Journal of Experimental Criminology
https://doi.org/10.1007/s11292-020-09443-w

The effects of cognitive behavioral therapy on recidivism among parolees in Central America: evidence from a Honduran experiment

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Published online: 12 September 2020

Abstract

Objectives Cognitive behavioral therapy (CBT) has shown promise as a tool for rehabilitating offenders in the USA and other developed nations. However, little is known about the effectiveness of CBT outside the developed world. In Central America, a region wracked by rampant violence and disorder, CBT has the potential to change the behavior of persistent offenders and improve public safety. The present study examines the results of a CBT among supervised offenders in Honduras.
Methods Randomized control trial, where one hundred parolees were randomly assigned to either a treatment ($n = 50$) or control conditions ($n = 50$) group and tracked for 14 months.
Results Subjects who participated in the CBT program were 69% less likely to reoffend at any compared with those assigned to the control group.
Conclusion Despite social, economic obstacles, CBT proved to be effective in reducing recidivism among parolees in Honduras—a testament to its robustness and wide applicability.

Keywords Rehabilitation · Cognitive behavioral therapy · Recidivism · Central America · Honduras

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Introduction

The Northern Triangle of Central America ("NTCA")—comprised of El Salvador, Guatemala, and Honduras—is one of the most dangerous regions in the world. Every country in the NTCA ranks in the top 10 countries by homicide rate—one of the few crime measures that can be credibly compared (Mosher et al. 2010)—with rates ranging from 23 per 100,000 in Guatemala, 39 per 100,000 in Honduras, to 52 per 100,000 in El Salvador, the world's highest (figures based on the latest available data from 2018; United Nations Office on Drugs and Crime n.d. a). During a recent 5-year period (2014–2018), roughly 70,000 people were killed in the region (UNODC n.d. b).

Such levels of criminal violence are confirmed by victimization surveys showing that about one in every three people living in the NTCA is victimized (Bachelet 2016). In one survey of migrants fleeing the region, about one-half of Hondurans and Salvadorans reported having lost a family member due to violence in the previous 2 years, while nearly three-quarters reported hearing gunshots in their neighborhood regularly (Medicins San Frontiers 2017. The level of crime in the region, described in the study as "unprecedented outside a war zone," was the most commonly given reason for migrating to Mexico (MSF 2017). The number of people detained by migration authorities in Mexico has reached nearly 190,000 per year, with more than 80% originating from the NTCA (United Nations High Commission for Refugees 2017).

As the region struggles to find a solution to the crisis, policymakers have begun to consider treatment options for the recently convicted as a way to reduce crime. Research has shown that a substantial number of those convicted will recidivate upon release from prison. In the USA, an estimated 68% of released prisoners were arrested within 3 years, 79% within 6 years, and 83% within 9 years (Alper et al. 2018). The rates of recidivism across the NTCA are similarly high, although there is considerable variability (possibly due to differences in data collection methods and quality): ranging from 11% in El Salvador (2015 prisoner census: self-reported readmission), to 45% in Honduras (2017, internal government statistics), to 59% in Guatemala (2010–2013, government report on a sample of inmates). These rates suggest that much of crime is committed by previous offenders, which is why experts have long argued for targeting crime prevention efforts on these individuals (Lipsey and Cullen 2007).

Cognitive behavioral therapy

There is a large body of research showing that some rehabilitative treatments can be effective in reducing recidivism (Hollin 1999; Lipsey and Cullen 2007; Pearson et al. 1997). According to the well-established risk-need-responsivity ("RNR") model of rehabilitation, the most effective rehabilitative treatments are those that target high-risk offenders (risk principle), address dynamic criminogenic needs (need principle), and bring about change in those needs (responsivity principle) (Andrews et al. 1990; Gendreau 1996; Taxman and Smith 2020). Compared with programs focused on noncriminogenic needs, treatments adhering to the RNR principles have been shown to be considerably more effective for various offender types (Dowden and Andrews 1999a, b).

One common dynamic (i.e., changeable) target of rehabilitative treatment is "criminal thinking." Criminologists have long held that "habits of thought" can play a key

role in the persistence of criminal conduct (Healy 1915). Patterns of criminal thinking are characterized by distortions which can cause offenders to misjudge benign situations as dangerous, externalize blame, and engage in deficient moral reasoning. As an example, violent sex offenders have been shown to exhibit distorted thinking to minimize their culpability (Whitaker et al. 2008) and justify their criminal offenses (Egan et al. 2005). In the context of an antisocial subculture, where criminal conduct is often encouraged, such distorted patterns of thought may be reinforced (Lipsey et al. 2007). While not implicated in all criminal offending, patterns of criminal thinking appear to play a profound role in a large proportion of persistent criminal offending (Zara and Farrington 2016).

Cognitive behavioral therapy ("CBT") is premised on the idea that distortions in thinking are not innate but instead are learned. Through a combination of cognitive and behavioral therapies, it attempts to disrupt these learned patterns and replace them with more adaptive ways of thinking. A variety of CBT programs have been developed to directly address the needs of criminal offenders, including the following: reasoning and rehabilitation (Ross and Fabiano 1985), moral reconation therapy (Little and Robinson 1986), aggression replacement training (Goldstein et al. 1998), thinking for a change (Bush et al. 1997), and becoming a man (Heller et al. 2017). Although slightly different in approach, the programs share a common set of goals: teaching offenders to monitor their thoughts, identifying automatic and biased patterns, and building the skills needed to bring about lasting change to them.

Empirical studies, including methodologically rigorous randomized-controlled trials and meta-analyses, consistently show that CBT is one of the most effective treatments for reducing recidivism in both the correctional and community setting (Zara 2019). Such studies show that CBT reduces recidivism on average by about 20–30%, with the most effective programs reducing it by as much as 50% (Landenberger and Lipsey 2005; Pearson et al. 2002; Wilson et al. 2005). Factors associated with larger reductions in recidivism include (a) the participation of high-risk offenders, (b) the involvement of researchers in the program's implementation, and (c) inclusion of anger control and interpersonal problem-solving treatment components (Lipsey et al. 2007). Notably treatment effects are not clearly associated with the type of CBT program, meaning that a generic CBT program can be just as effective as brand name one (Lipsey et al. 2007).

Because much of the research on CBT has been conducted in developed countries, one factor yet to receive much attention is a country's level of development, that is, whether CBT works in countries characterized by short life expectancy, high poverty, and low education (United Nations Development Programme 2018). In one study conducted in Liberia, an underdeveloped country with a recent history of civil wars, CBT was found to significantly reduce criminal conduct in the short run (2–5 weeks), but the effect faded after a year unless CBT was combined with a cash grant (Blattman et al. 2017). This suggests that CBT can be effective outside the developed world, yet whether and to what extent CBT can reduce recidivism in the specific context of Central America's developing nations is still unknown.

Purpose of the present study and hypothesis

Although CBT has shown promise as a tool for offender rehabilitation in the USA and other developed nations, to our knowledge, this is the first trial of CBT in the NTCA.

The purpose of the present study is to estimate the effect of CBT on the risk of recidivism among a random sample of parolees in the Department of Francisco Morazan, Honduras. Data on social-economic outcomes, mental health, crime, and recidivism suggest the NTCA is at the epicenter of a regional crisis. These conditions create a unique challenge for the successful reentry of parolees into society. Despite these challenges, we hypothesize that CBT will have a significant effect on time to reoffense.

Method

Participants

Participants in the CBT program were selected from a pool of offenders placed on conditional release before completing their entire prison sentence in the Department of Francisco Morazan, located in the center of Honduras. The department's capital is Tegucigalpa, which also serves as the capital for Honduras. From a sampling frame of the parolee population, a simple random sample of 100 parolees were selected using STATA's sample command. Then, using STATA's random number generator, the selected participants were randomly assigned to either the treatment or control group by the *Juzgado de Ejecucion de Penal*, which is in charge of sentencing and placing individuals into alternatives to incarceration such as probation and parole.

Table 1 presents descriptive statistics on the study participants. Additionally, we report the results of *t* tests or chi-square tests to test for significant differences between the treatment and control groups. Both groups consist almost entirely of males (92% in the control group and 96% in the treatment group). The treatment group is on average 4 years younger ($\bar{x} = 33.8$) than their counterparts ($\bar{x} = 37.4$). Treatment and control groups are also comparable in the crimes for which they were convicted. In both groups, most participants were convicted of property crimes (e.g., robbery, extortion), followed by rape and other sex offenses (e.g., rape, sexual harassment), violent crimes (e.g., homicide, battery), possession/trafficking of drugs, and illegal firearm possession.

Despite similar types of offenses, the control group received sentences ($\bar{x} = 10.1$) that were on average 1 year longer than the treatment group ($\bar{x} = 9.1$). The average parole sentence, or time in conditional release, was 4 years for both groups. As noted, *Juzgado de Ejecucion de Penal* selected 100 participants from a pool of eligible parolees, most already on conditional release. On average, participants in the control group were on parole for 147.7 days compared with 134.2 days in the treatment group. Roughly 80% of both groups live in urban areas of Honduras, primarily in Francisco Morazan (Fig. 1).

Significance tests show that control and treatment groups are balanced across all observed characteristics.

Description of the CBT program

The cognitive behavioral program titled *Previniendo el Riesgo de Reincidencia Delictiva a Través de la Terapia Cognitiva Conductual* ("Preventing Recidivism Through Cognitive Behavioral Therapy") was a 4-month group therapy program that met for approximately 3 h biweekly. The program was organized and led by the same

Table 1 Summary statistics of control and treatment groups at baseline

Variable	Control ($n = 50$)		Treatment ($n = 50$)		t test/x^2
	Frequency	Percent	Frequency	Percent	p value
Sex					0.40
Male	46	92	48	96	
Age	50	37.4	50	33.8	0.08
Crime					
Violent	9	18	8	16	0.79
Property	23	46	22	44	0.84
Drugs	7	14	3	6	0.18
Rape	10	20	15	30	0.24
Firearms	3	6	3	6	1
Sentence	50	10.1	50	9.1	0.18
Total parole sentence	50	4.2	50	4	0.20
Preobservation parole time	50	147.7	50	134.2	0.38
Urban	40	80	41	82	0.79

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

two teams. The first team, made up of two independent psychologists who had years of experience facilitating CBT group therapy, served as program facilitators. The second team, made up of psychologists and other personnel from *El Poder Judicial*, were in charge of logistics. They booked the meeting rooms where the group sessions took

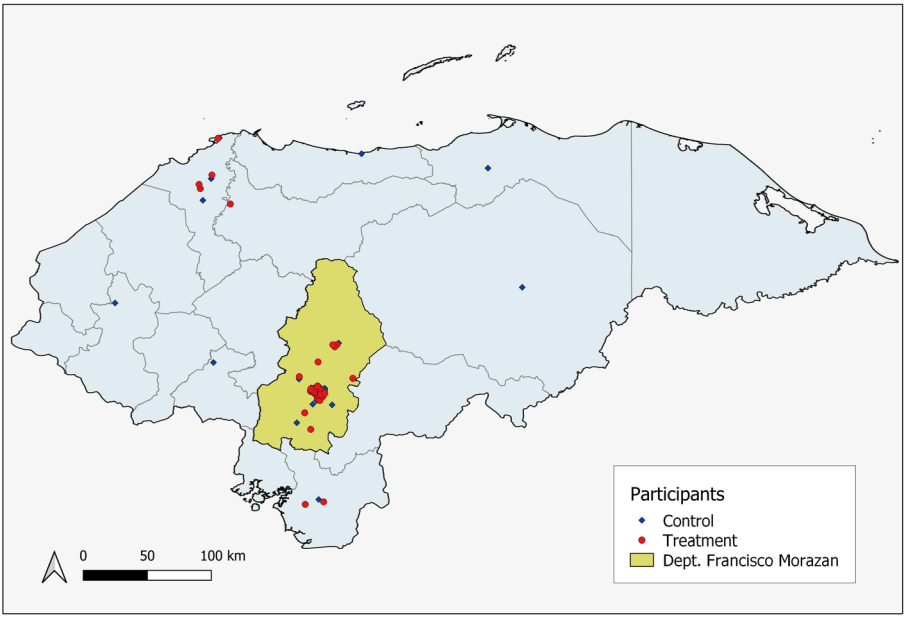

Fig. 1 Map of Department of Francisco Morazan and participants

place, organized the meals, took attendance, arranged for transportation, among other administrative tasks. Subjects were divided into two groups of equal size. Each facilitator led the same group for the duration of the program. The psychologists organized all content and materials for the group therapy sessions.

The program was based on the theoretical assumptions and clinical techniques described in Beck (1995). The first session focused on introducing the therapists and explaining the goals of the group sessions, the principles of CBT, and other logistical matters. The second and subsequent four sessions focused on self-esteem/self-perception, self-control/impulsivity, identification of problems, problem-solving, values/antivalues, resilience, delayed gratification, and support networks. The therapists relied primarily on Socratic questioning as the primary clinical technique. The group discussions allowed participants to identify distorted thinking and come up with replacement thoughts. In addition to the six group therapy sessions, participants were given two sessions on entrepreneurship, providing information on suppliers, chemicals, hardware, and hands-on training on how to make and sell soap, hand sanitizer, and other household products. Participants in the treatment group attended, on average, 70% of sessions. Missed sessions were commonly attributed to conflicting work schedules, problems with transportation, and protests in the city.

Participants assigned to the control group experienced no change in their regular supervision. Like those in the treatment group, they were subject to random visits by court officers and assigned to periodic check-ins with court psychologists and court officials. The control group also participated in entrepreneurship sessions.

Data collection procedures

Information on participants was gathered from Honduras's computerized database, which contains demographic information as well as the criminal history of all subjects. Recidivism is defined as a technical violation (i.e., a violation of one or more conditions of parole) or a substantive violation (i.e., a new law violation) that leads to revocation of parole.

Analytic strategy

This study examines the effect of CBT on recidivism through bivariate analysis and a multivariate survival analysis. Bivariate statistics are used to explore the difference in recidivism between the treatment and control groups and identify significant differences between them. Survival analysis (also known as hazard models) is used to estimate the effect of CBT on the time to reoffense. The goal of a survival model is to explain the occurrence of an event at a particular moment. Whereas in regression analysis we usually study how factors are associated with the presence or absence of an event (e.g., death, heart attack, crime), in survival analysis we study how factors affect the time to an event, also known as failure time. The variable to be explained in a survival model is the time to an event, also known as the hazard rate, defined as

$$h(t) = \lim_{\Delta t \to 0} \frac{\Pr(t \leq T \leq t + \Delta t | T \geq t, x)}{\Delta t},$$

where T denotes a nonnegative continuous random variable for the time to an event, and t denotes the time (e.g., years, age). The hazard rate gives the rate at which units fail by t, given that the units have survived until t (Box-Steffensmeier and Jones 2004). For instance, a hazard rate of four per day means that if this rate were to continue for an entire day, we would expect four failure times (or events). The above definition also implies that the hazard rate is conditional on a set of random independent variables (x). Assuming that all individuals share identical hazard functions, we can express the hazard rate as a product of two components:

$$h_i(t, \mathrm{x}) = h_0(t)\exp\left(\beta' \mathrm{x}\right),$$

where $h_0(t)$ is the baseline hazard function and $\beta'\mathrm{x}$ is a vector of regression parameters. This representation is known as the Cox proportional hazard model. This is the most popular survival model because it provides several advantages over parametric models, primarily, that the shape of the hazard does not need to be specified and time-varying covariates are allowed. Given that we are interested in not only whether an individual reoffends but also the timing of a new offense, this study will use a Cox proportional hazard model to estimate the causal effect on the time to reoffending. To improve the validity of the estimates, we fit a second model controlling for observed covariates.

Results

Of the parolees assigned to the CBT program ($n = 50$), 90% completed the class. In total, six participants lost their parole due to reoffending. Two reoffended and lost their conditional release prior to the start of treatment. The other four offenses were classified as technical violations. Two participants failed to report to the court, the third lost his/her conditional release based on an alcohol violation, and the fourth committed assault and subsequently stopped reporting to court. Given that these individuals reoffended prior to treatment, they were excluded from the analysis. Of the 48 participants remaining, two reoffended during the analysis time. This represents a recidivism rate of 8.3%.

The control group suffered two murders. One subject was murdered 3 days prior to the start of the experiment; the other was killed 3 months into the observation period. Of the participants that remained ($n = 48$), thirteen reoffended during the analysis time. This translates into a recidivism rate of 27%. Similar to the treatment group, all offenses were classified as technical violations. Seven of the ten participants reported the incorrect home address; the rest moved without authorization from the court. There is an 18.7 percentage-point difference in the recidivism rates between the treatment and control groups. As expected, parolees assigned to the treatment were less likely to reoffend during the analysis time. The difference in recidivism between the treatment and control groups is statistically significant ($x^2[1] = 5.7, p \leq 0.01$), with an effect size that can be characterized as moderate (Cramer's $V = 0.24$) (Fig. 2).

It is important to note that these differences neither account for observed differences between the treatment and control groups nor account for the duration of time to failure. Although the randomization process was effective in producing two groups balanced

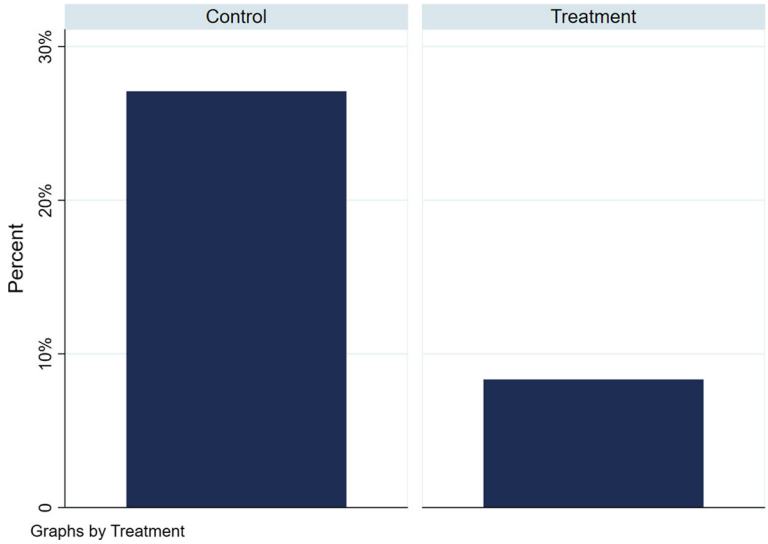

Fig. 2 Recidivism rate by treatment condition

across observed characteristics, multivariate survival analysis was used to further statistically control for these variables and to account for the timing of the reoffense.

Survival analysis

As noted, the dependent variable of survival models is the hazard rate or the intensity at which failures occur. This intensity is conceptualized as the time to failure or time to reoffend in this case. The longer the time between offenses, the lower the intensity of the hazard rate. Conversely, the shorter the time between events, the higher the intensity or hazard rate. Given that two participants reoffended and one passed away prior to the start of the program, 97 participants in total were tracked for 15 months (from October 2018 to December 2019).[1] During this time, there were 18 failures observed. Figure 3 presents the cumulative hazard function. The cumulative hazard function can be interpreted as the probability of committing an offense at time x given survival until time x. For example, given survival to the sixth month, the probability of violating parole was 7%; by the tenth month that probability increased to 15%. At the end of the study time, the probability of failure for those that survived until the fifteenth month was 22%. The cumulative hazard function illustrates the dynamic nature of recidivism. When looking at risk overtime, we clearly see that the likelihood of reoffending is not constant.

Comparing the cumulative hazard functions across treatment and control groups also provides support for the effectiveness of CBT in reducing the risk of reoffending. As Fig. 4 illustrates, those who took part in the CBT program had a much lower likelihood of failure than their counterparts. For example, the probability of reoffending at the

[1] Participants who failed prior to start of the program were dropped from the survival analysis. Survival models analyze risk over time. Once a participant enters the observation time, he/she is included in the analysis until failure.

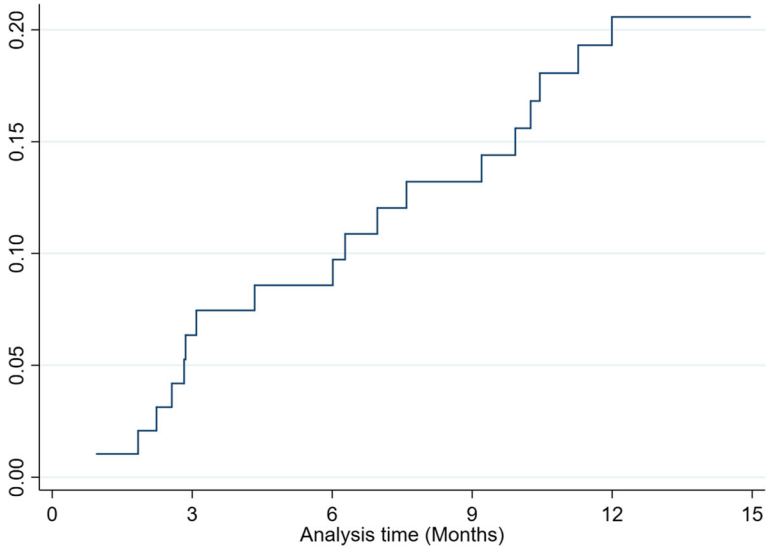

Fig. 3 Nelson-Aalen cumulative hazard estimate

third month was 3% for the treatment group and about 14% for the control group. At the end of observation time, that probability had increased to 11% and 32% for the treatment and control groups, respectively.

Table 2 presents the effect of the CBT program on the likelihood of reoffending. This effect is estimated through a Cox proportional hazard model. At the core of all hazard multivariate models is the following question: what are the factors that increase or decrease the time it takes for a failure to occur? In other words, in survival models, we are interested in not only the shape of the hazard function and survival probabilities but also the factors that aggravate or mitigate the rate at which events occur.

We fit two models. In model 1, we estimate the effect of program participation on the risk of reoffending. The results show that participating in the CBT program had a statistically significant impact on the risk of recidivism ($z = -2.09, p \leq 0.05$). Subjects who participated in the CBT program were 66% less likely to reoffend compared with those assigned to the control group ($100\ [0.34 - 1] = -66\%$). To test the robustness of this finding, in model 2, we estimate the effect of the CBT program while controlling for observed characteristics. Similar to model 1, we find that participating in CBT had a statistically significant effect on recidivism ($z = -2, p \leq 0.05$). After adjusting for covariates, subjects who participated in the CBT program were 69% less likely to reoffend at any time during the follow-up period compared with those assigned to the control group ($100\ [0.34 - 1] = -69\%$). One can appreciate the size of this effect in Fig. 5, which plots the predicted hazard and survival curves for the treatment and control groups. In survival models, the hazard function is directly related to the survival function. The survival function is the probability of surviving past time *t*. The higher the hazard rate or intensity of events, the shorter the expected probability of survival. Conversely, the lower the hazard rate, the higher the expected survival times. As illustrated by Fig. 5, the probability of survival past the second month is nearly the same for both groups (about 99%), but then diverges with the likelihood of survival (i.e., not committing a new offense) dropping more sharply for the control group.

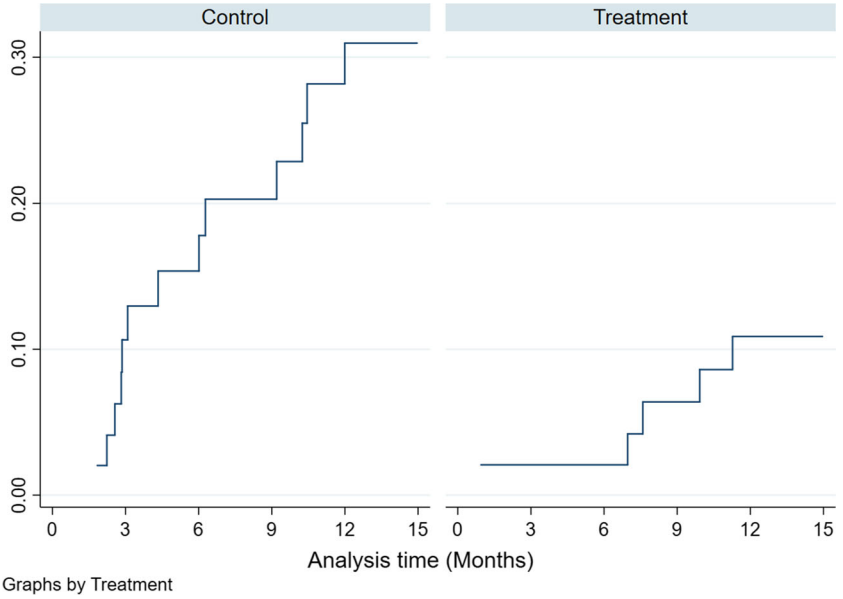

Fig. 4 Nelson-Aalen cumulative hazard estimates by treatment conditions

Table 2 Cox hazard model estimates of the causal effect of CBT on recidivism

Variable	Model 1			Model 2	
	Hazard ratio	95% CI		Hazard ratio	95% CI
Treatment	0.34*	[0.12	0.97]	0.31*	[0.10, 0.97]
Sex					
Male				2.98	
Age				0.98	[0.91, 1.05]
Crime					
Violent[a]					
Property				1.35	[0.19, 7.62]
Drugs				2.69	[0.32, 8.78]
Rape				1.09	[0.19, 6.03]
Firearms				3.19	[0.32, 2.34]
Sentence				1.16	[0.99, 1.35]
Total parole sentence				1	[0.98, 1.59]
Preobservation parole time				1	[0.99, 1.01]
Urban				1.60	[0.27, 4.90]
Number of subjects	97			97	
Number of failures	18			18	
Observation time	455 days			455 days	
Log likelihood	− 78.24			− 71.57	

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

[a] Reference category

Discussion and conclusions

By all metrics, the NTCA is in the midst of a crime epidemic, with violent crime rates among the highest in the world. A sizable portion of the crime is committed by individuals who have been or currently are under supervision. Recognizing that a significant number of crimes are committed by convicted criminals, the *Juzgado de Ejecucion de Penal* conducted a randomized-controlled trial of CBT among parolees in the Department of Francisco Morazan. One hundred participants were randomly assigned to either a treatment or control condition and were observed for a total of 180 days or 6 months. To our knowledge, this is the first CBT experiment in the region. Consistent with previous experiments, we find a 16 percentage-point difference in the recidivism rate between the treatment and control groups. After adjusting for covariates, survival analysis showed that CBT reduced the risk of recidivism by 69% at any time during the follow-up period compared with the control group.

This finding has important policy implications. First, it adds to the large body of research showing that rehabilitation can be effective in reducing recidivism. As noted, a large percentage of crime is committed by individuals who have been or are currently under the supervision of the criminal justice system. Targeting those at risk of reoffending not only is practical as they are already under our supervision but also can change the path of chronic offenders. Second, our results lend support to the efficacy of CBT in developing nations like those in the NTCA. In recent years, CBT has established itself as one of the most effective treatments for reducing recidivism (Zara 2019), but whether it could be effective outside the developing world remained unclear. The NTCA is characterized by extreme poverty, high unemployment rate, insecurity, low graduation rates, and lack of economic opportunities, and its citizens continue to struggle with the legacy of guerrilla warfare, counterinsurgency activities, civil war, drug cartels, and gang violence. The toll this has taken on them can be seen in their high levels of depression, anxiety, and somatization compared with other Latin

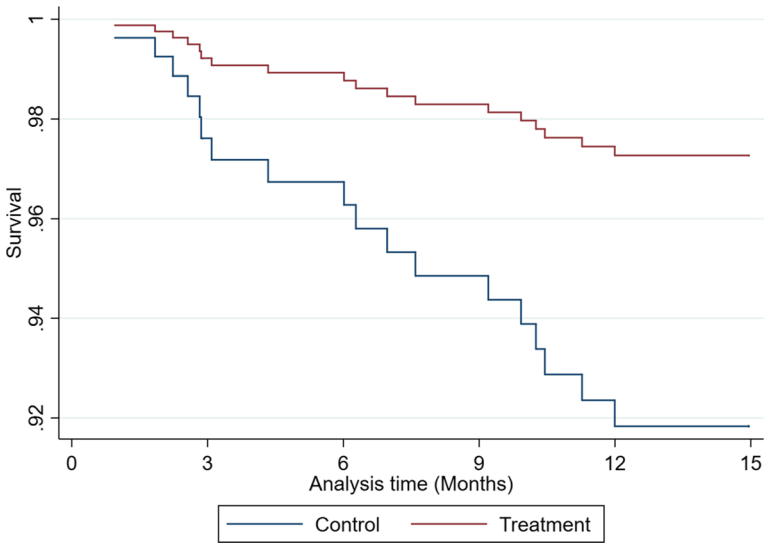

Fig. 5 Regression-adjusted survival function by treatment conditions

Americans (Labrador and Renwick 2018; Plante et al. 1995). Despite these conditions, we find that CBT is effective in reducing recidivism among parolees in Honduras, a testament to the robustness and wide applicability of CBT. Finally, our survival analysis showed that CBT produced a marked delay in time to a new offense. Just as a drug is efficacious if it delays the onset of disease, so too is a rehabilitative program that delays in crime—for every delay translates into a small measure of improved public safety.

This study has several limitations. One is the sample size. Although we had a sample big enough ($n = 97$) to detect a significant effect, its size limited our ability to obtain precise estimates. We found that participating in the CBT program reduced the hazard of recidivism by 69%, but the 95% confidence interval for this estimate indicates that it could be anywhere from 10 to 97%. A bigger sample would have allowed us to get a better sense of the magnitude of CBT's effect. Another limitation is the lower than expected attendance rates. As noted, participants in the treatment group attended 70% of sessions on average. It is unclear whether missed sessions attenuated the treatment effect.

Overall, our findings suggest that CBT can be a useful tool in combating crime in developing regions of the world. Future research should further evaluate CBT's effect on recidivism in this setting with a larger sample and a longer follow-up period, and examine whether dosage (attendance rate) is associated with the strength of CBT's effect.

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