Prevalence of Probable Hoarding and Associated Consequences at the Scene of Mississippi Fires, 2009–19

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Background: Increased risk for fire is an often-discussed consequence of hoarding disorder; however, the source of this association has been largely through clinicians’ accounts or hoarding patients’ self-reports. Purpose: The purpose of this study was to investigate the association between probable hoarding and incidence of fires using archival data from Mississippi. Methods: Incidents of residential fires from 2009 to 2019 were provided by the Mississippi State Fire Marshal’s Office. Fires that were classified as having “a significant amount of fire load present” were classified as probable hoarding fires for analysis. Results: Of the 5,194 unique residential fires identified across the study period, 96 fires (1.9% of all residential fires) were classified as potentially linked to hoarding. Compared to fires not classified as probable hoarding fires, probable hoarding fires were more likely to result in injury (8.3% versus 5.2%) or death (4.2% versus 2.1%), but this difference did not reach statistical significance. Conclusion: Our results suggest that the recorded prevalence of probable hoarding at the scene of residential fires in the state of Mississippi is lower than national estimates of the incidence of hoarding. However, more research is needed to determine whether such conditions increase the likelihood of injury or death.

Keywords: hoarding disorder, fire risk, clutter
Hoarding and Fire Risk

**Introduction**

Hoarding disorder is a mental health condition defined by urges to save objects, difficulty discarding current possessions, and excessive clutter levels (American Psychiatric Association, 2013). Approximately 2.1% of the general population is estimated to meet criteria for hoarding disorder (Cath et al., 2017). However, hoarding symptoms are observed related to other conditions (e.g., obsessive-compulsive disorder, schizophrenia; American Psychiatric Association, 2013), suggesting that the overall prevalence of hoarding symptoms is even higher. Hoarding has been linked to cognitive and functional impairment (Ayers et al., 2012; Woody et al., 2014), including deficits with planning and decision making (Woody et al., 2014), problems with interpersonal functioning and emotion regulation (Grisham et al., 2018), and high number of medical comorbidities (Ayers & Dozier, 2015). One in three older adults with hoarding disorder report comorbid major depressive disorder and eight out of ten live alone (Ayers & Dozier, 2015). Hoarding is linked to increased risk of eviction (Rodriguez et al., 2012), most likely due to the presence of excessive clutter that violates fire codes (Kwok et al., 2018).

Increased risk for fire is an often-discussed associated consequence of hoarding disorder; however, the source of this association has been largely through clinicians’ accounts (Kim et al., 2001) or hoarding patients’ self-reports (Ayers & Dozier, 2015). To date, there have been no peer-reviewed articles written about the observed association between hoarding and fire incidence and consequences. The gray literature on hoarding and fire includes two dissertations that examined fires in Melbourne, Australia, from 1999 to 2009 (Szlateniyi et al., 2009) and from 2009 to 2012 (Pappas et al., 2012). Probable hoarding was identified at only 0.25% of residential fires in Melbourne from 1999 to 2009; however, fires with probable hoarding were more severe and required more responders to be present at the scene (Szlateniyi et al., 2009). An increased incidence of hoarding fires was found for 2009–2012 (1% of all residential fires), likely due to increased reporting of hoarding conditions (Pappas et al., 2012). These two estimates of the prevalence of hoarding fires are lower than estimates of hoarding symptoms in the general population. Although the two dissertations conducted in Australia provide initial estimates of the incidence of hoarding as a risk factor for residential fires, there has not yet been an investigation of this association in the United States, and there are currently no peer-reviewed results available in the literature for any geographic location.

**Purpose**

The purpose of the current study was to investigate the association between hoarding and incidence of fires in Mississippi. Because of the novelty of this data, we focused on one state to provide an initial indication of the impact of hoarding on fires. Residents of Mississippi have a relatively high risk of death by fire, with 8.8 deaths per 1,000 residential fires compared with the national average of 6.1 deaths per 1,000 residential fires (National Fire Incident Reporting
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System, 2018). Using Mississippi as a proxy for general conditions in the southern U.S. is the initial step toward understanding the impact of hoarding on fires in the United States.

Methods

Data was provided by the Mississippi State Fire Marshal’s Office. Incidents of Mississippi residential fires from 2009 to 2019 were reviewed. This project was determined not to be human-subjects research by the local Institutional Review Board. All analyses were performed using SAS software, version 9.4 (SAS Institute, Cary, NC). Duplicated incidents were reconciled from the raw data set.

Fire load is a term used by fire departments to indicate the amount of combustible material at the scene of a fire. Thus, a significant amount of fire load at a residential fire would suggest that a large amount of combustible material (i.e., a large amount of clutter) was present in the home. Because excessive clutter is a core symptom of compulsive hoarding, fires were classified as probable hoarding fires for the purposes of the current analysis if the local fire department coded “a significant amount of fire load present” as a suppression factor.

Due to small cell sizes, Fisher’s exact test was used to compare the attributes and consequences of fires with and without probable hoarding present.

Results

From January 2009 until September 2019, 5,194 unique residential fires occurred in Mississippi. Of these fires, 272 (5.2%) had at least one person who was injured, with 112 (2.2%) fires resulting in at least one death. Ninety-six fires (1.9%) were classified as potentially being linked to hoarding.

Probable hoarding fires were not significantly more likely to have at least one individual injured (8.3% versus 5.2%; \( p = 0.16 \)). Similarly, probable hoarding fires were not significantly more likely to have a death (4.2% versus 2.1%; \( p = 0.15 \)).

Discussion

This study represents the first quantitative analysis of the prevalence of hoarding as a risk factor for fire in the United States. Over a 10-year period in Mississippi, 1.9% of residential fires were likely to have occurred in a house with evidence of hoarding. Additionally, the rates of injury and fatality were approximately twice as high at residential fires where a significant amount of fire load was present. However, these associations were not statistically significant in the current study, in part due to the infrequency of fires labeled as having a significant amount of fire load.
and the infrequency of outcomes of interest. As such, this trend should be verified using samples covering a greater area, population, and/or time period. The overall prevalence of hoarding disorder is estimated at 2.1% in the general population (Cath et al., 2017). Additionally, hoarding behaviors can present as a symptom of multiple disorders (American Psychiatric Association, 2013). Therefore, the prevalence of hoarding as a transdiagnostic behavior is likely to be even greater than the prevalence of hoarding disorder. If hoarding disorder increased the risk of fires, the prevalence of fires with excessive load would be expected to be higher than the prevalence of hoarding disorder. However, contrary to expectations, the prevalence of fires with excessive load (1.9%) was lower than the estimated prevalence of hoarding disorder.

There are several plausible explanations for this finding. First, there may be underreporting of excessive load present at residential fires. Across the study period, 361 locations (e.g., city/county fire departments) reported fires and only 60 reported a single incidence that was flagged as having a significant amount of fire load present. Underreporting of hoarding conditions would be consistent with the results found in the Melbourne dissertations (Szlatenyi et al., 2009; Pappas et al., 2012). This is of particular concern in rural areas, where there may be a longer delay between the onset of the fire and the arrival of first responders, which makes observing the conditions of the home more difficult (T. L. Peavy, Mississippi State Fire Marshal’s Office, personal communication, May 8, 2020).

Another explanation may be a discrepancy between the national prevalence estimates of hoarding disorder and the actual prevalence of hoarding in Mississippi. Mississippi is the fifth-most rural state in the United States, with 61.7% of its population living in rural areas and only 1.3% of its population living in urban areas (Housing Assistance Council, 2011). Hoarding may present differently, or at a different rate, in a rural context; however, to our knowledge, there has been no research investigating the presentation and prevalence of hoarding in rural areas that would support or refute this explanation. However, better tracking of hoarding conditions at the scene of residential fires is needed before any firm conclusions can be made about the association of hoarding homes and fire risk.

**Limitations and Recommendations**

There were multiple limitations to this project, including use of “significant fire load” as a proxy for clutter due to compulsive hoarding. Excessive clutter (i.e., “fire load”) could have resulted from a variety of causes, including hoarding as a symptom of other mental disorders or general neglect. Although all of the fires analyzed were classified as “residential,” this does not preclude the possibility that some of the buildings were being used solely for storage. It is also possible that some instances of hoarding conditions were not recorded (e.g., due to burden completing forms). Both positive and negative mechanisms of misclassification are expected to be random and, as such, reduce the power of the statistical tests conducted. Finally, the study did not examine the mechanisms by which excessive clutter impacts fires or fire danger. While excessive
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Clutter is known to often reduce mobility and block methods of egress, hoarding disorder may impact fires in other ways. For example, individuals with hoarding disorder may be more reluctant to leave a home that is on fire due to a desire to try to save their possessions. Further research is needed to determine the possible impact hoarding symptoms other than excessive clutter may have on fire consequences.

This study also had several significant strengths. Administrative data obtained directly from the Mississippi State Fire Marshall’s Office is expected to be complete and covers the entire state. This also ensures that state-level policy changes in recording were consistently enacted across the sample. Using this data set, we also expect high accuracy in identifying fires causing death and/or injury.

With the current lack of quantitative data on the association between hoarding and fire incidence and consequences, this project is an important first step toward understanding the full impact of hoarding as a public health concern. Our results suggest that the recorded prevalence of potential hoarding at the scene of residential fires in the state of Mississippi is lower than national estimates of the incidence of hoarding disorder; however, residential fires with likely hoarding present appear to be more deadly than fires in non-hoarding households. Future research should examine whether implementation of robust public health initiatives to reduce hoarding behaviors could reduce cost, both financial and human, of residential fires.

References


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http://www.ruralhome.org/storage/research_notes/Rural_Research_Note_Rurality_web.pdf


https://www.usfa.fema.gov/data/statistics/states/


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