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Original Research

Predictive and protective factors in suicidal behavior among males diagnosed with postural tachycardia syndrome

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Abstract

Background: Postural orthostatic tachycardia syndrome (POTS) is a chronic invisible illness characterized by orthostatic intolerance and increased heart rate upon standing (>30 beats per minute in adults and >40 beats per minute in adolescents). This study seeks to characterize the psychological distress in males who have been diagnosed with POTS. Males are diagnosed at much lower rates than females and are underrepresented in the literature. **Methods**: Forty-one male POTS patients responded to an online survey including the following instruments: acquired capability for suicide—fearlessness about death, beck depression inventory-II, interpersonal needs questionnaire-15, and the suicide behaviors questionnaire-revised. **Results**: In this study, 58.5% of men surveyed scored in high-risk group for suicide on the suicide behaviors questionnaire-revised. In a multiple linear regression analysis, perceived burdensomeness (β = 0.72; p = 0.001), age (β = –0.41; p = 0.001), changes in health due to chronic illness (β = –0.39; p = 0.05) and fearlessness about death (β = 0.35; p = 0.01) explained 50.7% of their suicidal behavior. **Conclusions**: In this small sample of men, perceived burdensomeness was the greatest predictor of suicidal behavior followed by fearlessness about death. Age and changes in health due to chronic illness seem to be protective against suicidal behavior. Therapeutic interventions, both medical and psychological, to decrease perceived burdensomeness could decrease the overall risk of suicide in men with postural orthostatic tachycardia syndrome. Fearlessness about death and increased changes in health due to chronic illness as indicators for suicidal behavior may provide an alternative approach for intervention for some men with postural orthostatic tachycardia syndrome.

Keywords: Postural orthostatic tachycardia syndrome (POTS); Male; Quality of life; Perceived burdensomeness; Fearlessness about death; Suicidal behavior

1. Introduction

Suicide is a prevalent global problem, and studies have shown that there are gender differences in suicidal behavior. In the general population, women are more likely than men to think about, plan, and attempt suicide, but men are more likely to complete suicide [1]. Interestingly, there appears to be a genetic component to suicidality that is largely related to depression in women, but may be attributed to other unknown factors in men [2]. Regardless of gender, unmarried people, those with low education, and teenagers and older adults are all at higher risk for suicidal behavior. In addition, a bimodal distribution in suicidal behavior exists, with teens and older adults both at higher risk [1].

Postural orthostatic tachycardia syndrome (POTS) is a chronic invisible illness characterized by dysfunction of the autonomic nervous system. In people with orthostatic symptoms, one hallmark feature of POTS is the increase in heart rate ≥30 beats per minute (bpm) in adults and ≥40 bpm in adolescents in the absence of postural hypotension [3]. POTS is a heterogenous disorder that affects multiple systems, often making diagnosis difficult. Common symptoms include orthostatic intolerance, lightheadedness, tachycardia, presyncope, fatigue, and difficulty concentrating [4]. Quality of life can be severely affected by POTS symptoms and is comparable to patients with congestive heart failure and chronic obstructive pulmonary disorder [5].

The interpersonal theory of suicide seems particularly applicable to the chronic illness population. This theory posits that two psychological states—perceived burdensomeness and thwarted belongingness—can increase the desire for suicide. Perceived burdensomeness (feeling like a burden on loved ones, and that others might value their death more than their life) and thwarted belongingness (not feeling part of a group) are hypothesized to increase feelings of hopelessness which could lead to suicidal behavior. If that person also has a capability for suicide (they are not afraid to die), then suicide could be attempted [6]. This theory seeks to understand the underlying reasons why people with suicidal thinking often do not make a suicide attempt [7], which may be helpful in preventing future suicide attempts in our chronic illness community.

Like many chronic invisible illness communities, the POTS community is thought to be predominantly female. However, there is a disparity in the literature between data collected via online surveys and those in the clinic. A large online study of >4300 POTS patients found that only 6% of POTS patients are male [4], while two studies of sev-

eral hundred teens and young adults seen in treatment centers reported approximately 20% men [8,9] and a study in China of underlying causes of fainting found 46% of POTS patients were male [10]. The disparity in gender reporting between online surveys and clinical situations is striking. Perhaps men are less likely than women to participate in online surveys, despite their illness.

We are not aware of another study of psychological factors in men diagnosed with POTS and hope to highlight issues specific to men here. Standardized measures were used to begin to understand suicide risk and contributing factors in this understudied population. We hypothesized that items consistent with the interpersonal theory of suicide (perceived burdensomeness, thwarted belongingness, and fearlessness about death) will increase suicidal behavior among men with chronic illness while controlling for age, duration of chronic illness, total diagnoses, and changes in health due to chronic illness.

2. Methods

A cross-sectional study was conducted to understand the psychological wellbeing of people with POTS.

2.1 Procedure

All data were collected electronically via the StandingUptoPOTS.org website between June and November 2019. Participants became aware of the online survey through social media and online POTS support groups composed predominantly of people who speak English as their first language. Participants were prompted to complete the electronically signed informed consent form before beginning the survey, which was both voluntary and anonymous. A debriefing statement was provided at the end of the survey. All participants were given contact information for the National Suicide Prevention Lifeline (phone) and HOPELINE (text).

2.2 Participants

To be included in this study, participants had to be over the age of 18 and report a physician diagnosis of POTS or another chronic invisible illness. The sample collected consisted of 766 participants. 21 participants were removed due to excessive missing data (stopping the survey before completion). Individuals that completed the survey but did not have a chronic illness were removed from the sample. For the purpose of this analysis, we examine data from the 41 males that completed the survey. The study protocol was reviewed and approved by the Wittenberg University Institutional Review Board.

2.3 Variables

The survey included demographic questions on gender, age, years chronically ill, and physician diagnoses of chronic illnesses. Because multiple diagnoses are typical for this population, the respondents were instructed to check "all that apply" to the diagnosis question. Respondent's age, number of years with chronic illness, and total number of diagnoses were measured as continuous variables. Other variables included are fearlessness about death, chronic illness inventory, perceived burdensomeness, and thwarted belongingness. These variables were measured through standardized screening questionnaires and used to predict outcomes on the suicide behavior questionnaire-revised. More information about the sample is available in Table 1.

2.4 Instruments

The following standardized screening questionnaires were used in this study:

2.4.1 Acquired capability for suicide scale–fearlessness about death (ACSS-FAD)

This 7-item self-report scale asks questions about feelings directly related to thinking or talking about death and has four possible responses (score 0–4). Scores are summed to derive a total score ranging from 0–28. Higher scores reflect high fearlessness about death [11]. Items measured as internally consistent (Cronbach's $\alpha = 0.888$).

2.4.2 Chronic illness inventory (CII)

Six of the 21 items from Beck Depression Inventory-II (BDI-II) [12] were used to create a CII. While the BDI-II is a 21-item inventory used to assess depression, several health indicators used in the scale measure common physical changes experienced by those with chronic illness (agitation, concentration, energy, fatigue, irritability, and sleep). These items were chosen from the BDI-II to assess how changes in physical health impact suicidal behavior for those with chronic illness. Each question has four possible responses (scored 0–3). Items were summed and mean scores were calculated. Higher scores on the CII reflect higher levels of physical symptoms. The CII was found to be reliable when tested for internal consistency (Cronbach's $\alpha = 0.779$).

2.4.3 Interpersonal needs questionnaire-15 (INQ-15)

The INQ-15 is a 15 item self-report scale with 6 questions that measure perceived burdensomeness (PB; e.g., "These days, I think I make things worse for the people in my life") and 9 questions to assess Thwarted Belongingness (TB; e.g., "These days, I feel disconnected from other people") [13]. Participants rate each statement on a one- to seven-point Likert scale; higher values indicate increased levels of perceived burdensomeness (range 6–42) and Thwarted Belongingness (range 9–63). Both scales were found to be reliable when tested for internal consistency (INQ-PB Cronbach's $\alpha = 0.949$; INQ-TB Cronbach's $\alpha = 0.850$). In Table 1, participants were separated into groups using cutoffs as determined for chronically ill populations—with high risk indicated by perceived burdensomeness scores $\geq$17 and Thwarted Belongingness scores $\geq$37 [14].

Table 1. Descriptive statistics for continuous variables and the self-report scales (n = 41).

Independent measures	Median	Mean (SD)	Skew
Age (18–75)	36.0	38.1 (13.3)	0.6
Years Ill (1–34)	5.0	9.6 (8.6)	1.1
Total diagnoses (1–6)	2.0	2.3 (1.3)	1.1
ACSS-fearlessness about death (0–28)	16.0	16.2 (7.9)	–0.03
BDI-II-chronic illness inventory (0–3)	1.7	1.7 (0.6)	0.1
	Frequency (%)	Mean (SD)	Skew
INQ-15 thwarted belongingness		20.5 (11.1)	0.1
Normal 6–16	18 (43.9)		
Desire for suicide $\geq$17	23 (56.1)		
INQ-15 thwarted belongingness		36.7 (11.6)	–0.6
Normal 9–36	18 (43.9)		
Desire for suicide $\geq$37	23 (56.1)		
Dependent measure	Frequency (%)	Mean (SD)	Skew
Suicide behaviors questionnaire-revised		8.2 (4.3)	0.2
Low risk $<$7	17 (41.5)		
High risk $\geq$7	24 (58.5)		

ACSS, Acquired Capability for Suicide Scale; BDI-II, Beck Depression Inventory-II; INQ-15, Interpersonal Needs Questionnaire-15.

2.4.4 Suicide behaviors questionnaire-revised (SBQ-R)

This four item self-report questionnaire quantifies suicide risk by assessing lifetime suicidal behavior [15]. The SBQ-R questions are: (1) "Have you ever thought about or attempted to kill yourself?" (six response options); (2) "How often have you thought about killing yourself in the past year?" (five options); (3) "Have you ever told someone that you were going to commit suicide, or that you might do it?" (five options); (4) "How likely is it that you will attempt suicide someday?" (seven options). SBQ-R total scores, ranging from 3–18, were used to classify participants by suicide risk: scores $\geq$7 indicate high suicidal risk, and scores $<$7 indicate low suicidal risk. Items measured as internally consistent (Cronbach's α = 0.834).

2.5 Statistical analyses

The data were analyzed with jamovi 1.6.23 (Sydney, Australia), after excluding female, nonbinary, and transgender participants to ensure only males were included in the sample (n = 41). Scales were constructed and tested for internal consistency. Descriptive statistics of the relative objective (predictors) and subjective (outcome) variables were computed. Bivariate correlations among all the study variables were calculated. A multiple linear regression was performed in which scores were entered as continuous variables. The dependent variable was the respondent's score on the SBQ-R and the independent variables include the instruments and continuous variables noted above. Significance testing was examined at $p < 0.05$. To test for multicollinearity, variance inflation factors (VIF) were calculated.

3. Results

3.1 Demographics

Table 1 shows that the participants' mean age was 38.1 (SD = 13.3), that they had been ill nearly a decade ($\bar{x}$ = 9.6, SD = 8.6) and reported an average of 2.3 diagnoses (SD = 1.3). 38 (92.7%) men had physician diagnosed POTS (Table 2). Comorbid disorders included 8 (19.5%) participants with chronic fatigue syndrome/myalgic encephalomyelitis, 8 (19.5%) with mast cell activation syndrome, 7 (17.1%) with orthostatic hypotension, 6 (14.6%) with Ehlers-Danlos syndrome, 6 (14.6%) with vasovagal syncope, 4 (9.8%) with fibromyalgia, 2 (4.9%) with Sjorgren's syndrome, and 1 (2.4%) with one of the following: lupus, Lyme disease, mitochondrial disease, or ulcerative colitis.

3.2 Self-report scales

All scale scores were normally distributed with participants showing elevation on all measures (Table 1). The median score for participants on the CII was 1.7 ($\bar{x}$ = 1.7, SD = 0.6), and ACSS-fearlessness about death scale was 16.0 ($\bar{x}$ = 16.2, SD = 7.9). In this sample, 56.1 % of participants had elevated INQ-15 PB ($\bar{x}$ = 20.5, SD = 11.1) and TB ($\bar{x}$ = 36.7, SD = 11.6) scores indicating a desire for suicide. Finally, elevated scores were found on the SBQ-R with 58.5% ($\bar{x}$ = 8.2, SD = 4.3) of the sample scoring as high-risk.

3.3 Bivariate correlations between self-report measures

There were statistically significant positive Pearson correlations between total SBQ scores and INQ-15 PB (r = 0.62, $p \leq 0.001$) and INQ-15 TB (r = 0.34, $p \leq 0.03$). INQ-15 PB positively correlated with total diagnosis (r =

Table 2. Frequency and percentages of primary and other diagnoses (n = 41).

Diagnosis	Primary diagnosis	Other diagnoses
	N (%)	N (%)
Addison's disease	—	—
Chiari malformation	—	—
Chronic fatigue syndrome, myalgic encephalomyelitis	3 (7.3)	5 (12.2)
Crohn's disease	—	—
Ehlers-danlos syndrome	1 (2.4)	5 (12.2)
Fibromyalgia	—	4 (9.8)
Lupus	—	1 (2.4)
Lyme disease	—	1 (2.4)
Mast cell activation disorder	1 (2.4)	7 (17.1)
Mitochondrial disease	—	1 (2.4)
Multiple sclerosis	—	—
Orthostatic hypotension	—	7 (17.1)
Postural orthostatic tachycardia syndrome	32 (78.0)	6 (14.6)
Sjogren's syndrome	—	2 (4.9)
Ulcerative colitis	—	1 (2.4)
Vasovagal syncope/neurocardiogenic syncope	—	6 (14.6)
Other	4 (9.8)	6 (14.6)

Primary diagnosis was chosen by the participant as the most prominent health issue. Other diagnoses were considered to be secondary diagnoses by the participant.

Table 3. Bivariate correlations between all variables (n = 41).

Variable	1	2	3	4	5	6	7
1. Age							
2. Years ill	0.43***						
3.Total diagnoses	0.21	0.16					
4. INQ-15 perceived burdensomeness	0.10	0.16	0.31*				
5. INQ-15 thwarted belongingness	0.26	0.29	0.004	0.56***			
6. ACSS-fearlessness about death	0.10	0.04	–0.03	–0.16	–0.27		
7. BDI-II-chronic illness inventory	–0.07	0.14	0.07	0.50***	0.63***	0.03	
8. Suicide behaviors questionnaire-r	–0.21	0.02	0.02	0.62***	0.34*	0.08	0.25

INQ-15, Interpersonal Needs Questionnaire; ACSS, Acquired Capability for Suicide Scale; BDI-II, Beck Depression Inventory-II. *$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$.

Table 4. Multiple linear regression analysis results (n = 41).

	Unstandardized coefficients		95% confidence interval for B		Standardized coefficients		
Predictors	b	SE	Lower	Upper	β	*t*	*p*
Age	–0.13	0.05	–0.70	–0.13	–0.42	–2.99	0.01
Years ill	–0.01	0.06	–0.28	0.24	–0.02	–0.14	0.89
Total diagnosis	–0.29	0.42	–0.34	0.17	–0.09	–0.69	0.5
INQ-15 perceived burdensomeness	0.28	0.06	0.42	1.02	0.72	4.86	<0.001
INQ-15 thwarted belongingness	0.14	0.07	–0.00	0.77	0.38	2.03	0.05
ACSS-fearlessness about death	0.19	0.07	0.09	0.60	0.35	2.75	0.01
BDI-II-chronic illness inventory	–3.00	1.28	–0.73	–0.05	–0.39	–2.35	0.03
Intercept	5.18	2.50				2.07	0.05

INQ-15, Interpersonal Needs Questionnaire-15; ACSS, Acquired Capability for Suicide Scale; BDI-II, Beck Depression Inventory-II.

0.31, $p \leq 0.05$), INQ-15 TB (r = 0.56, $p \leq 0.001$), and CII (r = 0.50, $p \leq 0.001$). CII and INQ-15 TB were positively correlated (r = 0.63, $p \leq 0.001$). Finally, age and years ill were positively correlated (Table 3; r = 0.43, $p \leq 0.005$).

3.4 Regression analysis

A multiple regression was carried out to investigate whether the independent measures (age, years ill, total diagnoses, INQ-15 PB, INQ-15 TB, ACSS-FAD, & CII) significantly predict suicide risk, as measured by the SBQ-R score. The model was a significant predictor of one's SBQ-R score and is presented in Table 4. The Omnibus F test for the suicide risk predictors was significant (F (7, 33) = 6.88, $p = 0.001$). The results of the regression indicated that the model explained 50.7% (Adjusted R^2= 0.507) of the variance in suicide risk score (SBQ-R). Perceived burdensomeness (INQ-15 PB) made the largest unique contribution to explaining suicide risk (β = 0.72, p = 0.001, CI = 0.42–1.02), followed by age (β = –0.42, p = 0.001, CI = –0.70––0.13), Changes in Health Due to Chronic Illness (CII; β = –0.39, p = 0.05, CI = –0.73– –0.05), and Fearlessness of Death (ACSS-FAD; β = 0.35, p = 0.01, CI = 0.09–0.60).

Multicollinearity was assessed using variance inflation factor quotients (VIFs; Table 5). VIFs >10 or <0.2 indicate significant cofounds. As all VIFs were between 1 and 3, we concluded that there were no significant confounders among the predictors [16].

Table 5. Variance inflation factors (VIF).

Predictor	VIF
1. Age	1.57
2. Years Ill	1.30
3. Total diagnoses	1.28
4. INQ-15 perceived burdensomeness	1.79
5. INQ-15 thwarted belongingness	2.92
6. ACSS-fearlessness about death	1.29
7. BDI-II chronic illness inventory	2.23

INQ-15, Interpersonal Needs Questionnaire-15; ACSS, Acquired Capability for Suicide Scale; BDI-II, Beck Depression Inventory-II.

4. Discussion

In this study, 58.5% of men with POTS and comorbid disorders were at high risk for suicide. The greatest indicator of suicidal behavior in these men was perceived burdensomeness, followed by age, changes in health due to chronic illness, and fearlessness about death. Interestingly, some of these factors were predictive of suicidal behavior (perceived burdensomeness and fearlessness about death) while others seemed to be protective (age and changes in health due to chronic illness).

4.1 Predictors of suicidal behavior

Suicide risk is linked to several chronic illnesses [17], and this study adds to the growing research by linking suicide risk to the chronic illness POTS among men. Suicidal behavior in men was most strongly predicted by perceived burdensomeness. Perceived burdensomeness has been identified as a major predictive factor for suicidal behavior in younger men with physical illness [18] and women with POTS [19], and this study substantiates these findings. Perhaps young men, in particular, believe that they are a burden on their loved ones because of their functional limitations [17]. Suicide risk for physically ill people aged 18–34 with significant activity limitations was four times higher than age matched controls [20]. Economic factors may be an important aspect of perceived burdensomeness, particularly in men. A recent study of POTS patients (primarily female) found that only 48% were employed. Moreover, 21% lost their job due to their illness and 70% lost income from reduced hours or missing work [21]. Higher risk of unemployment due to illness is known to increase both perceived burdensomeness and suicidal behavior [22], and may be particularly difficult for men who are traditionally expected to support the family. One study found that increases in missed more work for illness-related issues (cancer, accidents, and digestive and neurological disorders) significantly increased men's suicide risk [23].

Fearlessness about death, understandably, also had a positive relationship with suicide risk in this sample of men with POTS. Living with the pain and increased symptom load common in chronic illness may lead to decreased fear of death [17]. In one study, 66% of chronically ill older adults were afraid of becoming a burden on loved ones or exhausting their saving, while only 9.5% were afraid to die [24]. In contrast, college students with physical disabilities were found to have increased feelings of perceived burdensomeness, but not fearlessness about death, compared with age matched controls [25], so these two are not inextricably linked.

4.2 Protectors against suicidal behavior

Interestingly, increasing age was found to be protective in this sample. As the men got older, their risk of suicide decreased. Trauma patients have shown similar trends, with suicidal behavior decreasing after age 40 [26]. Large demographic studies have found peaks for suicidal behavior in the young and another in the elderly [27] with decreased suicidal behavior in mid-life. Perhaps older adults are better at managing their physical expectations when illness occurs later in life, whereas younger adults expect to perform activities of daily living without assistance and are distressed when this is not possible [20]. Particular attention—both in medical care and psychotherapy—needs to be paid to younger, chronically ill men in order to prevent suicidal behavior in this population.

Similarly, in this small study, the more physical symptoms that people experienced through their chronic illness, the lower their risk of suicide. This supports and adds to recent research findings indicating mental health is a stronger predictor of suicide risk than physical symptoms [28]. Increased symptomology may lead to increased believability that chronic invisible illnesses like POTS are both real and debilitating in these men. Our study demonstrates a divergence from past work that found suicidal behaviors increase with added symptoms and diagnosis [29]. Our findings may better mirror the patient's need for validation of their invisible illnesses after being told it was "all in their head". More research is needed to better understand how people with different types of illnesses react to increased symptom load as far as suicidal behavior.

4.3 Gender, chronic illness, and suicide risk

A growing area of literature surrounding men and chronic illness focuses on masculinity, the culturally shaped beliefs and ideas about what it means to be a man and how men are supposed to act [30]. Beliefs about masculinity and what it means to be "a real man" may negatively affect men with chronic invisible illness and perhaps increase suicidal behavior. Physical strength, autonomy, ability, and invulnerability were found to be common descriptors of masculinity by men with chronic illness [31]. While these are common traits used to describe ideal masculinity in Western cultures, the ability to live up to these standards is impacted by health status. Thus, valuing independence and invulnerability may lead to the greater feelings of burdensomeness that we demonstrated, and therefore increase suicidal behavior.

We found that having a higher sense of fearlessness toward death increased suicidal behavior. It's possible that individuals who value characteristics like bravery and stoicism as a representation of masculinity may score higher on the fearlessness about death scale. Research suggests that mental health issues, including depression, increase when men adhere to rigid masculine norms [32]. Men with chronic illness that hold rigid beliefs about masculinity must renegotiate their understanding of what it means to be a man as they encounter symptoms that reduce their physical strength and autonomy and increase their vulnerability, or they risk decreased mental and/or physical health [28]. Additionally, understanding how individual beliefs about "what it means to be a man" provides a new direction for research and therapeutic interventions on how perceived burdensomeness and fearlessness about death can lead to suicidal behaviors.

Considering how cultural constructions of gender shape attitudes and behaviors around illness provides direction to reduce male barriers to treatment and preventive care. Men endure great pain and delay medical treatment [32], especially when that illness is associated with weakness [31]. For example, studies examining men with breast cancer provide a foundation for understanding how masculinity impacts men's health. Men with breast cancer note negative feelings including feeling "shocked" and "foolish" for having a "women's cancer" [33]. This is partially ascribed to awareness campaigns that have unintentionally stigmatized men by using pink ribbons as well as through post-treatment programs designed to help women "find their femininity" after mastectomy. To counter this, there has been an introduction of gender sensitive targeted approaches, like providing information and resources about breast cancer designed for a male audience in order to reduce barriers for diagnosis and treatment [33]. Similar practices should be considered for men with chronic illnesses like POTS which have a reputation for being a "female" disorder. Practitioners working with men who have chronic illness and are exhibiting suicidal behaviors should consider how a patient's perception about masculinity can impact their experience with illness, their sense of self, and how these beliefs may lead to suicidal behaviors.

4.4 Steps to prevent suicide in chronically ill men

There are additional steps that can be taken to prevent suicide in men with POTS. Chronically ill people tend to be heavy users of medical services. Screening for suicidal behavior in the primary care setting may help identify patients in need of interventions for suicidal behavior [34]. Still, practitioners should act cautiously when using traditional suicide screening tools among men with chronic illness. Screening measures that rely on physical changes in the body as indicators of depression (and/or suicide risk) may be instead measuring symptoms of chronic illness [35].

Further, decreasing perceived burdensomeness, particularly in younger chronically ill men could decrease suicidal behaviors. Small changes within the family structure that allow for autonomy when possible and emphasize a caring attitude when help is required could be beneficial [34]. Psychological support can also be important—while many with POTS do not suffer from clinical depression or anxiety [36], learning to cope with the changing roles related to employment, family, and friends along with the development of new coping skills could be beneficial. Alternate career training that allows for a more sedentary work life might also be beneficial in decreasing feelings of burdensomeness and suicidal behavior.

4.5 Limitations

There are many limitations to this study. Our data may be biased by the fact that we used an online survey to gather data. Because our participants were solicited from online support groups, rather than from clinical samples, they may not be representative of all POTS patients. Many in these support groups may have more debilitating POTS symptoms than the average POTS patient, which may result in an overestimate of the percentage of male POTS patients at high-risk for suicide. Most members of these groups

have English as their first language, but we did not ask country of origin in the survey. Also, most participants reported physician diagnosed POTS, but most also disclosed co-morbid diagnoses that could worsen their symptomology and increase suicidal behavior. We were not able to obtain objective medical testing or direct physician diagnosis, and shared method variance may have inflated the predictor/criterion correlations. Rarely, a participant would complete the study without indicating a physician diagnosed chronic illness. These data were discarded from the study, as were incomplete surveys. Finally, we would caution that because this is a small sample of 41 men, the results of this study may not be generalizable.

4.6 Future research

Further research examining how constructions of masculinity affect the way in which men with chronic illness experience and make sense of the changes in their body and selves, especially for those with illnesses more commonly associated with women like POTS, would provide insight for building male-centered screening tools and treatment. Furthermore, research on the BDI-II is suggested, as we found that scoring higher on the CII decreased suicidal behavior whereas in Beck's model, these items would elevate the depression score. More research is needed to better understand the reliability of depression scales that include changes in the physical body as a measure of depression for those with chronic illness.

5. Conclusions

While our study tested factors related to the interpersonal theory of suicide, the link between our findings and Western notions of masculinity could not be overlooked. For example, we found perceived burdensomeness and fearlessness about death played a significant role in suicide risk within our study population. If men are expected to be invulnerable by modern notions of masculinity, we can anticipate that perceived burdensomeness will have a significant effect on the mental health of chronically ill men that must rely on others for support. To apply these findings, practitioners might consider how communication styles, marketing of services, and access to service can contribute to feeling of burdensomeness for men seeking care and work to remove these barriers. Additionally, men that equate masculinity to stoicism and invulnerability may have an increased sense of fearless about death, believing they should face death without complaint or even attempt to control it. Therefore, providing opportunities to discuss ideas about masculinity as well as allowing space and guidance to help men renegotiate their understanding of what it means to be a chronically ill man is important when providing intervention and treatment for suicidal behavior in this population. More research to understand how perceived burdensomeness and fearlessness about death differs by gender among the chronically ill will provide further insight for understanding differences in suicidal behavior.

Author contributions

CP designed the research study. BW analyzed the data. CP and BW wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

Ethics approval and consent to participate

This project was exempted by the Wittenberg University Institutional Review Board on April 10, 2019. Participants electronically signed the informed consent form before opening the online survey.

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Conflict of interest

The authors declare no conflict of interest.

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