Child Abuse & Neglect xxx (2015) xxx–xxx

Contents lists available at ScienceDirect

Child Abuse & Neglect

Research article

Examining the relationship between marijuana use, medical marijuana dispensaries, and abusive and neglectful parenting☆

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ARTICLE INFO

Article history:
Received 13 April 2015
Received in revised form 25 June 2015
Accepted 1 July 2015
Available online xxx

Keywords:
Medical marijuana dispensaries
Marijuana use
Marijuana availability
Child Physical abuse
Supervisory neglect
Physical neglect

ABSTRACT

The current study extends previous research by examining whether and how current marijuana use and the physical availability of marijuana are related to child physical abuse, supervisory neglect, or physical neglect by parents while controlling for child, caregiver, and family characteristics in a general population survey in California. Individual level data on marijuana use and abusive and neglectful parenting were collected during a telephone survey of 3,023 respondents living in 50 mid-size cities in California. Medical marijuana dispensaries and delivery services data were obtained via six websites and official city lists. Data were analyzed using negative binomial and linear mixed effects multilevel models with individuals nested within cities. Current marijuana use was positively related to frequency of child physical abuse and negatively related to physical neglect. There was no relationship between supervisory neglect and marijuana use. Density of medical marijuana dispensaries and delivery services was positively related to frequency of physical abuse. As marijuana use becomes more prevalent, those who work with families, including child welfare workers must screen for how marijuana use may affect a parent's ability to provide for care for their children, particularly related to physical abuse.

Introduction

Child abuse and neglect continues to be a major public health concern in the United States with about 700,000 children being abused and neglected in 2012 (U.S. Department of Health and Human Services, 2013). In California, physical abuse is defined as "physical injury inflicted by other than accidental means on a child or intentionally injuring a child" (California Penal Code 11165.6). Child neglect is defined as "the negligent failure of a person having the care or custody of a child to provide adequate food, clothing, shelter, medical care, or supervision" (California Penal Code 11165.2). Neglect can be further delineated by supervisory neglect, as defined by the failure of a caregiver to appropriately supervise a child, and physical

☆ This project was supported by grant number P60-AA-006282 from the National Institute on Alcohol Abuse and Alcoholism and grant number R01-DA032715 from the National Institute on Drug Abuse. The content is solely the responsibility of the authors and does not necessarily represent the National Institute on Alcohol Abuse and Alcoholism or the National Institutes of Health.

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http://dx.doi.org/10.1016/j.chiabu.2015.07.008
0145-2134/

neglect, which is defined as the failure of a caregiver to exercise a minimum degree of care in meeting the child's physical needs (e.g., medical care).

The 2010 Fourth National Incidence Study found that illicit drug use was a factor in 9.5% of cases of physical abuse and about 12.5% of all neglect cases (Sedlak et al., 2010). Parents with substance use problems are more likely to be physically abusive, commit child neglect, and have higher risk of child maltreatment than those without diagnosed substance use problems (Ammerman, Kolko, Kirisci, Blackson, & Dawes, 1999; Appleyard, Berlin, Rosanbalm & Dodge, 2011; Chaffin, Kelleher & Hollenberg, 1996; Walsh, MacMillan & Jamieson, 2003). Very little is known about which specific drugs may be more likely to result in maladaptive parenting behaviors as most research on child welfare populations (defined as abuse or neglect that comes to the attention of Child Protective Services) does not differentiate between specific substances used. Notable exceptions include research on "crack babies" during the crack epidemic of the 1990s and more recent research on methamphetamine use and harmful exposure to children (Barth & Needell, 1996; Besharov, 1990; Hohman, Oliver & Wright, 2004). However, this research has not yet extended to marijuana which has become more available over the past two decades due to increased legalization for either medical or recreational purposes.

Public opinion on marijuana use has shifted in the last ten years, with the majority of Americans (54%) now favoring legalization (Pew Research Center, 2014). This destigmatization of marijuana use has also been reflected in state-level policies, as marijuana use has been decriminalized, legalized, or authorized for medicinal purposes in 24 states plus the District of Columbia (Pew Research Center, 2014). However, the effects of changing marijuana legislation on social problems are largely unknown. This is especially true in the case of child maltreatment as studies on how marijuana use specifically affects abusive and neglectful parenting are rare despite the fact that marijuana is the most widely used illicit drug (Substance Abuse and Mental Health Services Administration, 2013). About six percent of mothers have used marijuana while pregnant, the highest prevalence of any illicit drug (Arria et al., 2006). Poisonings from ingesting marijuana (largely in the form of edibles) have increased among children 12 years and younger since the legalization of medical marijuana use in Colorado (Wang, Roosevelt, & Heard, 2013), a sign that parents may be inadequately supervising their children around marijuana products. However, a small focus group study of parents using medical marijuana in Colorado found that parents believe that marijuana use improves their parenting by allowing them to relax and prevents them from yelling at or hitting their children (Thurstone, Binswanger, Corsi, Rinehart, & Booth, 2013). Although this study does look at parenting in relation to medical marijuana use, the results are preliminary in nature and must be interpreted cautiously as they only include data from eleven parents in five focus groups in one city where the primary questions were not related to parenting.

Marijuana use is known to impair attention span, short term memory, and motor coordination (Fernández-Serrano, Pérez-Garcia, & Verdejo-García, 2011; Vik, Cellucci, Jarchow, & Hedt, 2004). These effects may make it difficult for parents to pick up on cues from their children or respond quickly when children are in danger (U.S. Department of Health & Human Services, 2009) and are consistent with neglectful parenting. In other words, parents who use marijuana when their children are around may not be watching their children closely enough and this could lead to injury or other harm. Similarly, these characteristics (e.g., short attention span and poor memory) may be linked to physical neglect if parents forget to buy or provide food or do not pay attention to the length or severity of a child's illness.

Based upon all we know about drug availability and use, legalization of medical and recreational marijuana should lead to greater access to and use of this substance. At the state level, Pacula, Powell, Heaton, and Sevigny (2013) found that states that allowed marijuana distribution through dispensaries had higher rates of marijuana use. At the local level, California cities with more medical marijuana dispensaries also have more residents who currently use marijuana and, among users, greater frequencies of use (Freisthler & Gruenewald, 2014). Thus greater physical availability of marijuana may make it easier for parents to obtain marijuana for use. In addition, legalization of marijuana for medical or recreational use at the state level has also been associated with increased traffic fatalities (Salomonsen-Sautel, Min, Sakai, Thurstone, & Hopfer, 2014), but lower suicide rates for young men (Anderson, Rees, & Sabia, 2014) and lower rates of opioid overdose mortality (Bachhuber, Saloner, Cunningham, & Barry, 2014), indicating that greater access to marijuana through changing legislation may affect other social problems. We extend this premise by examining how easier access through dispensaries could also be related to greater incidence and prevalence of abusive and neglectful parenting.

In sum, the changing legislation and norms around marijuana use have left child welfare and public health professionals scrambling to determine best practices around issues related to parenting and child abuse and neglect for parents who use marijuana for recreational or medical purposes. Understanding how marijuana use and availability of marijuana may be related to abusive and neglectful parenting is important in order to assess, prevent, and intervene to reduce problems for children. Currently no formal guidelines exist about how child welfare workers should handle cases where marijuana use has been recommended by a physician, resulting in several high profile cases where allegations of abuse or neglect have been based primarily on a parent's access to medical marijuana (Wyatt, 2014). This is further complicated as medical marijuana remains illegal at the federal level. Therefore physicians in California cannot provide a prescription; instead they provide a recommendation for use of marijuana for medical purposes. These recommendations are fairly easy to obtain, with a handful of doctors providing the majority of recommendations (Caplan, 2012). This discrepancy between state and federal law can increase confusion on how to handle cases where parents are found using marijuana or growing marijuana for personal use, despite having a medical recommendation. The results of the current line of inquiry may provide guidance on possible consequences of marijuana use for parenting behaviors.

The current study extends previous research by examining whether and how current marijuana use and the physical availability of marijuana are related to child physical abuse, supervisory neglect, or physical neglect by parents while controlling

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for child, caregiver, and family characteristics in a general population survey in California. We hypothesize that marijuana use by parents will (1) be related to a greater frequency of supervisory neglect; (2) be positively related to physical neglect; and (3) and have no relationship to child physical abuse.

Methods

Study Design and Sample

This study analyzed data from 3,023 parents or legal guardians of children 12 and younger collected during March 2009 through October 2009 via a telephone survey. Respondents were chosen from listed samples for 50 cities in California. The 50 cities were chosen from a randomized list of all 138 cities in California that had populations between 50,000 and 500,000 persons. The first city on the randomized list was chosen for the study. The next city on the list was compared to this city to ensure it did not share a geographic boundary or was at least two cities away from the original city. This process continued until all 50 cities were chosen.

Criteria for study inclusion included (1) at least one child 12 years of age or younger must live in the household; (2) the child lived with the parent or legal guardian at least 50% of the time; (3) the respondent must speak English or Spanish; (4) be age 18 years or older; and (5) must reside in one of the 50 cities chosen for this study. Participants were chosen from listed samples of addresses and telephone numbers of households. The listed telephone numbers were obtained from a sample vendor and is a composite of white page listings and other sources (e.g., Experian records). These telephone numbers are purged against lists of known businesses. Respondents from these listed samples appear to be unbiased relative to random digit dialing procedures (Brick, Waksberg, Kulp, & Starer, 1995; Hembroff, Rusz, Rafferty, McGee, & Ehrlich, 2005; Tucker, Lepkowski, & Piekarski, 2002). Each city had, on average, 60 participants in the survey with a low of 47 participants and a high of 74. As a way to improve the response rate, pre-notification letters that described the study purpose and contained a fact sheet about the study were sent to all individuals from the listed samples. Each working number was contacted at least 10 times at different times of the day, until a hard refusal was obtained or an eligible respondent completed the survey. Two refusal conversions of respondents deemed eligible but who refused to participate in the survey were attempted.

Our analytic sample included fewer non-White Hispanics than in the general population (25.4% compared to 34.6%), fewer Black respondents (3.7% compared to 6.8%) and fewer Asian respondents (7.8% compared to 12.1%). We constructed poststratification survey weights to reflect the race/ethnicity, gender, and household structure of the population living in the 50 cities. The response rate was 47.4%. Human subjects approval was obtained from the institutional review boards at Pacific Institute for Research and Evaluation and University of California, Los Angeles. Respondents gave informed verbal consent prior to commencement of the survey.

Measures

Dependent Variables. All questions relating to physical abuse and neglect were asked about one "focal" child, a child under 13 years old living in the home for the past year. For households with more than one child under 13, the child with the most recent birthday was chosen as the focal child. Child physical abuse was measured using the severe physical assault scale from Conflict Tactics Scale-Parent-Child Version (Straus, Hamby, Finkelhor, Moore, & Runyan, 1998). This scale includes items, such as throwing or knocking a child down, hitting him or her with a fist or kicking or her hard and would likely be substantiated as physical abuse by a child welfare worker. Response categories for the four items were: "Never", "1–5 times" "6–10 times" "More than 10 times". The scale was scored by selecting the midpoint for each category.

Neglect was measured using the Multidimensional Neglectful Behavior Scale (Kantor, Holt, & Straus, 2003). The items were age specific in order to assess the developmental needs of each child related to supervision and monitoring. Six items measure supervisory neglect for parents of children under 5 years of age (e.g., In the past year, how often could you always hear your child when s/he cries and you are out of the room?). Ten items were asked of parents of children between the ages of 5 and 9 years (e.g., In the past year, how often did you NOT know where your child was playing when s/he was outdoors?) and for parents of 10 to 12 year olds (e.g., In the past year, how often have you known where your child was going after school?). Response categories were "Never", "Sometimes", "Often", and "Always." If needed, items were reverse coded, so higher values referred to behaviors that were more likely to denote supervisory neglect. The items were averaged to create a supervisory neglect scale where higher values indicated more neglectful parenting. Internal consistency ranged from .407 to .618.

Physical neglect was also assessed with three items: (1) "In the past year, how often have you not had enough food in the house for the child?" (2) "In the past year, how often has the house been warm enough when it was cold outside?" and (3) "In the past year, how often have you not been able to take your child to the doctor when he/she was really sick?" Items were recoded, when necessary, so that higher values represented more frequent physical neglect. The response categories were the same as supervisory neglect but were averaged across all three variables to represent an index of physical neglect. Higher values on the index indicated more physical neglect. Reliability (measured using Cronbach's alpha) was 0.579.

In order to reduce problems related to social desirability bias, questions related to child physical abuse and neglect were asked using Interactive Voice Response (IVR) technology. This technology uses voice recording to ask questions related to these sensitive items. Respondents entered their responses using the touch tone or keypad on their phone. These responses

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were then encrypted and provided to the research team from the survey research firm. This ensured that neither the survey firm nor the research team had enough information to report parents for abusive or neglectful behaviors.

Independent Variables. Current marijuana use was assessed by a series of two questions. The first asked whether or not the respondent had used marijuana or hashish in their lifetime. For those that answered they had, they were asked how often they had used marijuana or hashish in the past year. Using marijuana at least once in the past year was recoded as current use. These measures were adapted from the National Survey on Drug Use and Health (Substance Abuse & Mental Health Services Administration, 2005).

The physical availability of medical marijuana was assessed through the number of store-front dispensaries and delivery services for a given city in 2012. Lists of dispensaries were obtained through six websites advertising locations of dispensaries or cities where deliveries were available, official city lists, and trade publications. This number of these services was denominated by the number of roadway miles in the city to create a density measure (Freisthler & Gruenewald, 2014). This variable was logged for the analyses.

A variety of child, individual, psychosocial control variables were included in the study. Characteristics of the focal child included in the model include gender and age. Gender, age (18–30 years, 31–45 years, older than 45 years), race/ethnicity (coded as non-Hispanic black, Hispanic, non-Hispanic white, and Asian, other race, or multiracial), marital status (single, divorced, and widowed as one group, married or cohabiting as another), education level (<high school, high school graduate, some college but no degree, and college graduate), employment status, income level (<$60,000; $60,001 to $100,000; and >$100,000), and number of children in the home were included as individual covariates.

Psychosocial characteristics included depressive symptoms, anxiety symptoms, impulsivity, and social support. Depressive and anxiety symptoms were measured using the PRIME-MD (Kroenke, Spitzer, & Williams, 2003; Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007). Depressive symptoms were assessed with two items: (1) having little interest or pleasure in doing things and (2) feeling down depressed or hopeless in the past month. A positive response for either question was coded as having depressive symptoms. Three items assessed anxiety symptoms in respondents: (1) having "nerves," feeling anxious or on edge; (2) worrying about a lot of different things; and (3) having an anxiety attack. As with depression, a positive response to any item was coded as anxiety. Impulsivity was measured using a modified version of the Dickman's Dysfunctional Impulsivity Scale (Dickman, 1990). The scale, which consisted of seven yes/no items, measures the respondent's tendency to act rapidly and inaccurately with little forethought. The number of positive items was summed to create a scale with a minimum of 0 and maximum of 7. Social support was measured using the Interpersonal Support Evaluation List (ISEL) (Cohen, Mermelstein, Kamarck, & Hoberman, 1985). The twelve items asking about different aspects of social support such as having someone who could pick you up if were stranded 10 miles from home or whether or not someone is available to ask about handling family problems. Responses of "Definitely False", "Probably False", Probably True" and "Definitely True" were summed to create an overall total level of social support measure.

Drinking behaviors were recoded to represent lifetime abstainers, ex-drinkers (did not drink in the past year but drank in his or her lifetime), light drinkers (only usually have one or two drinks during each drinking occasion and never drank more than five drinks on any given occasion in the past year), moderate drinkers (drank three to four drinks per occasion, but never more than five drinks), and heavy drinkers (drank five or more drinks at least one in the past year) (Kantor & Straus, 1987; Paschall, Freisthler, & Lipton 2005). These categories were created from questions that asked how often a person drank (from never to daily), the most drinks a person had on a given occasion, and the number of times the respondent drank 1, 2, 3 6, or 9 or more drinks.

Data Analysis Procedures

Data were analyzed using multilevel negative binomial and mixed effects models available in Stata v.13.1. Counts of physical abuse were analyzed using general linear models with a negative binomial link function, city level weights related to demographic characteristics, and adjustments for city level clustering using sandwich estimators. Supervisory and physical neglect scales were treated as Gaussian distributed with city level weights related to demographic characteristics and adjustments for city level clustering using multilevel mixed effects linear models and identity covariance matrices. All results reported here proved robust to re-specifications using alternative robust and random effects models.

Missing data. Missing data on most variables was negligible, less than four percent for most variables in this study. During the transition from live interviewer to interactive voice response about 10% of respondents dropped out of the survey. Multivariate comparisons of those who completed the survey with those who dropped out found the only significant difference was for respondents who were born in the U.S. (vs. foreign born). U.S. born respondents were over two times more likely to complete the survey than non-U.S. born respondents (Kepple, Freisthler, & Johnson-Motoyama, 2014). Cases with missing data were excluded from the analyses.

Results

Table 1 shows the descriptive statistics for categorical variables used in the study. For each variable, we provide the sample size and the weighted percent. The weighted percent provides the descriptive statistics when the survey weights are applied to the sample. About 5% of the sample reported using marijuana in the past year (see Table 1). Table 2 presents the descriptive statistics for the dependent variables and ratio-level independent variables. Higher values refer to higher levels

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Table 1
Sample characteristics of respondents and focal children.

	Weighted %	Sample *n*
Gender (focal child, *n* = 2909)		
Male	50.4	1495
Female	49.6	1414
Gender (respondent, *n* = 3023)		
Male	48.2	1050
Female	51.8	1973
Age groups (respondent, *n* = 3023)		
18–30 years	14.1	404
31–45 years	64.7	2034
46 years and older	21.1	585
Marital status (*n* = 3023)		
Single	23.5	350
Married or cohabiting	76.5	2673
Race/ethnicity (*n* = 3009)		
Non-Hispanic white	49.4	1256
Non-Hispanic black	4.8	111
Hispanic	30.6	733
Asian/multi-racial/other	15.2	412
Education status (*n* = 3021)		
<High school	6.2	150
High school graduate	13.9	387
Some college, no degree	24.2	680
College graduate, includes advanced degrees	55.7	1804
Unemployed (*n* = 3022)		
Yes	8.7	218
No	91.3	2804
Income categories (*n* = 2908)		
≤ $60,000	40.1	989
$60,001–$80,000	27.1	862
$100,001+	32.8	1057
Depressive symptoms (*n* = 2984)		
Yes	19.4	504
No	80.6	2480
Anxiety symptoms (*n* = 3006)		
Yes	47.7	1401
No	52.3	1605
Past year marijuana Use (*n* = 3009)		
Yes	5.1	129
No	94.9	2880
Drinking categories (*n* = 3008)		
Lifetime abstainer	9.2	292
Ex-drinker	19.4	564
Light drinker	41.9	1357
Moderate drinker	18.4	517
Heavy drinker	11.0	278

Table 2
Descriptive statistics for study dependent and ratio-level independent variables.

	Mean	SD	Min	Max
Dependent variables				
Physical abuse frequency (*n* = 2770)	0.33	1.98	0	50.0
Supervisory neglect (*n* = 2865)	1.26	0.32	1	3.75
Physical neglect (*n* = 2855)	1.16	0.44	1	4.0
Independent variables				
Age (years, focal child, *n* = 2914)	6.66	3.61	0	12.0
Number of children (*n* = 3023)	2.25	0.97	1	9.0
Social support (*n* = 2947)	43.55	5.05	16	48
Impulsivity level (*n* = 2975)	0.75	1.31	0	7
Density of medical marijuana dispensaries and delivery services per roadway mile (*n* = 50)	0.02	0.02	0	0.07

on the scales (e.g., impulsivity). In this sample, the parent respondent reports using physical abuse less than one time per year ($\bar{x} = 0.33$) and report higher levels of supervisory neglect ($\bar{x} = 1.26$) compared to physical neglect ($\bar{x} = 1.16$). Table 3 provides the multivariate results for the relationship of marijuana use, physical availability of marijuana and physical abuse, while Table 4 shows these relationships for supervisory neglect and physical neglect.

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Table 3
Multilevel analyses of the association of past year marijuana use, density of medical marijuana dispensaries, and frequency of child physical abuse ($n = 2529$).

	Physical abuse		
	Incident rate ratio	Standard error	*p*-value
Individual-level (Level 1)			
Intercept	1.086	1.367	0.092
Male (focal child)	1.767	0.445	0.024
Age, in years (focal child)	1.106	0.037	0.003
Male	1.126	0.291	0.648
Age (reference: <30 year)			
31–45 years	0.967	0.416	0.938
46 years and older	0.845	0.459	0.757
Married or cohabitating	0.788	0.214	0.379
Race/ethnicity (reference: Asian/other/multirace)			
Non-Hispanic black	1.692	0.753	0.237
Hispanic	0.731	0.266	0.389
Non-Hispanic white	0.580	0.175	0.070
Number of children	1.113	0.191	0.532
Education (reference: <high school)			
High school graduate	0.383	0.274	0.180
Some college, no degree	0.417	0.240	0.128
College graduate	0.776	0.468	0.674
Unemployed	0.962	0.326	0.908
Income (reference: <$60,000)			
$60,001–$100,000	1.184	0.398	0.616
>$100,000	0.742	0.278	0.426
Depressive symptoms	1.342	0.520	0.448
Anxiety symptoms	0.950	0.304	0.873
Impulsivity	1.191	0.082	0.011
Social support	0.966	0.020	0.098
Substance use			
Past year marijuana use	2.911	1.308	0.017
Drinking categories (reference: lifetime abstainer)			
Ex-drinker	2.358	1.037	0.051
Light drinker	2.777	0.924	0.002
Moderate drinker	2.420	0.897	0.013
Heavy drinker	2.499	0.918	0.017
City-level (Level 2)			
Log density of medical marijuana dispensaries (per roadway mile)	1.305	0.175	0.047

Physical Abuse

In the multivariate models shown in Table 3 we report the incident rate ratio (estimated as the number of events observed divided by the time at risk of event), the standard errors and significance level. As shown in Table 3, parents who reported using marijuana in the past year engaged in physical abuse 3 times more frequently than those who did not (IRR = 2.91; 95% CI = 1.21–7.02). Older children and boys experienced physical abuse more often than younger children and girls. Each successively greater year in child age was related to an 11% increase in risks for physical abuse; boys were physically abused 77% times more often than girls. Higher levels of impulsivity were related to more use of physical abuse. Light drinkers, moderate drinkers, and heavy drinkers engaged in physical abuse more often compared to lifetime abstainers. The logged density of medical marijuana dispensaries and delivery services was positively related to use of physical abuse (a 30% increase in physical abuse for each unit increase in the natural log density of medical marijuana dispensaries).

Supervisory Neglect

Current marijuana use was not related to supervisory neglect (see Table 4). Older children experienced supervisory neglect at higher levels. Parents aged 31–45 and 46 and older (compared to those 30 years and younger) and those with lower levels of social support participated in supervisory neglectful practices more frequently. Parents who were non-Hispanic Black and White engaged in supervisory neglect at lower levels than other race/ethnicities. Moderate and heavy drinkers engaged in supervisory neglect less often. Density of medical marijuana dispensaries and delivery services was not related to supervisory neglect.

Physical Neglect

Past year use of marijuana was negatively related to child physical neglect. Older parents committed physical neglect more frequently. White parents (compared to other race/ethnicity) engaged in physical neglect less often. Being a high school graduate, having some college education or being a college graduate (compared to less than high school graduate)

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Table 4
Multilevel analyses of the association of past year marijuana use, density of medical marijuana dispensaries, and supervisory neglect and physical neglect.

	Supervisory neglect ($n = 2615$)			Physical neglect ($n = 2608$)		
	Coefficient	Standard error	*p*-value	Coefficient	Standard error	*p*-value
Individual-level (Level 1)						
Intercept	1.682	0.151	<0.001	1.878	0.163	<0.001
Male (focal child)	0.025	0.019	0.192	−0.024	0.023	0.308
Age, in years (focal child)	0.011	0.002	<0.001	0.006	0.003	0.095
Male	0.037	0.019	0.060	0.012	0.024	0.625
Age (reference: <30 year)						
31–45 years	0.092	0.025	0.001	0.140	0.033	<0.001
46 years and older	1.099	0.530	<0.001	0.140	0.046	0.002
Married or cohabitating	−0.013	0.023	0.588	−0.039	0.037	
Race/ethnicity (reference: Asian/other/multirace)						
Non-Hispanic black	−0.069	0.034	0.047	−0.138	0.072	0.053
Hispanic	0.046	0.034	0.182	0.069	0.042	0.098
Non-Hispanic white	−0.046	0.019	0.017	−0.091	0.028	0.001
Number of children	−0.008	0.011	0.444	0.025	0.012	0.034
Education (reference: <high school)						
High school graduate	−0.053	0.056	0.345	−0.316	0.112	0.005
Some college, no degree	−0.100	0.057	0.084	−0.410	0.102	<0.001
College graduate	−0.085	0.053	0.111	−0.428	0.101	<0.001
Unemployed	−0.011	0.030	0.727	−0.072	0.033	0.028
Income (reference: <$60,000)						
$60,001–$100,000	−0.025	0.020	0.225	−0.051	0.025	0.039
>$100,000	−0.011	0.020	0.567	−0.059	0.026	0.022
Depressive symptoms	0.039	0.027	0.157	0.092	0.040	0.020
Anxiety symptoms	−0.011	0.019	0.546	−0.009	0.022	0.687
Impulsivity	0.015	0.008	0.068	0.019	0.009	0042
Social support	−0.009	0.002	<0.001	−0.008	0.003	0.007
Substance use						
Past Year marijuana use	0.038	0.038	0.328	−0.124	0.046	0.008
Drinking categories (reference: lifetime abstainer)						
Ex-drinker	−0.041	0.044	0.360	−0.074	0.055	0.177
Light drinker	−0.064	0.038	0.097	−0.099	0.045	0.028
Moderate drinker	−0.096	0.048	0.021	−0.130	0.044	0.003
Heavy drinker	−0.101	0.048	0.040	−0.077	0.049	0.116
City-level (Level 2)						
Log density of medical marijuana dispensaries (per roadway mile)	0.007	0.010	0.490	−0.001	0.014	0.924

was related to less frequent use of physical neglect. Income levels of $60,000–$100,000 and greater than $100,000 was related to less physical neglect compared to parents with incomes less than $60,000. Light and moderate drinkers physically neglected their child less often than lifetime abstainers. Having depressive symptoms and impulsivity were positively related to physical neglect and social support was negatively related to physical neglect. Density of medical marijuana dispensaries and delivery services was not related to physical neglect.

Discussion

Our study was designed to examine how marijuana use related to the inability to provide for a child's basic needs (physical neglect), lack of adequate supervision (supervisory neglect), or harsh and punitive parenting (physical abuse). Past year marijuana use was not related to supervisory neglect and negatively related to physical neglect. However, past year marijuana use was related to more frequent engagement in physical abuse by parents. In addition, having greater densities of storefront dispensaries was related to more frequent physical abuse.

Thurstone et al. (2013), using a small focus group, found that some parents report using marijuana to prevent them from hitting their children. The fact that parents may feel the need to use marijuana to reduce risks for aggression may suggest that they have higher aggressive tendencies than those who do not use marijuana. The findings here suggest current marijuana users are engaging in physical abuse more frequently than their counterparts who do not use marijuana, providing some support for this latter idea. As these data are cross-sectional, the causal mechanisms of this relationship remain unknown. Parents who are temperamental and prone to outbursts may use marijuana to relax. Despite the psychological effects of marijuana that include a feeling of calmness, marijuana can also increase anxiety or paranoia (National Institute on Drug Abuse, 2014) which may be what prompts physical abuse. A better understanding of the physiological and biological effects of marijuana related to aggressive behavior is needed in order to assess how changes in marijuana legislation may affect child physical abuse at the population level. The physical availability of medical marijuana through storefront dispensaries and delivery services was related to frequency of physical abuse. Greater availability may enable impulsive purchases and use in more risky contexts (Freisthler & Gruenewald, 2014).

Please cite this article in press as: Freisthler, B., et al. Examining the relationship between marijuana use, medical marijuana dispensaries, and abusive and neglectful parenting. *Child Abuse & Neglect* (2015), http://dx.doi.org/10.1016/j.chiabu.2015.07.008

While marijuana use impairs attention span and short term memory (Fernández-Serrano et al., 2011; National Institute on Drug Abuse, 2014; Vik et al., 2004) and use of medical marijuana has been linked to increased marijuana poisonings (primarily through ingestion of edibles) in Colorado among children under 12 years old (Wang et al., 2013), current marijuana use was not related to inadequate supervision in this study. Parents may be using marijuana when children are not at home or already in bed mitigating risks of supervisory neglect or keeping edibles out of reach of young children. Further, marijuana use by parents may be related to actual harm to children (e.g., poisonings or other unintentional injuries) but measures assessing risk for harm, as used here, may not be sensitive enough to find a statistical relationship.

With regards to physical neglect, current use of marijuana does not appear to occur at the expense of caring for a child's basic needs. In fact, current marijuana users were less likely to engage in physical neglect. As physical neglect outcomes are often entangled with economic factors (e.g., poverty), this study controlled for income, employment, and education. The negative relationship between marijuana use and physical neglect remained even when controlling for these variables. Freisthler and Gruenewald (2014) found that marijuana use occurs more often in higher income populations. Thus low income parents, may be less prone to use marijuana than wealthier parents, resulting in the negative relationship found here.

Limitations

In addition to limitations associated with being a cross-sectional study, several factors may limit generalizability of the study. These include the moderate response rate, the exclusion of major urban cities in California, and use of a telephone survey. Our study reflects a growing trend of lower response rates for telephone surveys. Our reliance on a list-assisted sample of landlines is likely to underestimate abuse and neglect among populations with no landlines (relying exclusively on cell or no telephones) including younger parents, parents of color, and those of lower socio-economic status (Kempf & Remington, 2007). Although we used poststratification weights to partially address this issue, the results should be interpreted with these caveats in mind. Despite procedures designed to reduce social desirability bias, some parents may not disclose abusive or neglectful parenting practices or report these at lower rates than they actually occur. Reliability estimates for the neglect scales were moderate which may affect findings. The questions related to anxiety and depression do not enable us to make any inferences about whether or not these respondents suffer from clinical levels of these mental health problems. The use of scales better aligned with clinical diagnoses would provide a better assessment of these problems. Further, no information was obtained on whether or not parents were using marijuana for specific medical conditions or whether or not they had a medical marijuana recommendation. Parents who use marijuana for severe medical conditions may find that the time needed to manage their illness may detract from their ability to supervise or care for their children. Similarly, being in physical pain may make parents less tolerant and more likely to use physical discipline when a child is acting up. This cross-sectional study cannot determine the causal factors between the physical availability of medical marijuana, marijuana use and child physical abuse but suggest lines of inquiry that would shed additional light on mechanisms at play.

Conclusions

As marijuana use becomes more common due to changing norms and laws allowing for recreational use, legalization may result in higher rates of physical abuse in the general population due to greater physical availability and more current use of marijuana. Legalization or wide-spread commercialization of marijuana may result in less attention being paid to parental marijuana use by child welfare workers. For example, use that does not meet clinical criteria for abuse or dependence may not be viewed by workers as a potential contributor to child abuse or neglect or deemed worthy of intervention. Future research is needed to better understand how child welfare workers calibrate risks associated with medical marijuana use and how this corresponds with other types of licit (e.g., alcohol or prescription drugs) and illicit substance use. As the majority of our marijuana users also report being current alcohol drinkers, the co-use of these substances may place children at greater risk for being abused. This should be further examined in future studies. More work that assesses alternative modes of ingestion (e.g., use of edibles) is necessary as they may have differential risks for engaging in abusive or neglectful parenting behaviors. For example, parents who use edibles might place their children at greater risk for marijuana poisoning if they don't supervise these children adequately when edibles are in the child's reach (Wang et al., 2013). Knowing how a person obtained their marijuana would also provide more information about the availability of marijuana (through dispensaries, delivery services, cultivation, or on the street). This information could help disentangle its relationship with child physical abuse, such that people who obtain marijuana from street-level dealers may be more prone to participate in other illegal activities that promote child abuse or neglect. Studies that assess whether or not a causal relationship exists would allow us to make more definitive statements about the role of marijuana use on abusive and neglectful parenting.

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Please cite this article in press as: Freisthler, B., et al. Examining the relationship between marijuana use, medical marijuana dispensaries, and abusive and neglectful parenting. *Child Abuse & Neglect* (2015), http://dx.doi.org/10.1016/j.chiabu.2015.07.008