



情绪调节与注意缺陷多动障碍患儿焦虑/抑郁症状: 社交问题的中介效应和家庭功能的调节*

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【摘要】目的 探讨社交问题在情绪失调对注意缺陷多动障碍(attention-deficit/hyperactivity disorder, ADHD)患儿焦虑/抑郁情绪的影响路径中的中介效应,以及家庭功能可能的调节效应。**方法** 纳入确诊的6~12岁ADHD患儿235名,分别使用情绪调节核量表、Achenbach儿童行为量表社交问题子量表和焦虑/抑郁子量表及家庭功能评定量表评估其情绪调节、社交问题、焦虑/抑郁情绪及家庭功能,使用有调节的中介模型分析社交问题、家庭功能在情绪调节与焦虑/抑郁情绪之间是否存在中介及调节作用。**结果** 社交问题在ADHD患儿情绪调节对其焦虑/抑郁情绪的影响中起部分中介作用,直接效应值为0.26[95%置信区间(confidence interval, CI): (0.17, 0.36), $P<0.001$],间接效应值为0.13[95%CI: (0.07, 0.19), $P<0.001$],中介效应值占总效应值的33%。家庭功能在社交问题与焦虑/抑郁情绪当中起正向调节作用。**结论** 本研究结果有助于了解ADHD患儿焦虑/抑郁的复杂影响因素,为进一步制定ADHD患儿针对性干预手段和改善预后提供依据。

【关键词】 注意缺陷 多动障碍 焦虑 抑郁 情绪调节 社交问题 家庭功能

Effect of Emotion Regulation on Anxiety/Depression Symptoms in Children With Attention-Deficit/Hyperactivity Disorder: The Mediating Role of Social Problems and the Moderating Role of Family Functioning LI Sixun, WANG Meiwen, YANG Yanping, WANG Zhuo, LIU Pei, LUO Tingting, TAO Yujie, HUANG Yi[△]. Department of Psychiatry, West China Hospital, Sichuan University, Chengdu 610041, China

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【Abstract】Objective To investigate the mediating effect of social problems in the effect pathway of emotional dysregulation influencing anxiety/depression emotions in children with attention-deficit/hyperactivity disorder (ADHD) and to explore the potential moderating effect of family functionality. **Methods** A total of 235 children diagnosed with ADHD were enrolled in the study. The participants' age ranged from 6 to 12. Emotion Regulation Checklist, Achenbach's Child Behavior Checklist (CBCL) Social Problems Subscale, CBCL Anxious/Depressed Subscale, and Family Assessment Device were used to evaluate the emotional regulation, social problems, anxiety/depression emotions, and family functionality of the participants. A moderated mediation model was employed to analyze whether social problems and family functionality mediate and moderate the relationship between emotional regulation and anxiety/depression emotions. **Results** Social problems partially mediated the impact of emotional dysregulation on anxiety/depression emotions in ADHD children, with the direct effect being 0.26 (95% confidence interval [CI]: [0.17, 0.36], $P<0.001$), the indirect effect being 0.13 (95% CI: [0.07, 0.19], $P<0.001$), and the mediating effect accounting for 33% of the total effect. Family functionality exhibited a positive moderating effect on the relationship between social problems and anxiety/depression emotions. **Conclusion** This study contributes to the understanding of complex factors influencing anxiety/depression in children with ADHD, providing reference for the further development of targeted interventions for children with ADHD and the improvement of prognosis.

【Key words】 Attention deficit Hyperactivity disorder Anxiety Depression Emotion regulation Social problems Family function

注意缺陷多动障碍(attention-deficit/hyperactivity disorder, ADHD)是最常见的神经发育障碍,影响全球大约5.29%的儿童和青少年^[1]。焦虑/抑郁症状是最常见的ADHD伴随症状之一^[2-3]; ADHD合并存在焦虑/抑郁症状

将加大治疗难度^[3],导致患者更严重的功能损害^[2]。情绪失调(emotion dysregulation, ED)通常指情绪产生具有冲动性,且难以诱导积极情绪和难以控制已诱发的情绪^[4-5]。既往研究显示,情绪失调在ADHD患儿中的发生率非常高,大约25%的ADHD患儿表现出严重的情绪失调,另外50%表现出中度的情感失调^[6-7]。同时患ADHD和ED的个体在整体功能损害更明显^[8],在犯罪活动^[9]、物质滥用^[10]等方面面临更高的风险。同时,ADHD患者在成长过程

* 成都市科技项目(No. 2022-YF09-00010-SN)和成都市医工融合项目(No. HXDZ22014)资助

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出版日期: 2024-03-20

中往往会面对社交困难、家庭功能受损等困难^[11-13]。根据生态系统理论,个体心理特征(包括情绪调节等)和环境因素(同伴、家庭等)对个体的心理健康有很大影响^[14]。既往研究发现情绪失调与ADHD症状和焦虑/抑郁等内化问题相关,并在一定程度上介导了两者的关联^[15-16]。另外,既往研究提示同伴关系^[17]、社交能力^[18]及家庭功能^[19]也在ADHD患者焦虑/抑郁情绪的发生发展过程中起着重要作用。然而,ADHD患者情绪失调与伴发的焦虑/抑郁症状及其相关因素之间的相互作用关系仍不清楚。本研究中我们通过建立中介模型分析社交问题、家庭功能在情绪调节与焦虑/抑郁情绪之间是否存在中介及调节作用。

1 对象和方法

1.1 对象

本研究的ADHD患儿主要来自2020-2023年四川大学华西医院心理卫生专科门诊,以及华西心理卫生中心公众号线上招募,同时也接受了普通学校的老师和家长推荐。纳入标准:①明确达到学龄儿童情感障碍和精神分裂症问卷中ADHD的诊断;②韦氏智力测验(言语智商+操作智商) ≥ 80 ;③年龄6~12岁;④自愿参加本研究,并获得患儿监护人的知情同意。排除标准:①韦氏智力测验全智商(言语智商+操作智商) < 80 ;②患神经发育障碍疾病;③患重大躯体疾病和神经系统疾病;④患严重精神障碍,如精神分裂症。研究最终纳入235名ADHD患儿。

1.2 方法

1.2.1 研究工具

1.2.1.1 学龄儿童情感障碍和精神分裂症问卷

学龄儿童(6~18岁)情感障碍和精神分裂症问卷终生版(Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version, K-SADS-PL)^[20]是用于评定6~8岁儿童和少年是否患有精神疾病的半结构化访谈,采用了DSM-IV的标准来评估受试者当前和既往是否患有精神疾病及其症状严重程度。ADHD是行为障碍中的一个部分,该部分的初步筛查包括4个条目,只要受试者在任一初筛条目评为“3”,就应对其进行17个条目的补充检查。最终根据问卷的诊断标准评定受试者是否患有ADHD。

1.2.1.2 中国儿童韦氏智力测定量表

中国儿童韦氏智力测定量表第三版(Chinese-Wechsler Intelligence Scale for Children, C-WISC-III)是国内迄今为止应用最广泛的评定儿童智商水平的重要研究

工具^[21],用于评定4~16岁儿童和幼儿的智力商数(intelligence quotient, IQ)。本研究采用的是四合一简版,包括知识、分类、填图、木块图四个分测验。

1.2.1.3 中文版注意缺陷多动障碍SNAP-IV评定量表

SNAP-IV(Swanson, Nolan, and Pelham, version IV)量表由SWANSON等^[22]编制,用于筛查和辅助诊断ADHD,以及评估干预治疗效果和改善情况。其中有18项是根据DSM-IV的ADHD核心症状编制的(1~9项评估注意力缺陷症状,10~18项评估多动/冲动症状)。得分越高,ADHD症状越严重。

1.2.1.4 情绪调节核量表

情绪调节核量表(Emotion Regulation Checklist, ERC)^[23]共包含24个条目,用于评定儿童的情绪调节能力,其中不稳定性/负性情感子量表(ERC-LN)评估儿童情绪状态的缺乏灵活性、情绪状态的快速变化和波动、负性情感的失调,以及表现出过分兴奋的倾向,ERC-LN得分较高表示情感失调程度较高。

1.2.1.5 Achenbach儿童行为量表

Achenbach儿童行为量表(Achenbach's Child Behavior Checklist, CBCL)^[24]用于描述患儿的行为和情绪问题。它分为9个子量表:退缩、身体主诉、焦虑/抑郁、社交问题、思维问题、注意问题、纪律行为、攻击性行为^[25]。本研究使用CBCL社交问题子量表(CBCL-social problems)来评估ADHD患者的社交问题,使用CBCL焦虑/抑郁子量表(CBCL-anxious/depressed subscale)来评估ADHD患者的焦虑和抑郁情绪。

1.2.1.6 家庭功能评定量表

家庭功能评定量表(Family Assessment Device, FAD)^[26]用于评估家庭功能的6个方面,包含7个子量表。本研究使用其中的总体功能子量表(FAD-GF)表示家庭的整体功能状况。得分越高,表示家庭功能评估结果越差,表明相应的家庭功能较差。

1.2.2 研究流程

本研究已取得四川大学华西医院医学伦理委员会的批准,批准号:2021(732)。由专业评估员对所有入组受试者进行诊断及智力评估,并完成相关信息的填写。由父母填写的量表在评估前由工作人员详细解释,确保填写者清楚理解了所有项目的含义。参与本研究的评估员都接受了项目培训并通过了一致性测试。

1.2.3 统计学方法

使用SPSS 28.0进行数据录入和整理,进行描述性统计分析和Pearson相关性分析。使用由Hayes编写的SPSS宏程序PROCESS进行中介及调节模型分析。置信区

间估计采用Bootstrap方法,选取重复抽样次数为5000次,置信区间估计采用bootstrap方法,选取重复抽样次数为5000次,计算95%的置信区间(confidence interval, CI)。 $\alpha=0.05$ 。

2 结果

2.1 一般人口学特征

235名参与者中,男性193名(82.1%),女性42名(17.9%)。平均年龄为(8.57±1.89)岁,平均智商为109.39±14.51,19名(8.1%)ADHD儿童精神障碍家族史阳性。SNAP-IV量表注意缺陷得分为16.94±4.77,多动冲动得分为13.21±5.31,SNAP-IV量表总分为40.90±12.12。

2.2 情绪调节与社交问题、家庭功能及焦虑/抑郁症状的相关性

Pearson相关分析表明,ADHD儿童的ERC症状与社交问题和焦虑/抑郁之间存在正相关,且有统计学意义($P<0.01$)。社交问题与焦虑/抑郁之间存在正相关,且有统计学意义($P<0.01$)。家庭功能与焦虑/抑郁之间也存在正相关,且有统计学意义($P<0.01$)(表1)。

2.3 ADHD患者焦虑/抑郁症状的影响因素

使用多元分层回归分析ADHD患者焦虑/抑郁症状的影响因素,在第一阶段,纳入ADHD患者相关人口学特征,结果显示性别($\beta=-0.17$, $P=0.01$)及症状严重程度

表 1 相关性分析结果

Table 1 Results of the correlation analysis

Variable	$\bar{x} \pm s$	Pearson correlation analysis (r)			
		ERC-LN	Social problems	FAD	Anxiety/depression
ERC-LN	33.97±5.76	1			
Social problems	4.96±2.55	0.36**	1		
FAD	25.76±5.73	0.16*	0.10	1	
Anxiety/depression	5.64±4.62	0.48**	0.57**	0.16*	1

ERC-LN: liability/negative subscale of emotion regulation checklist; FAD: family assessment device. ** $P<0.01$, * $P<0.05$.

($\beta=0.45$, $P<0.001$)对其焦虑/抑郁症状有一定影响($F=11.98$, $P<0.001$),因此本研究在之后的中介及调节分析中将性别及症状严重程度作为控制变量。在第二阶段,纳入ADHD患者情绪失调、社交问题及家庭功能,结果显示ADHD患儿情绪失调($\beta=0.23$, $P<0.001$)及社交问题($\beta=0.43$, $P<0.001$)对其焦虑/抑郁症状有一定影响($F=21.24$, $P<0.001$)。最终模型解释了总方差的41.0%,模型1(Model 1)中的变量解释了总方差的19.0%,模型2(Model 2)中增加的变量解释了总方差的22.0%(表2)。

2.4 社交问题的中介作用分析

在控制性别的情况下,以ERC作为自变量,以社交问题作为中介变量,以焦虑/抑郁症状作为因变量,检验社

表 2 ADHD患者焦虑/抑郁症状预测因素的多元分层回归分析

Table 2 Multiple hierarchical regression analysis to predict anxious/depressive symptoms in ADHD participants

Variable	Model 1				Model 2			
	B (95% CI)	SE	β	P	B (95% CI)	SE	β	P
Block 1								
Sex	-1.88 (-3.17, -0.58)	0.66	-0.17	0.01	-1.38 (-2.49, -0.27)	0.56	-0.13	0.02
Age	0.24 (-0.02, 0.50)	0.13	0.11	0.07	0.13 (-0.09, 0.36)	0.11	0.06	0.25
Intelligence	-0.01 (-0.05, 0.02)	0.02	-0.04	0.47	0.004 (-0.03, 0.03)	0.02	0.01	0.81
Symptom severity	0.17 (0.13, 0.22)	0.02	0.45	<0.001	0.05 (-0.001, 0.10)	0.03	0.13	0.05
Family history	0.08 (-0.11, 0.27)	0.10	0.05	0.42	0.13 (-0.04, 0.29)	0.08	0.08	0.14
Block 2								
ERC-LN					0.18 (0.08, 0.29)	0.05	0.23	<0.001
Social problems					0.78 (0.59, 0.98)	0.10	0.43	<0.001
FAD					0.06 (-0.02, 0.15)	0.04	0.08	0.14
R^2_{adj}		0.19				0.41		
R^2_{ch}		0.21				0.22		
F		11.98***				21.24***		

B: unstandardized beta coefficient; CI: confidence interval; SE: standard error; β : standardized beta coefficient; R^2_{adj} : a modified version of R^2 that accounts for predictors that are not significant in a regression model; R^2_{ch} : The change in R^2 between two equations. The other abbreviations are explained in the note to Table 1. *** $P<0.001$.

交问题在ERC与焦虑抑郁情绪中的中介效应。结果显示ERC对ADHD患儿焦虑抑郁情绪的预测作用显著($\beta=0.38, P<0.001$), 在纳入中介变量社交问题后, ERC对ADHD患儿焦虑抑郁症状的预测作用仍显著($\beta=0.25, P<0.001$)。同时, ERC对社交问题的预测作用显著($\beta=0.16, P<0.001$), 社交问题对焦虑抑郁情绪的预测作用也具有显著效应($\beta=0.81, P<0.001$) (图1)。采用bootstrap法进行中介模型检验, 结果表明社交问题的中介作用显著, 间接效应为0.13, 贡献率为33%(表3)。

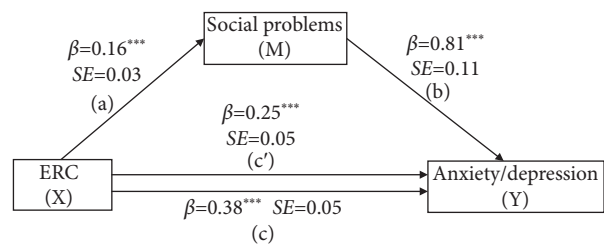


图 1 社交问题的中介模型检验

Fig 1 Testing the social problems mediational model

X: independent variable; M: mediating variable; Y: dependent variable. Path c represents the total effect of ERC on anxiety/depression without considering the mediation of social problems. Path c' represents the total effect of ERC on anxiety/depression with consideration of the mediation of social problems. *** $P<0.001$.

表 3 社交问题对ERC和焦虑抑郁情绪的中介效应分析

Table 3 Analysis of the mediating effect of social problems on ERC and anxiety/depression

Item	Effect size	Boot SE	Boot CI lower limit	Boot CI upper limit	Relative effect value
Total effect	0.38	0.05	0.29	0.50	
Direct effect	0.25	0.05	0.17	0.36	67%
Intermediate effect	0.13	0.03	0.07	0.19	33%

Boot SE, boot CI lower limit, and boot CI upper limit denote the standard error, lower limit, and upper limit, respectively, of the 95% confidence interval for the indirect effect estimated using the deviation-corrected percentile bootstrap method. All values are rounded to maintain precision to two decimal places.

2.5 家庭功能的调节作用

见表4。在控制性别的情况下, 检验家庭功能的调节作用。将调节变量FAD放入模型之后, FAD对焦虑抑郁的预测作用不显著($\beta=-0.04, P=0.44$), 但FAD与社交问题的乘积项对焦虑抑郁的预测显著($\beta=0.02, P<0.001$), 提示家庭功能在社交问题对焦虑抑郁情绪的预测中起调节作用。

2.6 简单斜率分析

为了更好的理解FAD在ADHD儿童社交问题及焦虑/抑郁症状之间的调节作用, 进一步进行了简单斜率分

表 4 有调节的中介模型检验

Table 4 Moderating mediation model tests

Variable	Anxiety/depression			
	B (95% CI)	SE	β	P
ERC-LN	0.24 (0.15, 0.32)	0.04	0.30	<0.001
Social problems	0.84 (0.65, 1.03)	0.10	0.46	<0.001
FAD	0.03 (-0.05, 0.11)	0.04	0.04	0.44
Social problems $\times$ FAD	0.05 (0.02, 0.07)	0.01	0.02	<0.001
R^2	0.44			
F	35.65***			

The abbreviations are explained in the note to Table 1. *** $P<0.001$.

析。结果显示, 社交问题可正向预测焦虑/抑郁水平, 并且在FAD得分较高的被试者中, 其社交问题对焦虑/抑郁水平的预测作用($\beta=0.47, t=8.73, P<0.001$)略强于FAD得分较低的被试者($\beta=0.26, t=5.04, P<0.01$), 再次证实家庭功能在调节社交问题与焦虑/抑郁症状之间关系的重要性, 尤其是在FAD得分较高的情况下, 社交问题可能对心理健康产生更大的影响(图2)。

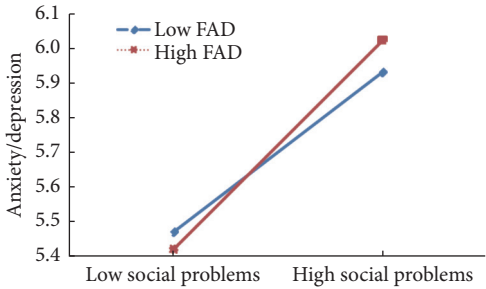


图 2 家庭功能在社交问题和焦虑/抑郁中的调节作用

Fig 2 The moderating role of FAD in the interaction between social problems and anxiety/depression

3 讨论

ADHD伴发抑郁/焦虑症状与严重功能受损和预后不良密切相关。采用相关分析及分层回归方法, 探索了ADHD伴发焦虑/抑郁症状的影响因素; 并进一步建立中介模型, 发现情绪调节可直接作用于焦虑/抑郁症状, 同时也可通过社交问题作为中介因素影响焦虑/抑郁症状, 尤其是在存在家庭功能不良情况下, 这一作用更为突出。本研究首次在ADHD儿童中研究了焦虑/抑郁症状的相关因素及各因素间的相互作用关系, 可为进一步制定ADHD儿童针对性干预手段和改善预后提供依据。

本研究发现情绪调节可以直接影响ADHD患者的焦虑/抑郁症状, 这与既往研究结果一致。例如, 一项研究发现同时存在ADHD及焦虑/抑郁等内化问题儿童出现

更高水平的情绪调节障碍^[27];两项研究发现情绪失调与 ADHD 儿童的焦虑/抑郁等内化问题相关^[28-29]。另外,一项纵向研究发现,ADHD 患者情绪调节问题在整个生命周期中均与构成其相关的内化问题相关。目前主要的情绪调节模型强调了情绪调节的两个关键过程——情绪识别(即个体如何关注和意识到情绪)和对情绪的行为反应(即个体如何管理令人不愉快的情绪)^[30-31]。与情绪识别相关的情绪调节困难包括对情绪的否认或不接受,缺乏情绪意识以及对情绪缺乏清晰度;与情绪的行为反应相关的情绪调节困难包括在情绪困扰时难以参与目标导向的活动,冲动控制困难,以及缺乏应对情绪的策略^[30-31];同时,这些特征又与焦虑/抑郁症状密切相关,甚至本身就参与这些症状表现^[32-34]。这个结果提示在 ADHD 伴发情绪症状的早期识别和干预中需要重视儿童的情绪调节能力。

本研究发现 ADHD 伴发的焦虑/抑郁症状与社交问题具有相关性。既往研究表明,情绪调节的重要成分情绪识别缺陷与社交技能缺陷相关^[35];情绪调节的另一成分——对情绪的不良行为反应,如低耐力、对情绪的过度兴奋以及情绪回归缓慢,可能导致同龄人认为 ADHD 青少年具有破坏性、过分兴奋或令人讨厌的特点而加以排斥^[36]。另一方面,ADHD 相关的社交问题,如同龄人虐待/排斥以及学术/职业失败,将损害其自尊心,增加焦虑/抑郁的发生风险^[37-39]。本研究进一步通过建立中介模型,发现情绪调节可以通过社交问题的部分中介作用影响 ADHD 患者的焦虑/抑郁症状。总的来说,既往研究发现情绪识别及情绪调节困难与 ADHD 的儿童和青少年社交困难有关^[40-41],而同伴关系等社会支持系统与 ADHD 儿童青少年共病焦虑、抑郁等情绪问题相关^[42-43]。结合本研究结果,在 ADHD 伴发情绪症状的早期干预和预防中应关注同时改善患者的社交问题,开展社交技能训练有助于减少伴发的焦虑/抑郁症状。

本研究结果支持在上述社交问题对于情绪调节和焦虑/抑郁症状的完全中介作用中,家庭功能具有调节作用,即良好家庭功能可以减轻社交问题对 ADHD 患者焦虑/抑郁症状的影响。既往的研究也发现,高家庭凝聚力可以为儿童青少年提供更温暖的家庭环境和积极的情感支持,最终减少抑郁的风险^[44];高适应性(或灵活性)家庭可以通过帮助儿童青少年有效应对外部负面生活事件的影响来减少抑郁的风险^[45]。结合本研究结果,关注家庭功能同样有助于减少 ADHD 伴发的焦虑抑郁症状。

本研究的局限:①病例并非来自社区,结论推广性受限,尽管如此,仍然有相当一部分是在社区招募,并非完

全来自临床,可以作为一个对于 ADHD 人群焦虑/抑郁情绪症状影响因素的初步探索;②由于样本量的限制,未进行不同情绪调节水平和成分(例如情绪识别、情绪调节)对于焦虑/抑郁症状的影响,今后需要扩大样本量进一步分析;③仅在 ADHD 样本中进行了分析,没有对照,但前期大量研究已经证实,相对于正常发育儿童,ADHD 儿童中焦虑/抑郁症状检出率更高,且功能受损更重,本研究正是针对这一问题,探索导致这一现象的相关因素和作用机制,为早期识别和早期干预提供依据。

综上,本研究在 ADHD 儿童中同时分析了其个体情绪调节能力及社交问题、家庭功能等环境因素对其焦虑/抑郁症状的影响,发现个体的情绪调节水平可直接影响焦虑/抑郁症状,也可以通过社交问题作用于焦虑/抑郁症状,其中家庭功能起调节作用。本研究结果可为伴有焦虑/抑郁症状的 ADHD 早期干预和预防奠定基础,并进一步为改善 ADHD 的预后提供依据。

* * *

作者贡献声明 李思迅负责正式分析、调查研究和初稿写作,王美雯负责项目管理和提供资源,杨燕平、王卓和刘沛负责调查研究,罗婷婷和陶煜杰负责验证,黄颐负责论文构思、经费获取和监督指导。所有作者已经同意将文章提交给本刊,且对将要发表版本进行最终定稿,并同意对工作的所有方面负责。

Author Contribution LI Sixun is responsible for formal analysis, investigation, and writing--original draft. WANG Meiwen is responsible for project administration and resources. YANG Yanping, WANG Zhuo, and LIU Pei are responsible for investigation. LUO Tingting and TAO Yujie are responsible for validation. HUANG Yi is responsible for conceptualization, funding acquisition, and supervision. All authors consented to the submission of the article to the Journal. All authors approved the final version to be published and agreed to take responsibility for all aspects of the work.

利益冲突 所有作者均声明不存在利益冲突

Declaration of Conflicting Interests All authors declare no competing interests.

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(2023 – 11 – 02收稿, 2024 – 02 – 24修回)

编辑 刘 华



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