 (p < 0.001)	
	-	-	**Δ R^2 = 0.161** (p < 0.001)		**Δ R^2 =** 0.008 (p = 0.256)	
**Interaction of driving anger x cognitive reappraisal*						

Insert Table 6 *here.*

5. Discussion

Emotion regulation strategies, particularly cognitive reappraisal (CR), can help individuals manage anger and stress by reframing stressful situations. Guided by the Process Model of Emotion Regulation (PMER), this study examined whether CR moderates the relationship between driving anger and work- and patient-related burnout among healthcare professionals, including nurses, physicians, and dentists. Contrary to expectations, CR was not a significant moderator of these relationships. This unexpected finding challenges the assumption that CR necessarily protects healthcare professionals. from the effects of driving anger on burnout and suggests that other contextual, individual, or occupational factors may influence this relationship.

While HCPs did report moderate levels of anger, driving anger, and burnout, this level of psychological disturbance may not have been sufficient to call on cognitive reappraisal as a tool for managing it. In other words, despite experiencing driving-related anger, healthcare professionals appeared able to regulate these emotions and maintain professional attitudes and behaviors in the workplace. This explanation is in line with a previous study that found that HCPs suppress intense negative emotions using other techniques, such as rationalization or distancing, in order to maintain their performance while caring for their patients (17). HCPs therefore experience unpleasant emotions and anger, yet appear to remain capable of fulfilling their professional roles and responsibilities toward their patients. This finding may be interpreted through PMER(8), which proposes that individuals can regulate the timing, intensity, and expression of their emotional responses at different stages of the emotion-generative process. Consequently, HCPs may manage driving-related anger effectively before it influences their professional attitudes and behaviors. This interpretation may help explain why driving anger did not appear to adversely affect HCPs' work- and patient-related burnout, and why CR did not significantly moderate the relationship between driving anger and burnout in the present study. Nevertheless, driving anger remained positively associated with angry feelings, aggressive impulses, and work- and patient-related burnout.

The ability of healthcare professionals to manage their anger and to avoid transferring it to their work while caring for patients may also be shaped by individual factors such as those proposed by Emotional Labor Theory [(18)]. The theory is consistent with the findings of this study, in that physicians, nurses, and dentists are expected to display compassion, empathy, and calmness regardless of their internal emotional state and level of anger. According to Feng and colleagues (19), HCPs may suppress anger and continue to provide high-quality care because they regard the management of emotional display as integral to their professional role. One significant note is that most HCPs reported being involved in road traffic accidents as victims rather than causing them. This suggests that, despite frequent exposure to occupational stressors, HCPs were generally able to maintain adequate emotion regulation while driving, preventing the negative emotions that may lead to unsafe driving behaviors. On the other hand, the high rate of near-miss incidents suggests some accumulation of work-related stress and a negative effect of driving anger. Near-miss accidents may reflect occasional lapses in concentration or decision-making, which partially supports previous studies emphasizing the negative effect of emotional dysregulation on the cognition and behavior of HCPs (20). .\

The study sample included nurses, physicians, and dentists who varied in their responsibilities and duty times. Nevertheless, no differences were found in relation to profession, age, sex, or experience. Level of education was the only factor on which driving anger was found to vary. This indicates that exposure to similar workplace stressors may exert a greater influence on driving anger than individuals’ demographics or their professional characteristics. The present findings are inconsistent with recent evidence from meta-analytic studies, which suggest that the association between driving anger and aggressive driving behaviors varies according to demographic factors such as age, gender, and driving experience (21).

One limitation of this study is the absence of objective data to verify participants' involvement in road traffic accidents. Furthermore, the assessment did not distinguish whether the reported driving anger was experienced during work-related commuting or reflected participants' general driving behavior.

6. Conclusion

7. Cognitive reappraisal did not attenuate the relationship between driving anger and work- and patient-related burnout. However, driving anger was associated with anger feelings, anger suppression, cognitive reappraisal, and both burnout dimensions. Differences in driving anger were observed according to education level, suggesting that driving anger may remain an important source of stress among healthcare professionals regardless of emotion regulation strategies. These findings highlight the need to integrate stress and anger management interventions into healthcare settings. Strengthening emotion regulation skills, including cognitive reappraisal and appropriate use of expressive suppression, may support healthcare professionals' well-being. Longitudinal and intervention studies are needed to clarify causal pathways and identify effective anger-management strategies.

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Abbreviations

HCPs, healthcare professionals; DAS, Driving Anger Scale; CBI, Copenhagen Burnout Inventory; ERQ, Emotion Regulation Questionnaire; SAM, Short Anger Measure; CR, cognitive reappraisal; PMER, Process Model of Emotion Regulation.

Declarations

Ethics approval and consent to participate

This study attained Institutional Review Board (IRB) approval from the Deanship of Academic Research at the University of Jordan (IRB approval No. 701/2026, approved July 21, 2026). The study was conducted in accordance with the ethical principles and relevant guidelines of the Declaration of Helsinki. Anonymity and confidentiality were strictly maintained throughout the study. All participants provided electronic informed consent before proceeding with the questionnaire. All data were stored on a password-protected computer and were used for research purposes only. No personal identifiers were collected, and all personal identifiers were omitted from the dataset.

Consent for publication

Not Applicable.

Competing Interests

The authors declare no competing interests.

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Author Contribution

AMHM: Conceptualization, methodology, supervision, formal analysis, writing—original draft, writing—review and editing, project administration.SJ: Conceptualization, methodology, investigation, writing—review and editing.DMAL: Investigation, data collection, writing—original draft, writing—review and editing.ARAQ: Investigation, data curation, literature review, writing—original draft, writing—review and editing.OLAJ: Investigation, data curation, literature review,

writing – original draft, writing – review and editing.OSJ: Investigation, data curation, writing—review and editing.LG: Methodology, investigation, writing—review and editing.JHS: Conceptualization, methodology, writing—original draft, writing—review and editing.LH: Conceptualization, methodology, writing—original draft, writing—review and editing.

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Data Availability

The datasets generated and/or analyzed during the current study are not publicly available due to participant confidentiality but are available from the corresponding author on reasonable request.

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