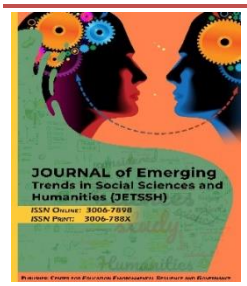

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Revision and Validation of the Recidivism Risk Scale for Individuals Convicted of Homicide (RRS-ICH)

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ABSTRACT

The purpose of this study was to revise and validate the Recidivism Scale for Inmates (Rasool & Iftikhar, 2022) to assess the factors of recidivism in individuals convicted of homicide. The sample for this study comprised 200 individuals, aged 30 to 70 years, who were granted parole after being convicted of homicide. An exploratory factor analysis using varimax rotation yielded a five-factor structure across 42 items. The Internal consistency estimates produced a good alpha coefficient (α =.84) for the overall RRS-ICH. Moreover, all items of the RRS-ICH were significantly correlated with the total score of RRS-ICH, confirming construct homogeneity and structural validity of items. A series of confirmatory factor analyses supported the five-factor structure of the scale, demonstrating an adequate model fit, *CFI* = .92, *TLI* = .91, and *RMSEA* = .067, 90% CI [.052, .078], yielding an excellent normed chi-square ratio of 1.87 (χ^2 (769) = 1439.86, p < .001). All indicator regression weights were statistically significant (p < .05), confirming convergent validity. Furthermore, discriminant validity was supported as all inter-factor correlations were below .85, thereby confirming overall construct validity. The RRS-ICH is a valid and reliable instrument of the factors of recidivism in individuals convicted of homicide.

Introduction

Crime is a phenomenon found in every society in the world. Moreover, it can be witnessed throughout the history of mankind (Reiner, 2017). Behaviors which are prohibited and punishable are categorized as crimes, whereas conduct which violates the criminal law of a country is categorized as criminal behavior (Schmalleger, 2010). Recidivism is a behavioral process or pattern in which an offender found guilty of a crime and sentenced commits a further offence, is found guilty, and receives a further sentence. It refers to re-offending behavioral patterns and a pro-criminal lifestyle (Mocan, 2024). Recidivism involves relapsing into previous undesirable

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criminal behavior. A person can relapse into criminal behavior by repeating the same crime again or by committing different crimes (Schoeman, 2010). Repeated offending and criminal behavior are both considered recidivism (O'Connell et al., 2020). Different factors are found to be involved in the risk of recidivism (Villanueva et al., 2019). The risk factors involved in recidivism in the crime of homicide are different than the factors involved in general recidivism (Sturup & Lindqvist, 2014). Since in Pakistan, as per a matter of policy, parole is only granted to offenders who committed homicide, unique factors are involved in assessing and reducing the risk of recidivism (Khokhar et al., 2025). Moreover, the criminal justice system in Pakistan is neither sufficiently equipped nor operational in reducing recidivism (Khoso & Kousar, 2021).

Literature Review

The risk of recidivism of an offender depends upon the presence and absence of different risk factors (Heffernan & Ward, 2017). Several studies have questioned the accuracy of predicting recidivism based on these associated factors (Mulder et al., 2011). However, predictions about recidivism are primarily made by measuring the risk factors associated with criminal behavior (Goodley et al., 2022). Studies have confirmed that recidivism can be predicted based on two categories of variables: namely, static and dynamic factors (Eisenberg, 2019). Both static and dynamic factors are involved in risk of recidivism (Zara & Farrington, 2015). Major static factors which increase the likelihood of recidivism are gender, age of the offender, age at first offence, and criminal history, whereas major dynamic factors are antisocial associates, antisocial attitudes, mental health indicators, substance use, and social support (Yukhnenko et al., 2020). These factors are associated with recidivism to different degrees and within different contexts (Gammelgard et al., 2015). Moreover, there are protective factors such as association with prosocial friends and prosocial behavior that are negatively correlated with recidivism (Pittman et al., 2022).

The risk factors involved in recidivism in homicide offences are significantly different from those associated with other criminal offenses (Broadhurst et al., 2018). Research has found that substance abuse and mental health indicators are the strongest risk factors associated with recidivism in homicide offences (Eronen et al., 1996). Another study identified the original conviction as a significant predictor of subsequent homicide offenses (Liem et al., 2014), while criminal history was also shown to play a significant role (Broadhurst et al., 2018). However, socioeconomic opportunities were negatively correlated with recidivism in homicide offences among parole population (York, 1996). Marital status of male offenders has been linked with recidivism in homicide offences, with married males demonstrating a lower likelihood of recidivating (Andersen et al., 2015).

In Pakistan, different indigenous factors are found to be involved in crime and recidivism. Specifically, the criminal justice system and prison conditions are likely to affect reoffending rates (Ahmed et al., 2025). Prison conditions in Pakistan are contributing to turning first-time offenders into hardcore criminals (Memon et al., 2022). An indigenous study indicated that personality factors are also contributing to the increased rate of recidivism (Shuja & Abbas, 2022). Furthermore, empirical evidence suggested socio-psychological factors as predictors of recidivism among incarcerated offenders (Perveen et al., 2024). The mental health of an offender is also found to be associated with recidivism (Gadit, 2005). However, the paradigm of dealing with criminals is shifting in Pakistan with an increasing tilt towards the rehabilitation to reduce recidivism (Ali et al., 2024).

Objective

The purpose of this study was to revise and validate the Recidivism Risk Scale for Individuals Convicted of Homicide (RRS-ICH).

Research Methodology

Sample

A sample of 200 participants aged 30 to 70 (M = 51.42, SD = 8.57) years was drawn. The purposive sampling technique was utilized based on the following inclusion criteria:

1. Only participants who were granted parole were included.
2. Only individuals who committed the offense of

homicide were included.

3. Only convicted individuals were included.
4. The sample consisted entirely of male participants.
5. Participants aged 30 to 70 years were included.

Table 1: *Demographic Characteristics of the Sample (N = 200)*

Characteristics	*M* (*SD*)	*f* (%)
Age	51.42 (8.57)	
Term of Sentence	24.17 (2.90)	
Education		
Below Matriculation		137 (68.5%)
Matriculation and above		63 (31.5%)
Marital Status		
Married		130 (65%)
Unmarried		70 (35%)

Procedure

The Recidivism Scale for Inmates (Rasool & Iftikhar, 2022) was revised and validated. Before the revision and validation of the scale, formal permission was obtained from the original author. In the first phase, a panel of five experts—each holding a minimum qualification of a Ph.D. experience in scale development—was convened to evaluate the instrument, and written informed consent was secured before their evaluation. The panel of experts unanimously recommended reducing the length of the scale, noting that the original instrument was too lengthy for a forensic population comprising individuals convicted of homicide. Based on the feedback of the experts, three redundant items (originally numbered as 41, 51, 54) were deleted, which reduced the scale from its original 85 items to 82 items. Furthermore, minor linguistic modifications were made to a few items based on expert consensus to enhance comprehension for the target sample.

In the second phase, after incorporating the modifications recommended by the expert panel, data collection for the revision and validation of the Recidivism Scale for Inmates were started. Participants meeting the inclusion criteria were approached from across the province of Punjab. Prior to data collection, formal written permission was secured from the Punjab Probation and Parole Service department, and written informed consent was obtained from each participant after explaining the nature and purpose of the study. Before the collection of data, written permission from the Punjab Probation and Parole Service department and the participants was taken after explaining to them the nature and objective of the study. Rapport was established with each participant to ensure maximize response accuracy. The data were collected from 200 individuals convicted of homicide and granted parole.

Analysis and Results

After data collection, the data was entered for statistical analysis. To establish the psychometric properties of the Recidivism Risk Scale for Individuals Convicted of Homicide (RRS-ICH), exploratory factor analysis with varimax rotation, Cronbach's Alpha reliability, and a series of confirmatory factor analyses were performed. The Kaiser-Meyer-Olkin measure of sampling adequacy was calculated (Kaiser, 1974) to evaluate data suitability for factorization, yielding a value of .65, which indicates an acceptable level to run the exploratory factor analysis (Field, 2024). The distribution of the responses of the participants was evaluated through Bartlett's test of sphericity (Bartlett, 1950), which was statistically significant χ^2 (3321) =7337.47, $p < .001$., showing the data possessed adequate shared variance to evaluate potential factor structure. EFA with varimax rotation was used to identify the factor structure of RRS-ICH (Henson & Roberts, 2006). First, the scree plot criterion was

used to determine the number of factors to extract which clearly suggested a five-factor solution. The five-factor principal component analysis explained a variance of 38.72%, emerging as the most meaningful structure. Secondly, the criteria for factor loading equal to or more than .40 and an eigenvalue greater than 1 (Kaiser, 1974; Kline, 1994) were adopted. These combined criteria yielded a total number of 42 items and five factors. The factor loadings of items are given in Table 2.

Figure 1: *Scree Plot*

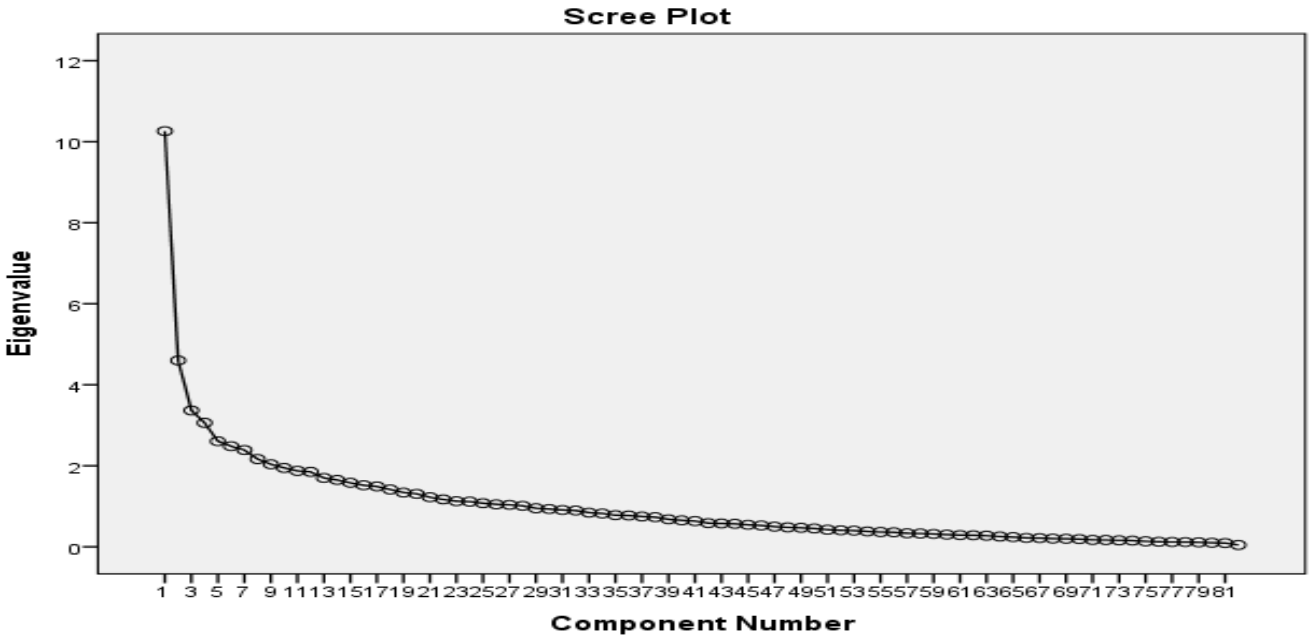


Table 2: *Factor Loadings of Items in Scale (N=200)*

Recidivism Scale		**Factor Loading**				
		1	2	3	4	5
Factor 1: Criminal Justice System and Prison Environment						
1	5	**.66**	-.10	.21	-.14	.10
2	1	**.60**	.05	.04	.20	-.19
3	11	**.57**	.31	-.07	.11	.02
4	82	**.56**	.04	.11	-.11	-.10
5	3	**.54**	.24	.07	.00	-.16
6	17	**.54**	.13	-.04	.24	.17
7	4	**.52**	-.21	.00	.39	.19
8	81	**.47**	-.11	.24	.07	.12
9	69	**.45**	.23	-.07	.18	-.03
10	53	**.43**	-.28	.05	.35	.26
11	28	**.43**	.04	.17	.30	.04
Factor 2: Mental Health Indicators						
1	65	.03	**.61**	.08	.18	.10
2	71	.30	**.54**	-.13	.21	.06
3	45	-.13	**.54**	.13	.18	-.23

4	29	.01	**.50**	.16	.16	.02
5	52	.07	**.50**	.36	.07	-.03
6	73	.30	**.48**	.08	.02	.05
7	72	.22	**.45**	-.15	-.11	.34
8	13	.06	**.44**	.10	.12	-.01
9	60	.02	**.44**	.15	.26	.07
10	9	.29	**.42**	.20	-.04	-.01
11	36	-.12	**.41**	.31	.25	-.16
12	34	-.10	**.41**	.14	-.05	-.07
Factor 3: Antisocial Associates and Antisocial Behavior						
1	66	-.14	.18	**.59**	.21	-.03
2	70	.08	.07	**.56**	.23	.09
3	68	-.03	.10	**.53**	.13	.03
4	12	.28	-.13	**.49**	.13	.00
5	77	.30	.34	**.47**	.01	.03
6	41	.29	.20	**.44**	-.03	-.04
7	37	.23	.30	**.41**	.24	-.04
8	22	.18	.06	**.40**	-.07	.09
Factor 4: Substance Use						
1	6	.10	.23	-.07	**.53**	.11
2	27	.00	.03	.12	**.46**	-.02
3	8	.27	-.07	.16	**.42**	-.08
4	38	.26	.15	.12	**.41**	.08
Factor 5: Socioeconomic Stability and Social Support						
1	61	-.15	.12	-.01	.15	**.52**
2	78	.10	.27	.14	-.16	**.48**
3	54	.25	-.21	.10	.19	**.47**
4	42	.16	.13	.01	-.29	**.47**
5	62	-.02	-.06	.16	-.02	**.44**
6	76	.09	.02	.19	-.25	**.43**
7	80	.05	.07	-.22	-.05	**.43**
Explained Variance		15.19%	7.94%	5.68%	5.23%	4.66%

A total of 42 items with five factors were retained based on the above-mentioned criteria. Factor 1 (Criminal Justice System and Prison Environment), Factor 2 (Mental Health Indicators), Factor 3 (Antisocial Associates and Antisocial Behavior), Factor 4 (Substance Use), and Factor 5 (Socioeconomic Stability and Social Support) contain 11,12,8,4,7 items, respectively. The first factor (Criminal Justice System and Prison Environment) explained 15.19% variance in the overall scale, while the second (Mental Health Indicators), third (Antisocial Associates

and Antisocial Behavior), fourth (Substance Use) and fifth (Socioeconomic Stability and Social Support) factor explained 7.94%, 5.68%, 5.23% and 4.66% variance, respectively.

Internal consistency estimates produced a good alpha coefficient of .84 for the overall scale. The alpha coefficient for Criminal Justice System and Prison Environment was .79, for Mental Health Indicators was .78, for Antisocial Associates and Antisocial Behavior was .73, for Substance Use it was .61 and for Socioeconomic Stability and Social Support it was .69.

Table 3: *Internal Consistency (α) of Factors in Scale (N=200)*

Factors	*K*	Item Mean Range	*a*
Criminal Justice System and Prison Environment	11	2.26-3.36	.79
Mental Health Indicators	12	2.19-2.80	.78
Antisocial Associates and Antisocial Behavior	8	2.56-2.76	.73
Substance Use	4	2.76-2.88	.61
Socioeconomic Stability and Social Support	7	2.31-2.70	.69
Total	42	2.19-3.36	.84

Moreover, item-total correlation analysis for the five subscales showed strong item-scale homogeneity, indicating that each individual item contributed significantly to its respective factors, as presented in Tables 4, 5, 6, 7 and 8.

Table 4: *Item total correlation and Cronbach's Alpha of Criminal Justice System and Prison Environment Factor (N=200)*

Item No.	*M*	*SD*	Item total Correlation	Cronbach's Alpha if Item Deleted
1	3.27	0.93	.51**	.77
3	3.04	0.96	.43**	.78
4	3.14	1.11	.45**	.77
5	3.23	1.06	.50**	.78
11	2.84	1.02	.49**	.77
17	2.76	1.04	.50**	.77
28	2.86	1.06	.40**	.78
53	2.26	1.12	.38**	.78
69	2.85	1.10	.41**	.78
81	3.13	0.89	.44**	.78
82	3.36	0.87	.41**	.78

Note. *p <.05, **p <.01

Table 5: *Item total correlation and Cronbach's Alpha of Mental Health Indicators (N=200)*

Item No.	*M*	*SD*	Item total Correlation	Cronbach's Alpha if Item Deleted
9	2.66	1.05	.40**	.77
13	2.63	0.98	.36**	.77
29	2.56	1.03	.41**	.76
34	2.80	1.03	.31**	.77

36	2.47	1.06	.41**	.76
45	2.19	1.21	.45**	.76
52	2.47	1.12	.48**	.76
60	2.55	1.10	.46**	.76
65	2.58	1.07	.56**	.75
71	2.57	1.03	.46**	.76
72	2.49	1.06	.32**	.77
73	2.67	1.03	.39**	.77

Note. *p <.05, **p <.01

Table 6: *Item total correlation and Cronbach's Alpha of Antisocial Associates and Antisocial Behavior (N=200)*

Item No.	*M*	*SD*	Item total Correlation	Cronbach's Alpha if Item Deleted
12	2.76	1.11	.37**	.72
22	2.77	1.07	.31**	.73
37	2.67	1.03	.46**	.70
41	2.72	1.02	.45**	.70
66	2.56	1.07	.49**	.69
68	2.73	1.08	.40**	.71
70	2.68	1.05	.48**	.69
77	2.65	0.98	.44**	.70

Note. *p <.05, **p <.01

Table 7: *Item total correlation and Cronbach's Alpha of Substance Use (N=200)*

Item No.	*M*	*SD*	Item total Correlation	Cronbach's Alpha if Item Deleted
6	2.89	1.00	.36**	.55
8	2.82	0.99	.26**	.54
27	2.78	0.99	.35**	.57
38	2.77	1.00	.37**	.55

Note. *p <.05, **p <.01

Table 8: *Item total correlation and Cronbach's Alpha of Socioeconomic Stability and Social Support (N=200)*

Item No.	*M*	*SD*	Item total Correlation	Cronbach's Alpha if Item Deleted
42	2.71	0.99	.25**	.67
54	2.66	1.13	.28**	.66
61	2.47	0.98	.31**	.65
62	2.37	1.03	.33**	.64
76	2.55	1.10	.28**	.66
78	2.59	1.03	.43**	.60

80	2.32	0.97	.27**	.66

Note. *p <.05, **p <.01

Moreover, a series of nested confirmatory factor analyses (CFAs) was conducted via structural equation modeling (SEM) with maximum likelihood estimation to evaluate the construct validity of the finalized measurement model against alternative configurations. This resulted in a refined measurement framework featuring 42 items across 769 degrees of freedom. All unstandardized regression weights for the remaining indicators were statistically significant (p < .05), confirming robust indicator convergent validity. Based on diagnostic structural criteria, alternative single-factor, two-factor, three-factor, and four-factor models were systematically compared against the hypothesized five-factor framework.

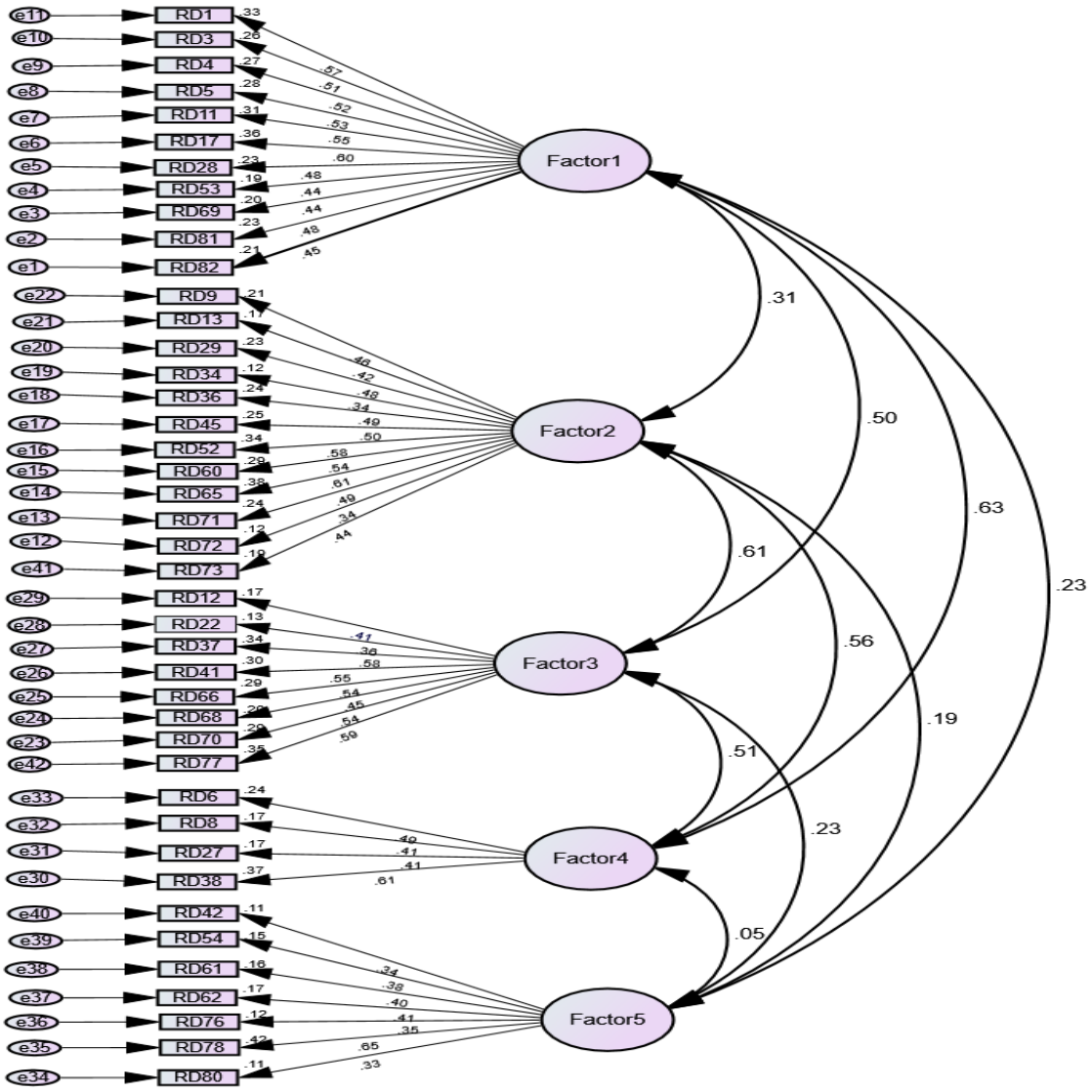
As displayed in Table 9, the baseline single-factor model exhibited poor fit across all conventional psychometric benchmarks. Sequential chi-square difference testing revealed that each step of multi-factor refinement yielded a statistically significant improvement in absolute fit. The hypothesized five-factor model demonstrated an acceptable absolute fit to the empirical data, yielding an excellent normed chi-square ratio of 1.872 (χ^2 = 1439.86, df = 769, p < .001) and a Root Mean Square Error of Approximation (RMSEA) of .067 with a stable 90% confidence interval of [.052, .078]. Incremental indices (CFI = .921, TLI = .913) showed that these comparative indices substantiate that the hypothesized five-factor model achieves a satisfactory fit overall to the empirical data.

Table 9: *Fit Indices and Model Comparison for Confirmatory Factor Analysis Models*

Model	χ^2	***df***	**NFI**	**CFI**	**TLI**	**RMSEA**	**PCFI**
1. Single factor	2394.110***	809	.480	.520	.520	.110	.340
2. Two-factor	2110.540***	806	.550	.600	.590	.090	.410
3. Three-factor	1892.300***	800	.610	.660	.660	.080	.470
4. Four-factor	1655.820***	788	.700	.760	.720	.070	.510
5. Five-factor (Hypothesized)	1439.869***	769	.831	.921	.913	.067	.555

Note. Structural equation modeling was used for the analysis. NFI = normed fit index; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; PCFI = parsimony-adjusted comparative fit index. ***p < .001.

Figure 2: *Confirmatory Factor Analysis of RRS-ICH*



Discussion

The purpose of this study was to revise and validate the Recidivism Scale for Inmates (Rasool & Iftikhar, 2022). The rationale behind the revision and validation of this scale was to adapt and use it to study recidivism in parolees who were convicted of the crime of homicide. There are several scales known to predict recidivism such as Statistical Information on Recidivism - Revised Scale **(**Nafekh & Motiuk, 2002), Adult Dynamic Validated Instrument for Sex Offense Recidivism (Duwe et al., 2024), STABLE (Hanson et al., 2007), Offender Group Reconviction Scale, (Howard, 2018), Level of Service/Case Management Inventory (Andrews et al., 2004), Static-99 (Hanson & Thornton, 1999), STABLE-2007 **(**Hanson et al., 2007), Ontario Domestic Assault Risk Assessment (Hilton et al., 2004). But none of them assesses exclusively the risk of recidivism in individuals convicted of homicide. Studies confirm that the factors of recidivism in homicide offenses are different than general recidivism (Sturup & Lindqvist, 2014).

The population of the present study was individuals who were granted parole after conviction for the offense of homicide. The scale was revised and validated exclusively on individuals who were convicted of homicide. The study carried out a sample of two hundred individuals convicted of homicide. The results found the criminal justice system and prison environment, antisocial associates and antisocial behavior, mental health indicators, substance use, socio-economic stability and social support as significant factors of recidivism in individuals convicted of homicide. The results of this

investigation are consistent with the previous studies (Broadhurst et al., 2018).

To establish the psychometric properties of the Recidivism Risk Scale for Individuals Convicted of Homicide (RRS-ICH), exploratory factor analysis with varimax rotation, Cronbach's Alpha reliability and a series of confirmatory factor analyses were performed. The Kaiser-Meyer-Olkin measure of sampling adequacy (Kaiser, 1974) yielded a value of .65, acceptable to conduct the exploratory factor analysis (Field, 2024). Bartlett's test of sphericity (Bartlett, 1950), to test adequacy of date distribution, also found significant χ^2 (3321) = 7337.47, p < .001. Based on the screen plot elbow criterion, a five-factor solution was extracted. Individual items were retained if they met the criterion of a factor loading equal to or greater than .40, which yielded a final scale comprising 42 items across five factors. Internal consistency estimates produced a good alpha coefficient of .84 for five factors. All five factors, Criminal Justice System and Prison Environment, Mental Health Indicators, Antisocial Associates and Antisocial Behavior, Substance Use, and Socio-economic Stability and Social Support showed good alpha coefficient values. Moreover, all items of the RRS-ICH were significantly correlated with the total score of RRS-ICH, confirming homogeneity of scale and structural validity of items. A series of confirmatory factor analyses supported the five-factor structure of the scale, demonstrating an adequate model fit, *CFI* = .92, *TLI* = .91, and *RMSEA* = .067, 90% CI [.052, .078], yielding an excellent normed chi-square ratio of 1.87 (χ^2 (769) = 1439.86, p < .001). All indicator regression weights were statistically significant (p < .05), confirming convergent validity. Furthermore, discriminant validity was supported as all inter-factor correlations were below .85, thereby confirming overall construct validity. The RRS-ICH is a valid and reliable instrument of the factors of recidivism in individuals convicted of homicide.

Limitations

The sample in the current study comprised exclusively male individuals who were granted parole after being convicted of homicide. The findings and psychometric properties of the RRS-ICH can only be safely generalized to male homicide offenders. This scale must undergo further empirical validation before it can be administered to female offenders or individuals convicted of offenses other than homicide.

Conclusion

The RRS-ICH is a valid and reliable measure to assess recidivism risk in offenders who were granted parole after being convicted of homicide. The results of the current study align with the existing literature on homicide and recidivism. Furthermore, this scale was validated using an indigenous population comprising individuals convicted of homicide. It is the first psychological construct in Pakistan to exclusively study homicide offenders and will encourage researchers to further work on homicide offenders. As the first psychological assessment instrument in Pakistan developed to study homicide offenders exclusively, the RRS-ICH fills a critical gap in local forensic literature and provides a foundational framework that will encourage future researchers to expand upon homicide and recidivism research.

Conflict of Interest

The authors showed no conflict of interest.

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