Characterizing Smokers and Non-Smokers among Opioid-Dependent Treatment Seekers

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INTRODUCTION

- America's opioid epidemic continues to exact a devastating toll on individuals and communities, driving increasing rates of overdose and premature death and imposing an estimated $78.5 billion economic burden (Florence et al., 2016; Gomes et al., 2018; Scholl et al., 2019).

- Opioid users are significantly more likely to smoke than the general population, with 73-76% smoking on average (Guydish et al., 2011; Parker et al., 2020). They also have a significantly lower quit rate (10%) than the general population (48%; Parker et al., 2020).

- Smoking has been related to higher severity of anxiety, increased likelihood of heroin use, more severe pain (de Moura et al., 2019; Yoon et al., 2015), and rural residence status (Coughlin et al., 2019). Smoking severity, as measured by cigarettes per day, is also related to a lower likelihood of quitting smoking, less education achieved (DuNah et al., 1991), and more depressive symptoms (Kenney & Holahan, 2008).

- In the present data, we sought to compare psychiatric severity, drug use, pain severity and other characteristics among opioid-dependent smokers vs. non-smokers.

RESULTS

Smokers vs. Non-Smokers

- Smokers had achieved significantly fewer years of education than non-smokers, $t = 2.38$, $p = 0.02$.
- Smokers were more likely than non-smokers to have ever used IV route in their life $\chi^2 = 4.32$, $p = 0.04$.

Table 1. Baseline Characteristics	Smokers ($n = 72$)	Non-Smokers ($n = 22$)	p-value
CPD	17.7 ± 9.7		
Age, yrs	39.7 ± 11.1	40.5 ± 13.8	$p = .90$
Female, %	39%	59%	$p = .15$
Non-Hispanic white, %	86%	95%	
Education, yrs	**12.2 ± 1.3**	**13.1 ± 1.9**	**$p = .02$**
Employed full time, %	67%	64%	$p = .97$
Rural, %	49%	68%	$p = .17$
IV History, %	**56%**	**27%**	**$p = .04$**
OD History, %	29%	23%	$p = .75$
Beck Anxiety Inventory	9.0 ± 10.2	6.8 ± 7.5	$p = .37$
Beck Depression Inventory	13.6 ± 12.4	15.4 ± 13.4	$p = .57$
Brief Symptom Inventory	0.68 ± 0.69	0.62 ± 0.71	$p = .69$
Pain, %	58%	50%	$p = .71$
Average Pain	5.3 ± 2.0	4.3 ± 1.7	$p = .11$
Worst Pain	7.1 ± 2.2	5.9 ± 2.8	$p = .14$
Pain Relief	43.2 ± 33.6	46.5 ± 31.1	$p = .78$
Narcotic Treatment,%	46%	80%	$p = .58$

METHODS

- Opioid-dependent adults entering a randomized trial evaluating Interim Buprenorphine Treatment
  - Participants were dichotomized into smokers ($n = 72$) and non-smokers ($n = 22$) according to whether they smoked >1 cigarette in the past 30 days at intake. Participants' baseline characteristics at study intake were examined as a function of smoking status.
  - Additional analyses were conducted with the subset of current smokers ($n = 72$) to examine more closely the association between smoking severity (i.e., CPD) and baseline psychiatric, pain and other demographic variables.

- **Measures**
  - The Brief Symptom Inventory is a 53-item likert-type scale ranging from 0 (*not at all*) to 4 (*extremely*); includes 9 subscales measuring symptom dimensions and 3 global indices of psychopathology
    - General Severity Index is a combined measure of symptoms and intensity of distress associated with psychopathology.
    - Positive Symptom Total is a count of total number of symptoms endorsed.
    - Positive Symptom Distress Index measures the symptom intensity, correcting for number of symptoms.
  - The Brief Pain Inventory asks patients to rate the intensity of pain in the past 24-hrs on a scale from 0 (*no pain*) to 10 (*pain as bad as you can imagine*). It also measures percent of pain relief in the past 24-hrs and whether or not the patient receives narcotic treatment for pain.

RESULTS

Within Current Smokers

- There were no significant associations between smokers' CPD and gender, race, education, BAI, BDI, or any of the pain indices (p's > 0.05).
- However, there was a strong relationship between participants' smoking severity and their psychological distress as measured at study intake (Table 2). More specifically, we observed a significant positive association between smokers' CPD and:
  - 8 out of 9 BSI subscales
  - Total General Severity Index (Figure 1)
  - Positive Symptom Total (Figure 2)
  - Positive Symptom Distress (Figure 3)
- Rural smokers reported significantly more cigarettes per day than non-rural smokers, $t = -2.68$, $p = 0.009$.

Table 2. Brief Symptom Inventory	M	r	p-value
Somatization	**0.63 ± 0.72**	**0.40**	**$p < .001$**
Obsession-Compulsion	**0.99 ± 0.99**	**0.28**	**$p = .02$**
Interpersonal Sensitivity	**0.63 ± 0.93**	**0.31**	**$p = .009$**
Depression	**0.74 ± 0.83**	**0.35**	**$p = .003$**
Anxiety	**0.65 ± 0.77**	**0.28**	**$p = .02$**
Hostility	**0.5 ± 0.62**	**0.38**	**$p < .001$**
Phobic Anxiety	0.5 ± 0.75	0.08	$p = .52$
Paranoid Ideation	**0.68 ± 0.81**	**0.33**	**$p = .005$**
Psychoticism	**0.46 ± 0.67**	**0.45**	**$p < .001$**
General Severity Index	**0.67 ± 0.69**	**0.37**	**$p = .001$**
Positive Symptom Total	**19.51 ± 14.99**	**0.27**	**$p = .02$**
Positive Symptom Distress	**1.54 ± 0.61**	**0.38**	**$p = .001$**

Figure 1. General Severity Index

Figure 2. Positive Symptom Total

Figure 3. Positive Symptom Distress Index
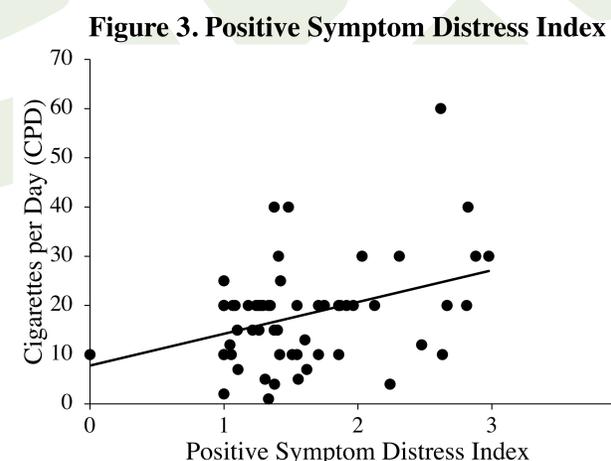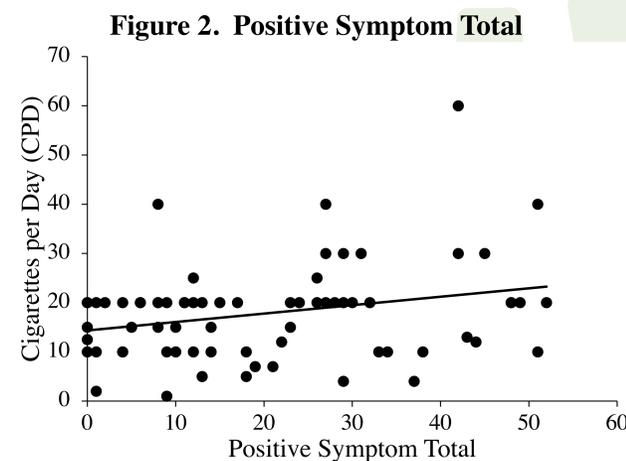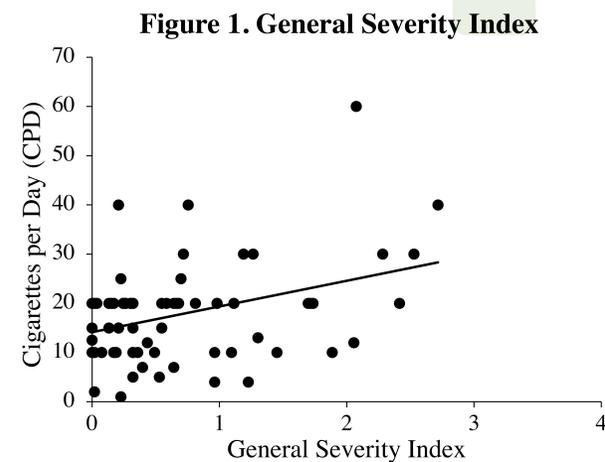
DISCUSSION

- The present analyses examined similar participant characteristics as previous research (e.g., McHugh et al., 2020) and expanded this to include rurality, pain, and general psychiatric severity; variables that may be associated with increased health risk.

- IV history and years of education varied according to smoking status consistent with findings of McHugh et al. (2020) and DuNah et al. (1991). Cigarettes per day (CPD) varied according to rural status, which is similar to findings in smokers without OUD (e.g., Coughlin et al., 2019). These findings indicate there may be sociodemographic characteristics in smokers with OUD that increase risk.

- Pain indices measured in the present sample were not significantly associated with CPD. Sample size may be a limiting factor of the present analyses. Future research should continue to delineate this relationship.

- Finally, higher smoking severity, as evidenced by greater number of cigarettes smoked per day, was positively associated with multiple symptom clusters of psychopathology (e.g., BSI subscales) as well as overall general psychiatric severity. These preliminary findings are consistent with prior reports that general psychopathological distress may interact with other vulnerabilities such as smoking, opioid use, and demographic characteristics to additively increase overall health risk (e.g., Higgins et al., 2015) and warrant further investigation.

SELECTED REFERENCES

- De Moura, F. B., Withey, S. L., & Bergman, J. (2019). Enhancement of opioid antinociception by nicotine. *Journal of Pharm. and Ex.Ther., 371*, 624-632.
- DuNah, R. E., Holly, E. A., & Ahn, D. K. (1991). Demographics and cigarettes smoking among women. *Prev. Med., 20*, 262-270.
- Guydish, J., Passalacqua, E., Tajima, B., Chan, M., Chun, J., & Bostrom, A. (2011). Smoking prevalence in addiction treatment: A review. *NTR, 13*(6), 401-411.
- Higgins, S. T., Kurti, A. N., Redner, R., … & Atwood, G. S. (2015). A literature review on prevalence of gender differences and intersections with other vulnerabilities to tobacco use in the United States, 2004-2014. *Prev. Med., 80*, 89-100.
- Kenney, B. A., & Holahan, C. J. (2008). Depressive symptoms and cigarette smoking in a college sample. *Journal of Am. College Health, 56*(4), 409-414.
- McHugh, R. K., Janes, A. C., … & Weiss, R. D. (2020). Clinical correlates of smoking status in men and women with opioid use disorder. *Substance Use & Misuse, 55*(7), 1054-1058.
- Parker, M. A., Weinberger, A. H., & Villanti, A. C. (2020). Quit ratios for cigarette smoking among individuals with opioid misuse and opioid use disorder in the United States. *Drug and Alcohol Dependence, 214*(1), 1-4.
- Yoon, J. H., Lane, S. D., & Weaver, M. F. (2015). Opioid analgesics and nicotine: More than blowing smoke. *Journal of Pain & Pall. Care Pharm., 29*(3), 281-289.

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