Pain and Self-Injury Ideation in Elderly Men and Women Receiving Home Care

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Abstract

OBJECTIVES—To investigate the associations of self-injury ideation with pain severity, pain control, and their combination in home care elders, and to examine gender differences in the associations.

DESIGN—Secondary data analysis, mixed models repeated-measures design.

SETTING AND PARTICIPANTS—N=16,700 elderly participants in two publicly-funded home care programs in Michigan.

MEASUREMENTS—All participants received in-home assessments at baseline and every three months thereafter using a standardized instrument which included questions about self-injury ideation and pain experience. Assessment data collected over one year following baseline were used.

RESULTS—Participants averaged 77.5 years old. The majority was female (72.2%) and White (81.4%). At baseline 1.4% of the sample—2.1% of men and 1.2% of women—had self-injury ideation. Compared to those without pain, the risk of self-injury ideation in men increased with pain severity (some pain: adjusted OR=1.88, 95% CI=1.12-3.13; severe pain: adjusted OR=2.36, 95% CI=1.29-4.30) and pain control (controlled by medication: adjusted OR=1.81, 95% CI=1.08-3.04; uncontrolled by medication: adjusted OR=3.39, 95% CI=1.45-7.95). Men with severe and uncontrolled pain were at especially high risk (adjusted OR=4.10, 95% CI=1.37-12.28). No measures of pain were significantly associated with self-injury ideation in women. Gender differences in the association of pain severity and self-injury ideation were significant (p<.05).

CONCLUSION—Pain in home care elders should be taken seriously and treated as one means to reduce risk of suicide. Pain assessment should include severity and control of pain. In men, complaints about pain should prompt questioning for self-injury ideation.

Keywords

suicidal behavior; deliberate self-harm; mental health; long-term care; frail elderly

INTRODUCTION

Because older persons have among the highest suicide rates of all age groups in the United States,[1] research to identify risk factors for suicidal behaviors in older adults is greatly needed. Suicidal behaviors range from ideation to actual attempt. In this study, we examine the associations between self-injury ideation and pain experience in older persons receiving home care—a segment of the elderly population who may be at high risk for suicide.[2]

Pain has some unique characteristics—intrusive, attention demanding, interrupting ongoing activities, physically unbearable, and difficult to "escape"— that are likely to invoke feelings of defeat and hopelessness, which in turn may elicit suicidal thoughts.[3,4] Some early studies have reported that chronic pain sufferers were about three times more likely than non-chronic pain sufferers to have suicidal ideation, and that suicide attempt was twice as frequent in pain sufferers than in those who were pain-free.[5] These early studies tended to use small clinical samples and have not controlled for potential confounding variables. A few population-based studies have also reported that pain was a strong correlate of suicidal ideation and suicide attempt, even after controlling for mental disorders such as depression. [6,7,8] But cross-sectional designs and/or measurement issues (e.g., defining pain as a "current" condition and suicidal ideation as "lifetime" or "past-year") limit their findings. Thus far, little relevant research has focused on the elderly population (with a few exceptions[9,10]), despite the prevalence of pain as well as suicide in older people.

Pain is a personal experience that has multiple aspects, one of which is severity. Intuitively, severe or excruciating pain, as compared to less severe pain, should be more likely to trigger suicidal thoughts. However, some studies have reported no association between pain severity and suicidal behavior.[11,12] Another aspect of pain experience is how much it is perceived to be under control. Analgesic medication, for example, when it adequately reduces pain that would otherwise be intolerable, offers an alternative to ending one's life. Reports of pain severity and pain control are likely to be correlated, and their effects on self-injury ideation may depend on each other. A better understanding of how these two aspects of pain are related to suicidal ideation will help to guide development of interventions to prevent suicide in the context of pain.

Some prior studies have implied gender differences in the association between pain and suicidal behavior. For example, Juurlink and colleagues[13] reported that the association between severe pain and suicide was somewhat stronger for men (OR=9.9) than women (OR=3.3). Recently, Sirey et al[9] reported that among older adults receiving home delivered meals, chronic pain was associated with suicidal thoughts in men but not in women. In this study, we use multi-wave longitudinal data collected from a large sample of home care elders to investigate the associations between pain severity, pain control, and their combination with self-injury ideation. We also examine whether the associations differ between men and women.

METHODS

Data Source and Sample

Original data for this secondary data analysis were collected from elderly participants in two publicly funded home and community-based long-term care programs in the State of

Michigan: Medicaid Waiver and Care Management. Both programs aim to support older persons who are eligible for nursing home care to stay in their home by providing supportive services. An income limit (Medicaid eligible) applies to Waiver and an age limit (60 years old or more) to Care Management participants. For care planning purposes, all program participants have to be assessed by case managers (social workers or nurses) at baseline and about every three months thereafter using the same instrument (Minimum Data Set for Home Care, MDS-HC). Assessments are conducted through home visits and based on all sources of information.

For this analysis, we extracted assessment data over one year from baseline of individuals aged 60 or more who enrolled in either the Waiver or Care Management program between 1999 and 2003. Only those who had no severe cognitive impairment at baseline (scored ≤ 3 on the MDS Cognitive Performance Scale)[14] and had been assessed at least two times (so as to estimate lag effects of pain on self-injury ideation) during the 1-year period were selected (N=16,700).

The analyzed sample was significantly different in several sociodemographic and health characteristics from those who were eligible but excluded due to having less than two assessments (n=4837). To assess potential sample selection bias, we repeated our analyses using the baseline data from all eligible participants and found similar patterns of results as those we report below.

Variables and Measures

(1) *Self-injury ideation.* Self-injury ideation was measured by a single item in the MDS-HC asking the participant whether he/she "considered self-injurious behavior in last 30 days," recorded as yes or no.

(2) *Pain severity.* Pain severity was based on two items in the MDS-HC. The first recorded how frequently participants complained about pain, with three response categories: no pain, pain less than daily, and pain daily. If participants reported pain, a follow-up question asked whether the pain was intense, with two response options: yes and no. Adapting an approach used in a prior study,[15] we used these two items to form three levels of pain: no pain, some pain and severe pain.

(3) *Pain control.* Another item in the MDS-HC asked participants whether medication offered control of their pain. Response categories included no pain, pain was partially or fully controlled by medication, and medication offered no control.

(4) *Pain combining severity and control.* In order to examine the combined effect of pain severity and control, we formed a variable that has five mutually exclusive categories. They were: (a) no pain in either severity or control, (b) some pain that was controlled by medication, (c) severe pain that was controlled by medication, (d) some pain that was not controlled by medication, and (e) severe pain that was not controlled by medication.

(5) *Health covariates.* The analysis adjusted for physical disability, cognitive function, disease burden and cancer. Physical disability was indicated by number of limitations in activities of daily living (ADL) and instrumental activities of daily living (IADL). ADL was assessed by eight (e.g., dressing; eating; bathing) and IADL by seven (e.g., preparing meals; managing finances; using the phone) items. Cognitive function was measured by the Minimum Data Set Cognitive Performance Scale (CPS), which has 7 levels ranging from 0 (cognitively intact) to 6 (very severe cognitive impairment).[14] (The analyzed sample all scored 3, representing moderate cognitive impairment, or lower on the CPS at baseline.) We used a dichotomous variable (cognitively intact vs. not intact) to indicate cognitive function. Disease burden was indicated by the total

number of chronic illnesses, among 41, that the participant had. Cancer was represented by a dichotomous variable indicating whether the participant had cancer in the past five years.

(6) *Psychiatric disorders*. Depressive and anxiety disorders, both dichotomously coded, were included as control variables. They were based on a record of current diseases in the MDS-HC which defined disease as one that "doctor has indicated is present and affects client's status, requires treatments, or requires symptom management."

(7) *Sociodemographic covariates*. They included age (in chronological years), race (White vs. Non-White; 98% of non-White were African Americans), education (high school graduated or more vs. less than high school), living arrangements (living alone vs. with others), and gender (female vs. male).

(8) Time and number of assessments. Time (in months) after enrollment and number of assessments in the one-year period were used as covariates to account for changes in self-injury ideation due to the passage of time and the probability of being observed.

Data Analysis

We used repeated-measures mixed models to estimate the lag effects of pain measures on self-injury ideation (i.e., pain was used as a time-varying independent variable predicting self-injury ideation in the following assessment). The models adjusted for time-varying variables (psychiatric disorders, health covariates and time) measured at the same time as pain and sociodemographic characteristics. Since self-injury ideation was a dichotomous outcome, Bernoulli Hierarchical Generalized Linear Models were estimated using the HLM software.[16] A total of 16,700 individuals and 49,200 person-records were included in the analysis.

We first analyzed male and female samples separately, then tested gender differences by including product terms of gender and pain measures in models using the total sample. Most study variables had missing data. The highest percentage missing was ADL limitations (14.9%). If conducting complete case analysis, 33% (n=5511) of the sample would have been lost. Therefore, we undertook multiple imputation using the NORM program.[17] Three imputed datasets were analyzed. The final estimates and standard errors combined results from the three analyses. Significance level was set at p<.05.

RESULTS

Descriptive Information of the Sample and Study Variables

Characteristics of the sample are presented in Table 1. At baseline participants averaged 77.5 years old. The majority was female (72.2%), White (81.4%), below high school educated (52.5%), not married (69%) and living with someone (56.2%). On average, they had 6.6 chronic conditions, and experienced limitations in 3.4 ADL and 5.7 IADL areas. About 43.4% of the sample were cognitively intact, 13.9% had cancer, 34.8% had depression and 19.6% had anxiety disorders.

With regard to pain severity, 25.2% of the sample reported no pain, 46.0% had some and 28.9% had severe pain. For pain control, 25.7% reported no pain, 71.3% said that their pain was controlled by medication and 2.9% said that medication offered no control. As expected, pain severity and control were significantly correlated ($\chi^2(4) = 15418$, p<.001); more severe pain was less likely to be controlled by medication.

Combining the two measures, 26.2% of the sample had no pain, defined as reporting no pain in either severity or control. About 43.7% had some pain that was controlled (by

medication), 27.2% had severe pain that was controlled, 1.4% had some pain that was not controlled, and 1.5% had severe pain that was not controlled. About 1.4% of the sample had self-injury ideation at baseline. Across all person-records, 1.1% (565/49200) was positive in self-injury ideation.

Table 1 also displays sample characteristics by gender. Male and female participants were significantly different in all sociodemographic and health characteristics except race. They also differed in pain experience, with women more likely to report some or severe pain and that medication offered control of their pain. Men (2.1%) were more likely to have self-injury ideation than women (1.2%) at baseline. About 1.7% (225/13269) of person-records in men and 0.9% (340/35931) in women had positive self-injury ideation response.

Effects of Pain Severity on Self-injury Ideation—Using repeated-measures mixed models, we estimated the lag effects of pain severity on self-injury ideation in each gender (Table 2). Among men, pain severity significantly predicted self-injury ideation. Compared to men reporting no pain, the odds of having self-injury ideation in the subsequent assessment increased 88% (adjusted OR=1.88, 95% CI=1.12-3.13) for men having some pain, and more than two times (adjusted OR=2.36, 95% CI=1.29-4.30) for men reporting severe pain. Among the covariates, having depression, anxiety disorders, and being White increased the odds of having self-injury ideation in men; while being cognitively intact, older, and having more assessments during the 1-year period decreased the odds.

In women, the effect of pain severity on self-injury ideation was not statistically significant (some pain vs. no pain: adjusted OR=.96, 95% CI=.65-1.43; severe pain vs. no pain: adjusted OR=1.02, 95% CI=.66-1.58; Table 2). Women with depression were more likely to have self-injury ideation; as were those who were younger, White, and had fewer assessments.

Using the total sample, we found that the product terms of pain severity and gender were significant (some pain X gender: adjusted OR=.52, 95% CI= .27-.99; severe pain X gender: adjusted OR=.45, 95% CI= .22-.90; Table 2), which suggests that the effect of pain severity on self-injury ideation was stronger for men than women.

Effects of Pain Control on Self-injury Ideation

With regard to the effects of pain control (Table 3), we found that in men, those whose pain was controlled by medication were 81% (adjusted OR=1.81, 95% CI=1.08-3.04) more likely than those without pain to have self-injury ideation, and those whose pain was not controlled by medication were 3.4 times (adjusted OR=3.39, 95% CI=1.45-7.95) more likely. In women, pain control did not have significant effects on self-injury ideation. The interaction effects of pain control and gender were not statistically significant at p<.05, although the product term—controlled pain X gender—had a p-value of .07 (adjusted OR=.57, 95% CI=. 30-1.06).

Effects of Combined Pain Measure on Self-Injury Ideation

Using the measure combining pain severity and control, we found that among men, the risk of having self-injury ideation increased progressively with more severe and less controlled pain. Specifically, compared to men with no pain, the odds of self-injury ideation increased 74% (adjusted OR=1.74, 95% CI=1.00-3.03) for men reporting some pain that was controlled by medication; more than doubled (adjusted OR=2.13, 95% CI=1.51-3.93) for men having severe pain that was controlled; almost tripled (adjusted OR=2.85, 95% CI=1.08-7.55) for men who had some pain that medications offered no control; and were 4

times higher (adjusted OR=4.10, 95% CI=1.37-12.28) for men experiencing severe pain that was not controlled.

In women, the combined pain measure had no significant effects on self-injury ideation. The interaction effects of the combined pain measure and gender in the total sample were not statistically significant at p<.05. But the product term—severe and controlled pain X gender —had a p-value of .06 (OR=.50, 95% CI= .24-1.02).

DISCUSSION

This study shows that the risk of self-injury ideation increases with more severe pain, however, pain that is not controlled by medication poses especially high risks. For example, the odds of self-injury ideation for men having severe and controlled pain are two times higher than men with no pain, but men having severe and uncontrolled pain are at four times higher risk. The potency of uncontrolled pain may be related to a sense of helplessness and hopelessness, which have been suggested as mechanisms linking pain and suicide.[5] Only a small percentage (2.9%) of our sample had pain that was not controlled, and a smaller percentage (1.5%) had severe pain that was not controlled. So the highest risk of self-injury ideation would only apply to a very small subset of the elderly population in home care. However, we should note that even when pain is under control and not severe, home care elders having pain are still more likely to have self-injury ideation than those without pain. These findings hold even after accounting for potential confounds of depression and anxiety diagnosis, physical health and functional status.

Men appear to be more likely than women to be at risk for self-injury ideation when experiencing pain. In gender stratified analyses the associations of self-injury ideation with pain severity, pain control, and their combination were all statistically significant in men but not in women. One reason for women's relative 'resilience' may be that women have developed a wide repertoire of coping strategies from pain experience, resulting from menstruation, ovulation, pregnancy and childbirth.[18] Men, on the contrary, may have learned to ignore and tolerate pain—a feature of masculinity. When it comes to the point that the pain is not tolerable or ignorable, men may be less prepared to cope, or their masculinity may be threatened, giving rise to the use of maladaptive strategies such as pain catastrophizing.[11] Another explanation for the gender difference is that men and women may differ in the expression of pain. Men's report of some or severe pain may represent more extreme pain experience relative to women's reports of comparable levels of pain.

Our findings corroborate reports of another study that found suicidal thoughts to be associated with chronic pain in men but not women among older adults receiving home delivered meals.[9] Recent data show that suicide rates increase with age among men, but the rate decreases for older women compared to women of younger ages.[1] To what extent these differential age trends are related to gender differences in pain experience in later life warrants further investigation.

Some limitations of this study should be noted. First, the sample was limited to home care elders who participated in publicly-funded home care programs in Michigan. Caution should be taken when generalizing the findings to other elderly populations. Second, the analysis was based on secondary data collected for care planning purposes. Our key variables of pain severity and control were measured by one or two items—not as precise as one would prefer —and the self-injury ideation item was similarly limited. Although non-suicidal self-injury is far less common among older adults than younger populations,[19] the degree of overlap between self-injury and suicidal ideation in later life is not yet clear. Moreover, the precise relationship between suicidal or self-injury ideation and suicide attempts or completed

suicide is still ill-defined. Therefore, caution should be used in translating these findings to late life suicide prevention. Finally, our sample included elders with cognitive impairment. We had rerun our analyses excluding those with Alzheimer's disease or other types of dementia, and found a similar pattern of results.

A strength of this study is its large sample, which is critical because self-injury ideation or suicidal behavior in general is a rare event at the population level. Further, we utilized longitudinal data, which allowed us to make clear the temporal order of pain and self-injury ideation.

Overall, the findings of this study suggest that any levels of pain in home care elders should be taken seriously and treated as one means to reduce risk of suicide. Prior research has reported that undertreatment of pain is pervasive in older persons[20] and that those who are older, minority, or cognitively impaired are more likely to receive unsatisfactory analgesia. [21,22] While interventions at multiple levels are needed, public policies could play a role in improving pain management.[20] Many of the states' drug prescribing laws, regulations and medical board guidelines have been criticized as outdated.[23] Given the prevalence of pain in older persons (75% of our sample reported having pain) and its association with suicidal behaviors, there is an urgency to develop state policies that support the provision of evidence-based pain management practices.

Of course, pain management is important to the older individual's quality of life as well. When clinicians assess pain, they should address not only severity but also effectiveness of medication in controlling pain. When patients report that medication offers no control, it is important to find alternatives to provide them temporary relief. In men, complaints about pain should prompt questioning for self-injury ideation.

Acknowledgments

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Table 1

Characteristics of Study Participants at Baseline

	Total Sample (N=16,700)	Men (N=4,643)	Women (N=12,057)
Age (in years; mean ± sd)	77.54 ± 8.70	76.51 ± 8.75	77.94 ± 8.65
Race (% White)	81.4	82.1	81.1
Education (% high school or more)	47.5	44.6	48.7
Marital status (% married)	31.0	53.8	22.2
Living arrangements (% living alone)	43.8	30.3	49.0
Program (% Waiver)	51.6	49.0	52.5
No. of ADL limitations (mean ± sd)	3.44 ± 2.62	3.66 ± 2.71	3.35 ± 2.58
No. of IADL limitations (mean ± sd)	5.73 ± 1.27	5.92 ± 1.27	5.66 ± 1.26
Cognitive function (% intact)	43.4	39.0	45.1
Depression (% yes)	34.8	31.6	36.0
Anxiety disorders (% yes)	19.6	14.8	21.4
Cancer (% yes)	13.9	18.8	12.0
No. of chronic diseases (mean ± sd)	6.65 ± 3.15	6.26 ± 3.09	6.80 ± 3.15
Pain severity			
No pain (%)	25.2	33.9	21.9
Some pain (%)	46.0	42.0	47.5
Severe pain (%)	28.9	24.1	30.6
Pain control			
No pain (%)	25.7	34.2	22.5
Controlled by medication (%)	71.3	62.6	74.7
Not controlled by medication (%)	2.9	3.2	2.8
Pain combining severity & control			
No pain (%)	26.2	34.8	23.0
Some pain & controlled (%)	43.7	39.6	45.2
Severe pain & controlled (%)	27.2	22.4	29.0
Some pain & not controlled (%)	1.4	1.6	1.4
Severe pain & not controlled (%)	1.5	1.6	1.5
Self-injury ideation (% yes)	1.4	2.1	1.2

Note. Men and women were significantly different (p<.001) in all characteristics except race

Table 2

Estimates of Pain Severity and Covariates from Repeated-Measures Mixed Models Predicting Self-Injury Ideation

	Men		Women		Total Sample	
	Adjusted Odds Ratio (95% CI)	P-value	Adjusted Odds Ratio (95% CI)	P-value	Adjusted Odds Ratio (95% CI)	P-value
Pain severity (No pain)	1		1		1	
Some pain	1.88 (1.12-3.13)	.017	.96 (.65-1.43)	.85	1.88 (1.13-3.11)	.015
Severe pain	2.36 (1.29-4.30)	.005	1.02 (.66-1.58)	.92	2.34 (1.32-4.16)	.004
No. of ADL limitations	.96 (.87-1.05)	.36	.96 (.89-1.04)	.37	.96 (.91-1.02)	.22
No. of IADL limitations	1.06 (.83-1.34)	.66	1.02 (.88-1.18)	.81	1.03 (.91-1.17)	.64
Cognitive function (Not intact)	1		1		1	
Cognitively Intact	.56 (.34-.95)	.031	.91 (.64-1.30)	.62	.78 (.58-1.04)	.10
Depression (No)	1		1		1	
Yes	3.45 (2.09-5.70)	<.001	4.18 (2.82-6.21)	<.001	3.87 (2.83-5.28)	<.001
Anxiety disorders (No)	1		1		1	
Yes	2.22 (1.33-3.70)	.002	1.07 (.75-1.53)	.72	1.38 (1.02-1.85)	.034
Cancer (No)	1		1		1	
Yes	1.16 (.67-2.00)	.60	.76 (.41-1.41)	.38	.92 (.62-1.37)	.68
No. of chronic diseases	.96 (.89-1.04)	.28	.99 (.93-1.04)	.59	.98 (.93-1.02)	.28
Age	.96 (.94-.99)	.005	.96 (.94-.98)	<.001	.96 (.95-.98)	<.001
Race (Non-White)	1		1		1	
White	3.84 (1.41-10.45)	.009	3.10 (1.49-6.45)	.003	3.30 (1.83-5.96)	<.001
Education (Below high school)	1		1		1	
High school or more	.89 (.58-1.37)	.60	.91 (.65-1.27)	.57	.90 (.69, 1.16)	.41
Living arrangements (w/others)	1		1		1	
Living alone	.93 (.56-1.53)	.77	.98 (.68-1.39)	.89	.95 (.71-1.26)	.71
Time (in months)	.98 (.94-1.03)	.38	.99 (.96-1.03)	.77	.99 (.96-1.02)	.47
No. of assessments	.69 (.58-.84)	<.001	.72 (.62-.82)	<.001	.71 (.63-.79)	<.001
Gender					1.06 (.60-1.86)	.84
Pain severity X Gender						
Some pain X Gender					.52 (.27-.99)	.049

	Men		Women		Total Sample	
	Adjusted Odds Ratio (95% CI)	P-value	Adjusted Odds Ratio (95% CI)	P-value	Adjusted Odds Ratio (95% CI)	P-value
Severe pain X Gender					.45 (.22–.90)	.024

Table 3

Estimates of Pain Control from Repeated-Measures Mixed Models[a] Predicting Self-Injury Ideation

	Men		Women		Total Sample	
	Adjusted Odds Ratio (95% CI)	P-value	Adjusted Odds Ratio (95% CI)	P-value	Adjusted Odds Ratio (95% CI)	P-value
Pain control (No pain)	1		1		1	
Controlled by medication	1.81 (1.08-3.04)	.025	1.01 (.70-1.45)	.97	1.81 (1.09-3.02)	.022
Not controlled by medication	3.39 (1.45-7.95)	.005	1.62 (.75-3.49)	.22	3.23 (1.41-7.44)	.006
Gender					.96 (.54-1.68)	.88
Pain control X Gender						
Controlled X Gender					.57 (.30-1.06)	.07
Not controlled X Gender					.51 (.17-1.58)	.25

[a]The models adjusted health (ADL limitations, IADL limitations, cognitive function, depression, anxiety disorders, cancer, number of chronic diseases) and sociodemographic (age, race, education, living arrangements) characteristics, time and number of assessments. The estimates of the covariates are very similar to those shown in Table 2.