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Domains of Functional Impairment and Their Associations with Thwarted Belonging and Perceived Burden in Older Adults

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Abstract

Objectives—Functional impairment and social disconnection are risk factors for suicide in later life. This paper examines associations between domains of functional impairment and two forms of social disconnection that are empirically linked to suicide in later life—low (or thwarted) belonging and perceived burden on others.

Methods—Participants are 62 older primary care patients (67.68% female, mean age = 72.05) who endorsed feeling lonely or like a burden. Participants completed self-report measures of low belonging and perceived burden (INQ-R) and domains of functional impairment (WHODAS 2.0) at a single time point.

Results—Greater perceived burden was associated with greater impairment in activities of daily living ('self-care,'), while greater thwarted belonging was associated with greater impairment in social functioning, when controlling for depressive symptoms and age. Domains of mobility, cognition, and social participation were not associated with either belonging or perceived burden.

Conclusions—Impairment in self-care (ADLs) and social functioning may be more strongly associated with perceived burden and thwarted belonging than other domains of functional impairment.

Clinical Implications—Considering specific domains of functional impairment—rather than functioning more broadly—may facilitate tailored interventions to target suicide risk.

Keywords

older adults; suicide; disability; functional impairment; social connectedness; perceived burden; belonging; Interpersonal Theory of Suicide

Suicide in later life is a significant public health issue of growing concern as the population of older individuals increases. In the U.S., suicide rates for white men age 85 and older, in particular, are four times higher than the national age-adjusted rate (Centers for Disease Control and Prevention, 2018). Contributors to risk for suicide in later life include physical illnesses, functional impairment, psychiatric illnesses, social disconnection, and access to lethal means (Conwell, Van Orden, & Caine, 2011). Most models of suicide risk posit that risk increases when individuals experience a greater number of risk factors, however, less is

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known about how these risk factors influence each other and potentially compound risk, information that could inform intervention efforts. The purpose of this paper is to examine the nature of the relationship between different domains of functional impairment and two forms of social disconnection that are empirically and theoretically linked to suicide in later life (via The Interpersonal Theory of Suicide)—low (or thwarted) belonging and perceived burden on others (Van Orden et al., 2010).

Functional impairment is a common characteristic of older adults who think about suicide or engage in suicidal behavior (for a review, see Fassberg et al., 2015). Numerous studies have documented associations between functional impairment and increased risk of suicidal ideation (e.g., Batstad & Rudmin, 2015; Fiske, Bamonti, Nadorff, Petts, & Sperry, 2013; Lutz, Morton, Turiano, & Fiske, 2016) and deaths by suicide in later life (e.g., Conwell et al., 2010; Harwood, Hawton, Hope, Harriss, & Jacoby, 2006; Kaplan, McFarland, Huguet, & Newsom, 2007).

Social disconnection is also a common characteristic of older adults who think about suicide or engage in suicidal behavior (for a review, see Fassberg et al., 2012). Numerous studies have documented associations between low social connectedness and increased risk of suicidal ideation (Almeida et al., 2012; Fanning & Pietrzak, 2013; Harrison et al., 2010) and deaths by suicide in later life (Duberstein et al., 2004; Harwood et al., 2006; Tsai, Lucas, & Kawachi, 2015; Tsai, Lucas, Sania, Kim, & Kawachi, 2014; Turvey et al., 2002; Waern, Rubenowitz, & Wilhelmson, 2003).

Given the robust associations between suicide in later life and both functional impairment and social disconnection, understanding how these two risk factors may influence each other could increase understanding of the synergistic effects of risk factors for suicide. Functional decline predicts declines in connectedness in later life (Avlund, Lund, Holstein, & Due, 2004; Perissinotto, Stijacic Cenzer, & Covinsky, 2012; Smith, Dainty, & Macgregor, 2017) through varied mechanisms including increased dependence on others (Fried & Guralnik, 1997), which can impact the nature and quality of relationships as well as limitations in the ability to leave the home or otherwise engage in social interaction (Berg, 1992; Rebok & Jones, 2016). Conversely, disconnectedness also predicts declines in functioning in later life (Everard, Lach, Fisher, & Baum, 2000; McLaughlin et al., 2012; Mendes de Leon, Glass, & Berkman, 2003; Shankar, McMunn, Demakakos, Hamer, & Steptoe, 2016).

One potential pathway whereby functional impairment may increase risk for suicide is by changing the way individuals perceive themselves and their relationships with others—perceptions of social connectedness. The Interpersonal Theory of Suicide (Joiner, 2005; Van Orden et al., 2010) specifies two perceptions about social connectedness that are empirically linked to suicide risk in older adults that may be relevant to this pathway: first, *perceived burden on others* refers to an individual's belief that they are a liability to those around them and that others would be better off if they were gone. Role changes, such as dependency, may increase risk for perceiving oneself to be a burden on others. In line with this hypothesis, several studies have documented associations between greater functional impairment and stronger perceptions that one is a burden on others, including in students and adults with movement disorders (Dempsey, Karver, Labouliere, Zesiewicz, & De Nadai,

2012; Khazem, Jahn, Cukrowicz, & Anestis, 2015, 2017). Stronger perceptions of burden are in turn linked to suicide risk among older adults (Cukrowicz, Cheavens, Van Orden, Ragain, & Cook, 2011).

The second perception specified by the Interpersonal Theory of Suicide, *thwarted (or low) belonging to others*, refers to a perception that one does not belong to meaningful relationships and/or groups that promote a sense of caring and security. Declines in mobility or sensory function that limit social interactions may increase risk for perceiving that one does not belong. In line with this hypothesis, studies have documented associations between greater functional impairment and constructs that are strongly associated with low belonging, including loneliness (Burholt, Windle, Morgan, & team, 2016; Shankar et al., 2016). As described above, social disconnection, including low belonging, is strongly linked to suicide risk in older adults.

Despite strong theoretical and empirical evidence consistent with perceived burden and low belonging as potential mechanisms whereby functional impairment may increase risk for suicide in later life, few studies have directly tested this hypothesis. Dempsey and colleagues (2012) found that greater severity of functional impairment—activities of daily living such as bathing, dressing, and toileting measured with the Groningen Activity Restriction Scale—was associated with higher scores on a measure of perceived burden on others (i.e., a composite of two self-report measures of perceived burden on others including burden on both caregivers and others). Further, in cross sectional analyses, Dempsey and colleagues found that more severe perceptions of burden were associated with greater depression symptom severity via a mediational effect of perceived burden on others; the authors did not test a model with others forms of functional impairment as predictors, belonging or loneliness as mediators, nor suicide ideation as an outcome.

Given that functional impairment has many facets, we reasoned that these different facets could increase suicide risk via different psychological mechanisms. Specifically, some facets of functional impairment may increase risk for perceived burden while others may primarily increase risk for low belonging. Greater clarity regarding associations between types of functional impairment and between both perceived burden and low belonging could inform understanding of how risk factors for suicide in later life interact and compound risk. Thus, the objective of the current study was to examine associations between domains of functional impairment as measured with the World Health Organization Disability Assessment Schedule (WHODAS 2.0) and indices of perceived burden and low belonging as measured by the Interpersonal Needs Questionnaire. The WHODAS assesses six domains of functional impairment— cognition (perceived difficulties with memory and executive functioning), mobility, self-care (i.e., activities of daily living, ADLs), life activities (i.e., instrumental activities of daily living, IADLs), getting along with others (i.e., social functioning), and participation in society (i.e., social participation). Our sample involves primary care patients age 60 and older who endorsed either feeling lonely or like a burden on others in the prior two weeks. These characteristics allow us to test our hypotheses in a sample with greater endorsements on our constructs of interest.

We hypothesized that due to the greater likelihood of need for assistance from others and dependency on others, greater impairments in the domains of ‘self-care’ (ADLs), ‘life activities’ (IADLs), ‘mobility’, and ‘cognition’, would each be associated with greater levels of perceived burden on others, even when adjusting for levels of low belonging, depressive symptoms, and age. We further hypothesized that due to lower levels of social engagement and lower relationship quality, greater impairments in the domains of social functioning (‘getting along with others’) and social participation (‘participation in society’), would each be associated with greater levels of thwarted belonging even when controlling for levels of perceived burden, depressive symptoms, and age. Given that depressive illness often involves negative self-perceptions that may impact perceptions of belonging and perceived burden, it is important to examine associations between domains of functioning and belong/burden over and above the contribution of depressive symptoms; thus, we adjust for depression symptom severity in all models.

Methods

Participants and Procedures

Participants were 62 primary care patients age 60 and over who enrolled in a randomized trial of Engage psychotherapy (versus care-as-usual) to increase social connectedness in older adults (K23MH096936). Data for this study come from in-home baseline assessments, with most measures administered orally to standardize administration across participants. Participants were recruited via informational letters from primary care physicians. Interested individuals called study staff to complete a phone screen for eligibility. Inclusion criteria was endorsement of social disconnectedness, operationalized as loneliness and/or feeling like a burden on others in the prior two weeks. These inclusion criteria were selected to identify a population at risk for suicide according to the Interpersonal Theory of Suicide, which posits these interpersonal factors increase risk for suicide ideation. Exclusion criteria were cognitive impairment that could preclude engagement in the psychotherapy, operationalized as a score of 19 or lower on the Montreal Cognitive Assessment (MoCA; Nasreddine et al., 2005), psychosis in the past month, and active alcohol abuse in the past year (AUDIT score of 5 or more; Bradley et al., 1998). Level of depressive symptoms and antidepressant medication use were not inclusion or exclusion criteria. Participants’ primary care providers were notified when participants enrolled in the study and were provided information on study procedures as well as information regarding mental health symptoms—depressive symptoms, anxiety symptoms, suicide ideation/behavior, alcohol misuse, and cognition. Providers were also given brief recommendations regarding suicide risk, including suggestions for ongoing monitoring as well as information on resources provided by the study, including the development of a list of coping strategies and education on emergency numbers (suicide prevention hotline). This study was approved by the Institutional Review Board of the University of Rochester Medical Center.

Measures

Perceived burden and *thwarted belonging* were assessed using the 15-item Interpersonal Needs Questionnaire (Van Orden, Cukrowicz, Witte, & Joiner, 2012) which was scored using a 3-point Likert scale, from 0 (*not at all true for me*) to 2 (*very true for me*) that was

validated for oral administration (Parkhurst, Conwell, & Van Orden, 2016). Examples of items include “Others would be better off if I were gone,” which assesses perceived burdensomeness and “I feel like I belong,” which assesses thwarted belonging. Scores are derived from the sum of each response, with several items scored in reverse. A higher summed score denotes higher levels of social disconnection—greater perceived burden and lower belonging (i.e., thwarted belonging).

Depression symptom severity was measured using the 16-item Quick Inventory of Depressive Symptoms (QIDS-C; Rush et al., 2003). This semi-structured interview assesses DSM-IV symptoms of a major depressive episode as rated in severity by trained assessors: sleep, sad mood, appetite, concentration, self-outlook, suicidal ideation, involvement, energy, and psychomotor slowing. A higher score denotes increased depression symptom severity, with total scores ranging from 0 to 27.

Functional impairment was assessed using the World Health Organization Disability Assessment Schedule (Ustun et al., 2010), which includes six domains of functioning. The domains of *self-care* and *life activities*, address activities of daily living (ADLs) and instrumental activities of daily living (IADLs) respectively. The mobility domain addresses impairments related to moving around and getting to places. The domains of *getting along with others* and *participation in society* address one’s perceived ability to interact with other people—which reflects social functioning—and the ability to take part in community activities—which reflects social participation. Lastly, *cognition* reflects perceived difficulties with memory and executive functioning. Each domain consists of 4 to 8 items that assess perceived degree of difficulty experienced with a given task in the past 30 days. A 5-point Likert scale is used from “None” to “Extreme or cannot do.” Due to a large portion of participants being retired, the work/school section of the life activities domain (items D5.5 - D5.8) was not included. Further, because a large number of subjects stated that the item on sexual activities within the *getting along with others domain* was not relevant to them, we excluded that item from the subscale total.

Data Analytic Strategy

Data were analyzed in Stata with two linear regression models, the first with belonging as the dependent variable and the second with perceived burden as the outcome variable. Covariates for both models were depression symptom severity and age given their strong associations with functioning. We conducted regression diagnostics in Stata to examine whether our models met assumptions for linear regression: the assumption of homogeneity of variance was met for both models and collinearity was acceptable with a variance inflation factor tolerance threshold of .10. Given that measures were administered orally by assessors highly trained in assessment with older participants, missing data was minimal (i.e., two subjects with missing data on the outcome variables were removed from analyses).

Results

Table 1 presents descriptive statistics to characterize the sample. Participants were 62 adults age 60 and older (68% female, n=42). The average age was 72 (std 9.07), with a range of 60.55 years to 92.75 years. The majority of participants identified as white, while three

identified as black and one identified as multiracial (Native American and white). No participants identified as Hispanic. Participants reported marital status as follows: 19.4% reported being currently married and living with their spouse ($n=12$), 3.2% married but not living with their spouse ($n=2$), 30.6% widowed ($n=19$), 3.2% legally separated ($n=2$), 30.6% divorced ($n=19$), 11.3% single/never married ($n=7$), and 1.6% living with partner/significant other ($n=1$). The average cognition score on the MoCA was 24.84 (std 2.20) with a range of scores from 22 to 30. The average depression symptom severity score on the QIDS was in the mild range (7.90, std 4.79), with scores ranging from no symptoms to very severe symptoms: 23 (37%) scored in the no symptoms range (scores 0–5), 21 (34%) with mild symptoms (scores 6–10), 14 (23%) with moderate symptoms (scores 11–15), 3 (5%) with severe symptoms (scores 16–20), and one participant with very severe symptoms (scores of 21). Participants demonstrated a wide range of functional impairment for all domains.

Table 2 contains full results of the regression model testing our hypotheses regarding thwarted belonging. As hypothesized, when controlling for age, depressive symptoms, and perceived burden, impairments in social functioning (“getting along with others; $\beta = .27$, $p < .05$) were associated with lower levels of belonging (recall that higher scores indicate *thwarted* belonging). Contrary to our hypothesis, thwarted belonging was not significantly associated with social participation (“participation in society”), but was associated with *fewer* IADL impairments ($\beta = -.47$, $p < .01$). Regarding the latter unexpected finding, belonging was not associated with IADL impairments in a univariate, unadjusted model, while collinearity was acceptable in the full model, suggesting that this counterintuitive finding could be due to a moderation/suppressor effect between depressive symptoms and IADL impairments. Given our relatively small sample size and that we did not posit moderation hypotheses a priori, we did not conduct follow-up tests with interactions.

Table 3 contains full results of the regression model testing our hypotheses regarding perceived burden. As hypothesized, when controlling for age, depressive symptoms, and thwarted belonging, impairments in ADLs (‘self-care’) were significantly associated with higher levels of perceived burden on others ($\beta = .35$, $p < .01$). Contrary to our hypothesis, higher levels of perceived burden were not significantly associated with greater severity of IADL impairments (‘life activities’), mobility, nor cognition.

Discussion

This study sought to characterize associations among specific domains of functional impairment and perceived burden and thwarted belonging—indicators of risk for suicide in later life. In support of our hypotheses, greater impairment in ADLs (‘self-care’ domain) was associated with greater perceived burden. Contrary to our hypotheses, greater impairments in IADLs (‘life activities’ domain) were not associated with perceived burden, but were associated with *higher* levels of belonging. Support was found for our hypothesis regarding an association between impairments in social functioning (‘getting along with others’) and thwarted belonging. The current study did not detect significant associations between impairments in the domains of mobility, cognition, and social participation (‘participation in society’) with perceived burden nor thwarted belonging, though these null findings must be interpreted with caution given our relatively small sample size.

Given that self-care impairments center around basic ADLs, such as eating, bathing, and toileting, individuals with impairments in this domain are likely to require a greater level of hands-on care from others (Mlinac & Feng, 2016). The current findings suggest that individuals with these impairments experience stronger feelings of being a burden on others, perhaps due to beliefs that receiving caregiving support equates to caregiver burden. IADL impairments were not associated with perceived burden (when accounting for levels of belonging and depression symptoms), highlighting the importance of specifying the domain of functional impairment present when considering social connectedness—and potentially—suicide risk.

The association between belonging and IADL impairments was not hypothesized and in an unexpected direction. This suggests that the association between IADL impairments and perceptions of social connection is likely complex and may be dependent on depression severity given this association only emerged with depression included in the model. Further research is needed to confirm these findings, as an alternative explanation is that this finding was spurious. One area that we recommend looking towards next is whether cognitive impairment impacts this association, as research has shown that individuals with IADL impairments often have impairments in executive functioning (Boyle, Cohen, Paul, Moser, & Gordon, 2002; Cahn-Weiner et al., 2007; Farias et al., 2013).

The ‘getting along with others’ domain of the WHODAS assesses a wide range of difficulties in social functioning, including meeting new people, making new friends, and maintaining relationships. The association between thwarted belonging and difficulties with social functioning supports our hypothesis that individuals who have difficulties maintaining and forming friendships, as well as interacting with both new and familiar people also feel that their need to belong is unmet. Further research should address the temporal direction of this relationship to determine whether social impairments lead to feelings of thwarted belonging or if feeling like one does not belong results in difficulties getting along with others, as this could inform intervention efforts.

Impairments in the domains of cognition, mobility, and social participation (‘participation in society’) were not associated with perceived burden nor thwarted belonging in the current analyses. In all three of these domains, however, depression symptom severity was a significant predictor for impairment. This is consistent with prior research supporting a link between depression and impairments in cognition and mobility (Hasselbalch, Knorr, & Kessing, 2011; MacIntosh et al., 2017; McIntyre et al., 2013; Penninx, Leveille, Ferrucci, van Eijk, & Guralnik, 1999), as well as reduced social participation (Chiao, Weng, & Botticello, 2011). Additionally, the items that make up the WHODAS mobility domain vary considerably with regards to the difficulty of tasks (e.g., “Standing up from sitting down” vs. “Walking a long distance such as a kilometre [or equivalent]”). Impairments on less difficult tasks may be more indicative of a level of disability requiring significant assistance from others. Future research on the individual items of this domain and their associations with social connectedness constructs would be beneficial to examine whether variability in the level of difficulty of the task has an impact on the association with perceived burden.

The primary limitation of the current study is the cross-sectional design, which limits our ability to understand the direction of the associations and precludes causal inference. Further, this design limited us with regards to analyses: we did not test a mediational model with suicide ideation as the outcome given the inappropriateness of testing mediation with cross-sectional data. An additional limitation is that data on functional impairment were based on self-report. Some individuals may lack insight or be reluctant to disclose functional impairment whereas other individuals may over-estimate the severity of their impairment. The cognition domain may be particularly sensitive to over-reporting or under-reporting of impairment due to a potential lack of insight regarding the status of one's cognition (Edmonds et al., 2014; Roberts, Clare, & Woods, 2009). Future studies may benefit from multi-method assessments of functional impairment that supplement self-report with caregiver/provider ratings and/or performance assessments (e.g., walking speed, strength). Another limitation concerns our modest sample size of 62 older adults, which suggests the absence of significant associations in some domains of function could be due to insufficient statistical power; thus, the domains for which we did not find associations with belonging and/or perceived burden are best interpreted as inconclusive until examined in larger datasets. Finally, this modest sample size also limited our ability to test interaction effects with depressive symptoms; thus, our findings cannot be generalized beyond the presentation of mild depressive symptoms (i.e., the average depressive severity in our sample).

Despite these limitations, our findings provide a more nuanced characterization of the association between functional impairment and both low belonging and perceived burden by examining multiple domains of functioning. With the knowledge of which areas of impairment are associated with belonging and perceived burden, we may be able to tailor interventions to best impact suicide risk factors. Occupational therapy to address self-care, transportation assistance to increase mobility, and interventions that build on social skills to improve getting along with others are all potential components to consider during the development of interventions to reduce suicide risk in older adults with functional impairment. We look forward to future longitudinal studies to continue this line of work that could address whether the constructs of social connectedness measured in the current study fluctuate over time to better inform the development of interventions targeting social connectedness in individuals with functional impairment. Given the impact that interpersonal factors have on suicide risk, this study suggests a novel way of looking at functional impairment to address a public health issue of considerable importance.

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Clinical Implications

- Functional impairment and social disconnection are key risk factors for suicide in later life.
- Impairment in activities of daily living (ADLs) and social functioning may be more strongly associated with perceived burden and thwarted belonging than other domains of functional impairment.
- Considering specific domains of functional impairment—rather than functioning more broadly—may allow tailoring of interventions to target suicide risk factors.
- Interventions for functional impairment could prioritize domains linked to social disconnection to simultaneously improve two risk factors for suicide.

Table 1:

Participant characteristics.

	N(%) or Mean (std)
Age	72 (std 9.07)
Female	42 (68%)
Race	57 white (92%)
	3 black
	1 Native American
	1 refuse to answer
Lives alone	43 (69.0)
Married	12 (19%)
Cognition (MoCA)	24.84 (2.20)
Depressive symptoms (QIDS)	7.90 (4.79)
(thwarted) Belonging	6.23 (3.87)
Perceived burden	1.25 (1.98)
WHODAS cognition	4.82 (3.86)
WHODAS mobility	5.98 (5.44)
WHODAS ADLs (self-care)	1.19 (1.92)
WHODAS IADLs (life activities)	5.03 (4.55)
WHODAS social function (getting along)	2.74 (2.70)
WHODAS social participation	10.42 (6.21)

Notes: All scores indicate more symptoms or worse functioning (except MoCA scores).

Table 2:

Linear regression with thwarted belonging as the dependent variable

Predictors	<i>b</i>	std err	<i>t</i>	<i>p</i>	Beta
Age	−0.047	0.045	−1.04	0.303	−0.113
Depressive symptoms	0.272	0.103	2.65	0.011	0.324
Perceived burden	0.579	0.240	2.41	0.020	0.304
Cognition	−0.042	0.127	−0.34	0.738	−0.043
Mobility	0.008	0.106	0.08	0.937	0.012
ADLs (self-care)	−0.075	0.245	−0.31	0.759	−0.038
IADLs (life activities)	−0.411	0.136	−3.01	0.004	−0.469
Social function (getting along)	0.386	0.159	2.42	0.019	0.274
Social participation	0.181	0.092	1.96	0.055	0.288

Note: Model $F(9, 50) = 5.69$, $p < 0.001$

Table 3:

Linear regression with perceived burden as the dependent variable

Predictors	<i>b</i>	std err	<i>t</i>	<i>p</i>	Beta
Age	0.020	0.025	0.80	0.425	0.093
Depressive symptoms	0.024	0.061	0.40	0.690	0.055
Thwarted belonging	0.180	0.075	2.41	0.020	0.343
Cognition	−0.080	0.070	−1.14	0.261	−0.153
Mobility	−0.112	0.057	−1.96	0.056	−0.295
ADLs (self-care)	0.363	0.127	2.87	0.006	0.349
IADLs (life activities)	0.145	0.080	1.80	0.078	0.314
Social function (getting along)	0.082	0.093	0.87	0.386	0.110
Social participation	0.038	0.053	0.72	0.475	0.116

Note: Model $F(9, 50) = 4.40, p < 0.001$