Published in final edited form as:

Community Ment Health J. 2020 January ; 56(1): 186–192. doi:10.1007/s10597-019-00483-9.

Associations between the NIH Toolbox Adult Social Relationship Scales and Suicidal Ideation

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Abstract

Various measures of social support have been associated with suicidal ideation (SI). However, a brief, consistent, multidimensional approach to social support assessment has not been established. We assessed the NIH Toolbox Adult Social Relationship (ASR) scales and their associations with the Beck Scale for Suicidal Ideation (BSI). Five ASR scales (emotional support, instrumental support, friendship, loneliness, perceived rejection) were used to predict BSI scores among psychiatric inpatients at baseline (N=79) and at 3-months follow-up (N=63). Mean BSI scores were 22.2 (SD 8.6) at baseline and 5.7 (SD 6.7) at follow-up. The ASR scales had high internal consistency (Cronbach's $\alpha = 0.93 - 0.96$). Emotional support was associated with SI at baseline and 3-month follow-up. Instrumental support, loneliness and perceived rejection were associated with SI at baseline. Friendship was not associated with SI at either time-point. The ASR scales appear promising in differentiating aspects of social support most relevant to SI.

Keywords

suicide; social support; peer support; measurement

Introduction

While social support has broadly been associated with suicidal ideation (SI) across numerous studies and in meta-analysis, some specific aspects of social support may be more important for suicide risk and prevention than others (Chang, 2017; Kleiman, 2013).

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Conflict of interest: All authors report no conflicts of interest.

Compliance with Ethical Standards

The authors of this manuscript certify that they have no potential conflicts of interest. This study involved a secondary analysis of data from a randomized control trial of a peer support intervention that involved human subjects; informed consent was obtained for all participants. Both this study and the parent study were approved by the institutional review boards associated with the University of Michigan and the Henry Ford Health System's Kingswood Hospital and were conducted in accordance with the guidelines of those bodies.

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Establishing the relative impact of various social support constructs on suicidal ideation is challenged by differences in measurement. Although some measures of social support such as the UCLA Loneliness Scale (Russell, 1978) assess a single construct, others assess differing sets of constructs. The latter approach is borne out by prior factor analyses of social support constructs, which suggest that social support can be viewed as a single second-order factor that is comprised of various first-order subdomains (Brookings, 1988). Examples of these measures include the Interpersonal Support Evaluation List, which assesses tangible support, appraisal support, belonging, and self-esteem, and the Medical Outcomes Study Social Support instrument, which assesses positive social interactions and support that is emotional/informational, tangible, and affectionate (Cohen, 1985; Sherbourne, 1991). In order to provide researchers with a common set of brief unidimensional social support measures, Cyranowski et al. used exploratory factor analysis and item response theory to develop the National Institutes of Health Adult Social Relationship (ASR) Scales, which were subsequently validated (Cyranowski, 2013). The six ASR scales assess emotional support, instrumental support, friendship, loneliness, perceived rejection, and perceived hostility.

Prior studies have compared multiple social support subdomains in the same sample. A systematic review of social support among older adults (Fässberg, 2012) suggests subdomains related to emotional support, friendship, loneliness, and rejection are associated with suicidal ideation or attempts whereas instrumental support is not. However, studies involving non-elderly adults have shown instrumental support to also be associated with suicide-related outcomes (Bryan, 2013; Hirsch, 2011; Otsuka, 2019; Park, 2010; Robins, 2009; Vilhjálmsón, 1998). However, only one other study previously used the NIH ASR Scales, finding that loneliness (but not emotional support or perceived hostility) was associated with suicidal ideation in U.S. Veterans with depression receiving primary care (Teo, 2018).

In the current study, we sought to determine whether the social support constructs measured by the ASR scales differ in their relationship to suicidal ideation among individuals who had been psychiatrically hospitalized due to risk for suicide. In order to determine whether scale associations with SI differed by severity of SI within the sample, we conducted the assessments during the baseline period of heightened SI and at 3-months follow-up. We additionally sought to determine whether any of the ASR scales, which were not designed specifically to explain suicide risk, were predictive of suicidal ideation after controlling for two additional constructs, thwarted belongingness and perceived burdensomeness, which are derived from Joiner's Interpersonal Theory of Suicide (Van Orden, 2009) and have been associated with suicidal ideation when measured using the interpersonal needs questionnaire (INQ) (Chu, 2017). Findings from this study will establish the potential for the ASR social support scales and their represented constructs to explain variation in suicidal ideation.

Methods

This study involved secondary analysis of data obtained from participants in a pilot randomized controlled trial of a peer support intervention. Patients admitted to either of two participating inpatient psychiatric units (University of Michigan, Henry Ford Health

System's Kingswood Hospital) were recruited by research staff who screened the medical records of all new admissions. Patients were included if they had medical record documentation of suicidal ideation or a suicide attempt at the time of admission, and all but 3 participants had a Beck Suicide Scale score of 5 or more indicating ongoing suicidal ideation at the time of baseline assessment. Patients were excluded if, in their inpatient psychiatrist's assessment, they were too impaired by psychosis, a cognitive disorder, or severe personality disorder to have a productive peer support relationship. Patients with acute psychosis could be approached later in their admission if their condition improved to the point they could participate. Consenting patients completed the baseline survey assessments while on the inpatient unit and completed a 3-month survey assessment at a location of their choosing. Participant psychiatric diagnoses were those listed in the medical record at discharge.

The baseline and 3-month surveys included 5 of the 6 NIH Adult Social Relationship (ASR) scales: emotional support, instrumental support, friendship, loneliness, and perceived rejection. The scale for perceived hostility was excluded to limit the total number of survey items and because perceived hostility was not likely to be influenced by the study intervention. The ASR scales each have 8 items except the loneliness scale, which has 5. Each item uses a 5-point response scale from "never" to "always" to assess the frequency of social support experiences. The measures show concurrent validity with previously established measures of social relationships (Cyranowski, 2013). Each ASR scale score was converted to a T-score, where 50 represents the T-score mean in the general population and the standard deviation is 10. Thwarted belongingness (TB) and perceived burdensomeness (PB), key constructs of the Interpersonal Theory of Suicide, were also assessed according to the 9-item subscales of the 18-item version of the Interpersonal Needs Questionnaire (INQ). Various versions of the subscale have demonstrated an association between the construct and suicide risk (Chu, 2017). The primary outcome of SI was measured according to the well-validated Beck Scale for Suicidal Ideation (Beck, 1979).

We characterized each of the social support measures by determining the mean and standard deviation for each measure and the correlation coefficients between each of the measures. We assessed the relationship between ASR scale scores and SI at baseline and at 3 months using linear regression, adjusting for patient age and gender. We similarly assessed whether baseline ASR scales scores predicted SI at 3 months. We subsequently added TB and PB as covariates to each of the regression models to determine whether any of the ASR scales remained significant predictors of SI at baseline or 3 months. To assess for multicollinearity between each ASR scales and TB or PB, we calculated variance inflation factors (VIFs). Missing data was handled using pairwise deletion for bivariate analyses and listwise deletion without imputation for multivariate analyses. We used an alpha of .05 for all statistical tests. Data were analyzed using SAS version 9.4 (SAS Institute, Inc.).

This study was approved by the institutional review boards associated with the University of Michigan and the Henry Ford Health System's Kingswood Hospital.

Results

The baseline study population (n=79) was 53.2% female, 79.8% white, 12.7% black, 5.1% Hispanic, 2.5% other race/ethnicity, and had a mean age of 34.4 (SD=14.4) (Table 1). The most common mental health diagnoses among the study population were unipolar depressive disorders (59.0%), bipolar disorders (10.3%), personality disorders (10.3%), substance use disorders (7.7%), anxiety disorders (3.9%) and psychotic disorders (3.9%). 76.9% of participants had a lifetime history of a suicide attempt. Follow-up measures of suicidal ideation were completed by 80% (n=63) of participants, and there were no statistically significant sociodemographic differences between follow-up completers and non-completers. The participants' mean baseline and 3-month follow-up scores were respectively 22.2 (SD=8.6) and 5.7 (SD 6.7) for the Beck Scale for Suicidal Ideation, 38.8 (SD=11.7) and 40.0 (SD=11.2) for emotional support, 42.7 (SD=9.9) and 43.2 (SD=10.3) for instrumental support, 38.5 (SD=11.4) and 40.5 (SD=12.3) for friendship, 70.4 (SD=9.4) and 66.0 (SD=11.5) for loneliness, 63.7 (SD=11.5) and 59.8 (SD=12.1) for perceived rejection, 37.9 (SD=12.5) and 33.9 (SD=13.4) for thwarted belongingness, and 34.8 (SD=13.4) and 28.3 (SD= 13.5) for perceived burdensomeness. Correlations between measures at baseline (ignoring sign) ranged from 0.27 (perceived burdensomeness and instrumental support) to 0.81 (loneliness and thwarted belongingness (see correlation matrix in Table 2). Correlations between baseline and 3-month administrations of the social support measures were 0.61 for emotional support, 0.66 for instrumental support, 0.70 for friendship, 0.50 for loneliness, 0.42 for perceived rejection, 0.33 for perceived burdensomeness, and 0.34 for thwarted belongingness (Table 2). The Cronbach's alphas of the ASR measures in our sample were between 0.93 and 0.96, for thwarted belongingness alpha was 0.89, and for perceived burdensomeness it was 0.90.

In separate regression models of each social support measure adjusted for age and gender (Table 3) emotional support was significantly associated with SI at baseline ($b = -0.21$; $p = 0.01$) and at 3-month follow-up ($b = -0.17$; $p = 0.03$) as was perceived burdensomeness (*baseline*: $b = 0.24$; $p = 0.002$; *3-months*: $b = 0.23$; $p < 0.001$). Several measures were significantly associated with SI at baseline only: instrumental support (*baseline*: $b = -0.27$; $p = 0.006$; *3-months*: $b = -0.06$; $p = 0.46$), loneliness (*baseline*: $b = 0.24$; $p = 0.02$; *3-months*: $b = 0.13$; $p = 0.09$) and perceived rejection (*baseline*: $b = 0.18$; $p = 0.04$; *3-months*: $b = 0.06$; $p = 0.37$). Thwarted belongingness was only significant at 3-month follow-up (*baseline*: $b = 0.15$; $p = 0.07$; *3-months*: $b = 0.14$; $p = 0.02$). Friendship was not related to SI at either time point (*baseline*: -0.10 ; $p = 0.27$; *3-months*: $b = -0.05$; $p = 0.48$).

None of the baseline social relationship measures predicted SI at 3 months. In models of each of the ASR scales adjusted for thwarted belongingness and perceived burdensomeness (as well as age and gender) baseline instrumental support (but not instrumental support at 3-month follow-up) was the only ASR scale that remained significantly associated with SI ($b = -0.25$; $p = .02$). Perceived burdensomeness was significantly associated with SI at baseline in each of the models that included ASR scales as covariates. Thwarted belongingness was not associated with SI in any of the models that included ASR scales as covariates. VIFs for the social support measures ranged from 1.19 to 3.67.

Discussion

Our findings suggest that several of the NIH adult social relationship (ASR) constructs may have important relationships with suicidal ideation (SI) that should be further explored. To the best of our knowledge, this is the first longitudinal study of social support and SI to employ the ASR scales.

Instrumental Support

The ASR scale for instrumental support was associated with SI at baseline, a relationship that remained significant when controlling for perceived burdensomeness and thwarted belongingness. This suggests that perceived tangible support is independently related to SI in a manner not captured by Joiner's Interpersonal Theory of Suicide (IPTS; Van Orden, 2010). Thus, in addition to the isolating effect of knowing there is nobody to provide a ride to a doctor's office or the grocery store if needed, the concern that those material needs themselves will go unmet appears to also contribute to suicidal ideation.

The fact that instrumental support was not associated with suicidal ideation at follow-up suggests the relationship may be greater in the context of an acute suicidal crisis and hospital setting where patients could experience decreased self-efficacy (Shafer, 2016). However, other studies have shown instrumental support to be associated with suicidal ideation, suicide attempts, and suicide deaths in non-acute populations (Bryan, 2013; Hirsch, 2011; Otsuka, 2019; Robins, 2009; Vilhjálmsón, 1998). In contrast to studies showing positive associations among college students and predominantly male military populations (Bryan 2013; Hirsh 2011; Robins, 2009), Park et al. found an association between low instrumental support and SI in middle-aged women, but not in younger women or in men (Park, 2010). A systematic review (Fässberg, 2012) found that instrumental support was not associated with suicidal ideation in older adults; however, this analysis did not include a large study that subsequently found a strong relationship in middle-aged and older adults (Otsuka, 2019). The difference in findings across studies may be due to other aspects of the populations, such as their socioeconomic status, or variations in measurement of instrumental support. For example, the Interpersonal Support Evaluation List used in both the Bryan and Robins studies asks about the availability of financial help from others, while other measures (including the ASR scale for instrumental support) do not.

Given our findings and the breadth of studies which have found relationships between instrumental support and SI, services that address the material needs of patients immediately following a suicidal crisis should be explored.

Loneliness and Perceived Rejection

Our finding that the ASR scales for loneliness and perceived rejection were associated with SI at baseline is in line with Joiner's IPTS, which postulates that feelings of isolation and rejection are drivers of SI (Van Orden, 2010). Neither relationship was significant after controlling for the perceived burdensomeness (PB) and thwarted belongingness (TB) subscales of the Interpersonal Needs Questionnaire—which was designed to test the IPTS—indicating significant overlap among these concepts.

The link between loneliness and SI is well-documented in other studies. Teo et al. (2018) found that the ASR scale for loneliness predicted SI among U.S. Veterans receiving primary care. Other studies, many using the UCLA Loneliness Scale, have also found associations between loneliness and SI (for examples see Lamis, 2014 and Yang, 1994). There are few studies that look explicitly at the relationship between SI and perceived rejection (measured separately from related concepts such as loneliness or TB). One study found a positive association between perceived peer rejection and SI among adolescent psychiatric inpatients (Prinstein, 2000) while another study found an association between perceived family rejection and SI among cisgender Thai adolescents but not among their transgender peers (Yadegarfar, 2014). Given the consistency with which loneliness, perceived rejection, and related constructs of TB and PB have been associated with suicide risk, interventions that address these vulnerabilities represent promising opportunities for suicide prevention.

Friendship and Emotional Support

Our finding that emotional support was a significant predictor of SI while friendship was not suggests that for individuals at risk for suicide, having companions for leisure activities (as typified by the ASR scale items) is not alone a sufficient source of support—unless those friends will also listen to their problems and provide advice. Conversely, for people at high risk for suicide that do not have friends, focusing on identifying other sources of emotional support may be a higher priority than encouraging recreational socialization.

Our findings are consistent with a study by Bell et al. (2017) which found that perceived level of family support, but not support from friends or significant others, predicted a history of suicide attempts in U.S. military veterans with a history of depression. In contrast, Marver et al. (2017) found that friendship quality and frequency of contacts with friends predicted suicide attempts in adults experiencing a major depressive episode. Demographic characteristics of the study population might influence the strength of the relationship. A large population study found that increased participation in ‘friendship networks and hobby groups[s]’ was protective against SI particularly among middle-aged men, though not in younger men, elderly men or in women (Ra et al. 2013).

Prior studies have similarly found emotional support to be significantly related to SI, including in studies of college students (Hirsch, 2011) and Black American adults (Lincoln, 2012). Park et al. (2010) found that middle-aged men with limited emotional support were more likely to have SI, though this was not true for women or younger men. Null studies also exist; one study using a subset of the ASR scales found no association between emotional support and SI in veterans with depression receiving primary care (Teo, 2018). Ullman (2009) also found no relationship between emotional support and SI in female sexual assault survivors.

The inconsistent associations between SI and friendship and emotional support may be due in part to differences in the measures used to assess these constructs, which in some cases do not differentiate between the types and sources of support. For example, the multi-dimensional social support measure used in the Bell study includes items related to emotional support when assessing support received by friends, and the measure of emotional support used in the Park study includes items related to contact with family. The ASR scales,

in contrast, clearly distinguish friendship from emotional support as separate constructs, and do not assess the source of support (e.g., family, friends) when assessing emotional support.

Perceived Burdensomeness and Thwarted Belongingness

Among the Interpersonal Needs Questionnaire constructs, we found PB to be associated with SI at baseline even in models that included the ASR scales as covariates. This suggests that the ASR scales do not completely account for all of the social support constructs that contribute to suicidal ideation. The correlations between PB and SI were stronger at both time points than those between TB and SI, and TB did not meet the threshold for statistical significance in any models that included the ASR scales as covariates. Meta-analysis of prior studies found both constructs to be associated with SI; however, consistent with our findings, meta-analysis also showed TB's association with SI to be weaker than that of PB (Chu, 2017).

Social Support as a Predictor of Future Suicidal Ideation

Our finding that none of the ASR social support measures at baseline predicted SI at 3 months may be related to fluctuations in perceived social support over time. Using daily diary assessment, Coppersmith et al. (2018) found that perceived social support varied significantly from day to day, and that perceived social support predicted same-day SI, but not next-day SI after controlling for same-day SI. One-time assessments of social support appear inadequate for predicting future suicidal ideation.

Limitations

This study had several limitations. We used secondary data from an ongoing randomized controlled trial, and as such the population studied may not generalize to all inpatients or individuals at high risk for suicide. Because nearly all participants had substantial suicidal ideation at baseline, there was truncation of the dependent variable. Findings from these analyses may be biased towards weaker correlations and are not generalizable to individuals with low levels of suicidal ideation at baseline. Our relatively small sample size may have impacted the power of our analyses to detect some associations. We did not control for several sociodemographic factors or for depression, which other studies have found to mediate the relationship between social support and suicidal ideation (DiFilippo and Overholser, 2000; Lasgaard, 2011; Winterrowd, 2011). There are substantial correlations between some of the social support measures and INQ measures. Based on our analysis of the VIFs of the social support measures used in our multiple regressions, there is likely some inflation of the standard errors of the estimates, which would bias the results towards null effects. This problem could potentially be addressed in future studies with larger sample sizes. Our findings are based on self-report measures, which may not reflect actual support received, and the single follow-up time point of 3 months may be insufficient to characterize long-term effects. Finally, the Perceived Hostility ASR measure was not administered during the study and thus could not be included in our analyses.

Conclusion

The clinical implications of our findings, if replicated in future studies, are that efforts to bolster the social support of individuals at risk for suicide should focus on establishing relationships beyond sources of recreation that are typified by the ASR friendship scale items. For individuals with high suicidal ideation severity, a broad range of other support approaches may be helpful, including being present and listening to that person's challenges, providing advice, validation and supporting self-efficacy, and also delivering tangible assistance, such as helping with transportation or activities of daily living.

The brief unidimensional ASR scales were able to differentiate which constructs of social support were associated with suicidal ideation at different time points relative to a suicidal crisis. Among the ASR scales, the instrumental support measure appears most complementary to measures of thwarted belongingness and perceived burdensomeness. Suicide researchers should strive for a standard definition of the different domains of social support and a common set of comprehensive unidimensional tools to measure them. This may facilitate the design of interventions that focus on the specific types of support most likely to be protective against future suicide risk.

Acknowledgments

Funding source: National Institute of Mental Health (R34MH103447)

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Table 1.

Baseline Demographics

Age and Gender	
Female Gender:	53.2%
Male Gender:	41.8%
Other Gender:	5.1%
Mean Age (SD)	34.4 (14.4)
Ethnicity	
Black:	12.7%
Hispanic:	5.1%
Other:	2.5%
White:	79.8%
Psychiatric History	
Unipolar depressive disorders	59.0%
Bipolar disorders:	10.3%
Psychotic disorders:	3.9%
Anxiety disorders:	3.9%
Substance use disorders:	7.7%
Personality disorders:	10.3%
Other:	5.1%
Lifetime history of suicide attempt:	76.9%

Table 2.

Correlation matrix between social relationship measures at baseline among psychiatric inpatients (N=79) and the correlation between baseline and 3-month administrations within measures (along the diagonal in italics).

	ES	IS	Friend	Lonely	PR	TB	PB
Emotional Support (ES)	<i>0.61</i>						
Instrumental Support (IS)	0.66	<i>0.66</i>					
Friendship (Friend)	0.56	0.46	<i>0.70</i>				
Loneliness (Lonely)	-0.71	-0.52	-0.70	<i>0.50</i>			
Perceived Rejection (PR)	-0.59	-0.54	-0.34	0.57	<i>0.42</i>		
Thwarted Belongingness (TB)	-0.73	-0.47	-0.67	0.81	0.53	<i>0.34</i>	
Perceived Burdensomeness (PB)	-0.46	-0.27	-0.38	0.52	0.39	0.65	<i>0.33</i>

Table 3.

Social support constructs as predictors of Beck Scale for Suicidal Ideation (SI) scores* at baseline (N=78) and 3 months (N=63)

Scale	SI at Baseline		SI at 3 Months	
	b (95% CI)	p-value	b (95% CI)	p-value
Emotional Support	−0.21 (−.37, −.04)	0.01	−0.17 (−.32, −.02)	0.03
Instrumental Support	−0.27 (−.46, −.08)	0.006	−0.06 (−.23, .10)	0.46
Friendship	−0.10 (−.27, .08)	0.27	−0.05 (−.19, .09)	0.48
Loneliness	0.24 (.03, .45)	0.02	0.13 (−.02, .27)	0.09
Perceived Rejection	0.18 (.01, .35)	0.04	0.06 (−.08, .21)	0.37
Thwarted Belongingness	0.15 (−.01, .30)	0.07	0.14 (.02, .26)	0.02
Perceived Burdensomeness	0.24 (.09, .39)	0.002	0.23 (.12, .34)	<0.001

* Results adjusted for age and gender