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Article

The Questionnaire for Suicidal Ideation (QSI): Psychometric Properties of a Brief Tool Measuring Suicidal Ideation in Adult and Adolescent Clinical Populations

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ABSTRACT

Background: Identifying accurate methods of assessing suicidal ideation has important implications. The lack of a universal definition of suicidal ideation has complicated measurement efforts. This study details the development of a brief self-report measure of suicidal ideation which specifically focuses on thoughts of suicide. **Method:** The Questionnaire for Suicidal Ideation (QSI) was developed by collating items from three existing measures of suicidal ideation. Items explicitly describing acts or behaviours were removed and Posner et al.'s (2007) definition of suicidal ideation was applied to the remaining items. The final questionnaire consisted of 6 items. Participants were adults (n = 192) and adolescents (n = 152) attending community mental health services in the Irish public health service. **Results:** The QSI demonstrated excellent reliability in adult (α = .91) and adolescent (α = .90) samples. Exploratory factor analysis produced a one-factor solution explaining 70% and 66% of the variance in adult and adolescent samples respectively. Evidence of relation with other variables was demonstrated with strong correlations between the QSI and measures of depression, hopelessness and borderline symptoms (r = .48 - .68). **Conclusions:** The results suggest that the QSI may be a reliable and valid method of assessing suicidal ideation in clinical populations.

El Cuestionario de Ideación Suicida (QSI): Propiedades Psicométricas de un Instrumento Breve Para Medir la Ideación Suicida en Poblaciones Clínicas de Adultos y Adolescentes

Palabras clave:
Ideación suicida
Evaluación psicométrica
Análisis factorial
Adultos
Adolescentes

RESUMEN

Antecedentes: Identificar métodos precisos para evaluar ideación suicida es importante. La falta de una definición universal de ideación suicida ha complicado su evaluación. Este estudio describe el desarrollo de un instrumento breve de pensamientos de suicidio. **Método:** El Cuestionario para Ideación Suicida (CIS) se desarrolló a partir de tres medidas establecidas de ideación suicida. Se eliminaron los ítems de actos o conductas y, para los ítems restantes, se aplicó la definición de ideación suicida de Posner et al. (2007). El cuestionario final tuvo 6 ítems. Se incluyeron adultos (n = 192) y adolescentes (n = 152) de centros de salud mental del servicio de salud pública de Irlanda. **Resultados:** El CIS demostró una excelente fiabilidad en adultos (α = 0,91) y adolescentes (α = 0,90). En un análisis factorial exploratorio, se identificó una solución de un solo factor que explicó el 70% y el 66% de la varianza en adultos y adolescentes, respectivamente. AAdemás, se demostraron relaciones con otras variables por medio de correlaciones entre el QSI y medidas de depresión, desesperanza y síntomas límite (r = 0,48 - 0,68). **Conclusiones:** Los resultados sugieren que el QSI puede ser un método fiable y válido para evaluar ideación suicida.

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The development of standard operational definitions and nomenclature to classify suicide and self-injurious thought and behaviours is necessary to guide both research and clinical practice (Silverman & De Leo, 2016). Suicidal ideation and suicidal behaviour have both been identified as important risk factors for suicide (Large et al., 2021). A recent systematic review reported a prevalence of suicidal ideation in youths from 14.3% - 22.6% across regions (Van Meter et al., 2023). Assessing suicidal ideation during adolescence is therefore critical to facilitate prevention and intervention in early life.

At present, no universally consistent definition or classification of suicidal ideation exists, with several recent studies highlighting the fact that researchers have failed to achieve unanimity about a definition (e.g. De Leo et al., 2021; Goodfellow et al., 2020). This lack of consensus has resulted in a range of measurement challenges across clinical and research domains. The measurement of any concept demands a precise and explicit definition which is functional, explanatory, and quantifiable. Suicidal ideation as a concept however has been critiqued for its ambiguous nature (Silverman & De Leo, 2016). While some definitions have successfully addressed certain aspects of suicidal ideation, many have failed to encompass all its components. As a result of the disparity in its definition, the identification of an accurate measure of suicidal ideation is difficult and leads to doubts about the accuracy of existing measures which have been constructed on an ambiguous foundation. In a recent study which examined terms and definitions used internationally to describe suicidal phenomena, distinctions were made between the terms 'suicidal ideation', 'death wishes', 'suicide plan' and 'preparatory suicidal behaviour' amongst other terms (De Leo et al., 2021). Importantly, distinctions are made between acts (e.g. suicide attempt, preparatory suicidal behaviour, self-harm) and thoughts (e.g. suicidal ideation). Given this conceptual distinction between thoughts and acts, we believe this lends evidence to confirm that a measure of suicidal ideation should focus solely on thoughts. The study reported here focused exclusively on thoughts of suicide in line with Posner et al.'s (2007) definition of suicidal ideation: "passive thoughts about wanting to be dead or active thoughts about killing oneself, not accompanied by preparatory behaviour" (p. 1037). Posner et al's (2007) definition was the preferred definition in this study as we felt it most closely represented the term 'ideation' which is suggestive of thoughts/ideas. This is consistent with the most recently proposed definition by De Leo et al. (2021) which also focuses on thoughts without behavioural components: "to think of suicide with or without suicidal intent, or hope for death by killing oneself, or state suicidal intention without engaging in behaviour." (p.8).

Along with inconsistent definitions across studies, divergent approaches have been taken in the development of suicidal ideation measures in terms of sampling and timeframe. Two systematic reviews which looked at self-reported measurement of suicidal ideation in various clinical and non-clinical samples concluded that there was no gold standard approach to the measurement of this construct (Batterham et al., 2015; Ghasemi et al., 2015). We conducted a comprehensive literature review to examine commonly used measures of ideation in adult and adolescent clinical populations. To do so, we searched relevant databases (e.g. PubMed) with terms such as "suicide ideation", "suicidal ideation" and "scale". We also reviewed the reference lists of relevant studies to ensure comprehensiveness. We carried out a review of all relevant (or potentially relevant) measures of suicidal ideation following this search. We conducted a thorough and more detailed review of studies which included scales or subscales of suicidal ideation which were in line with Posner et al.'s definition and which largely included items focused on thoughts. We identified the Adult Suicidal Ideation Questionnaire (ASIQ; Reynolds, 1991) and the Beck Scale for Suicide Ideation (BSI; Beck & Steer, 1991) as potentially relevant measures for adults. We noted the Positive and Negative Suicide Ideation Inventory (PANSI; Osman et al., 1998) and the Suicidal Ideation Questionnaire (SIQ; Reynolds, 1988) for examining suicidal ideation in adolescents. Despite some psychometric merits of the ASIQ and BSI, both are licensed, copyrighted measures and must be purchased for use. The ASIQ also includes terminology that would not typically be used in the context of mental health services in Ireland (i.e. multiple references to killing oneself). For the BSI, there are items included in this scale which pertain to suicidal behaviours (e.g. preparation of suicide note; previous suicide attempts), as well as items focused on suicidal ideation. The inclusion of items related to behaviours is an example of the earlier outlined issue of inconsistency with how suicidal ideation is classified. This limits the utility of the BSI in contexts where clinicians or researchers wish to focus exclusively on thoughts about suicide. For the adolescent measures, the SIQ is also a licensed measure requiring purchase for use. The PANSI examines factors which may increase the risk of suicidal ideation and behaviour but was developed to assess suicide-related behaviour. Thus, there is a need for valid and reliable tools that measure suicidal ideation, which are easily accessible to the scientific community and clinical professionals.

The current study outlines the development of a measure which: (a) focuses solely on measuring *thoughts* about suicide, (b) is brief in nature, (c) is suitable for administration across adult and adolescent populations, and (d) does not have financial implications for use. A secondary goal of this study was to assess the responsiveness of the newly developed measure to change over time from pre- to post-targeted intervention for this participant group. We hypothesised that there would be a reduction in suicidal ideation scores for both adults and adolescents at post-intervention.

Method

Development of Questionnaire for Suicidal Ideation

The QSI was developed through the desire to have a brief measure of suicidal ideation which could be administered to both adult and adolescent clinical populations receiving dialectical behaviour therapy (DBT) in community settings. Guidelines for the development of the scale were followed in line with Spector (1992) and Streiner & Norman (2008). Specifically, the five major steps for developing a summated rating scale outlined by Spector (1992) were followed: 1. Define construct; 2. Design scale; 3. Pilot test; 4. Administration and item analysis and 5. Validate and norm. Existing measures for the assessment of suicidal ideation in adults and adolescents were reviewed when generating items for the Questionnaire for Suicidal Ideation (QSI). Statements from three previous questionnaires that exemplified the best attempts at creating items depicting suicidal ideation were collated. Specifically, items from the following measures were compiled: Adult Suicidal

Ideation Questionnaire (Reynolds, 1991; 25 items); Suicidal Ideation Questionnaire (Reynolds, 1988; 15 items); Beck Scale for Suicide Ideation (Beck et al., 1991; 21 items). Two of the authors gathered a compendium of all 61 statements from the above three measures to visualise what aspects of suicidal ideation the assessment would capture. We first excluded 12 statements which were duplicates from the ASIQ and SIQ. Next, we excluded 14 statements which explicitly described acts or behaviours related to suicide (e.g. "I thought about writing a will" and "I have almost finished or completed my preparations for committing suicide"). With the 35 items remaining, to consider potentially relevant items, we referred to Posner et al.'s (2007) definition of suicidal ideation. Potential items were only retained if they focused solely on suicidal ideation. This resulted in 11 remaining items. For statements in which there was overlap, these were merged/deleted as relevant. Items pertaining to frequency/ time in relation to thoughts were deleted. Finally, Posner et al.'s definition was applied to the remaining statements and rewording was carried out as appropriate. The next stage of development involved input from two of the authors who provided clinical review and guidance regarding the wording of the proposed statements. Input was also sought from clinicians working in child and adolescent mental health services regarding the suitability of the wording and terminology to assess suicidal ideation in adolescents. At that point, any items which referred to 'killing oneself' was changed to 'ending one's life'.

The questionnaire was then administered to an independent researcher who piloted the measure. Following the piloting phase, revisions were made which included changes to the wording and order of statements. The final version consisted of a 6-item brief questionnaire which measures the intensity of patients' specific suicidal thoughts in the past week (Table 1). Each item required a response to a 5-point rating scale ranging from 0 (*'Not at all'*) to 4 (*'Daily or more'*). Scores ranged from 0 to 24 with higher scores indicating greater suicidal ideation.

Table 1
Items in the Questionnaire for Suicidal Ideation

Item
I thought it would be better if I was not alive
I thought about ending my life
I thought about how I would end my life
I thought that ending my life would solve my problems
I thought that no-one cared if I lived or died
I thought that others would be happier if I was not alive

Participants

Participants were 196 adults and 152 adolescents who were attending a DBT programme in their local community mental health service in Ireland. Data were collected from participants who started a DBT programme between February 2014 and February 2017. Demographic characteristics of adult participants are outlined in table 2.

The adult sample consisted primarily of females (n = 158, 81%) and ranged in age from 18 to 65 years with the majority aged between 25 and 44 years (60%). The gender and age of adolescent participants was recorded. The adolescent sample also primarily comprised of females (n = 129, 85%) and were aged between 13 and 18 years (M = 15.7, SD = 1.13).

Table 2
Sample Characteristics of Adult Participants

	N (%)
Gender	
Female	158 (80.6)
Male	38 (19.4)
Age	
18-24 years	41 (20.9)
25-34 years	57 (29.1)
35-44 years	58 (29.6)
45-54 years	35 (17.9)
55-64 years	4 (2.0)
Did not specify	1 (0.5)
Marital status	
Single	86 (43.9)
In a relationship	45 (23.0)
Married	36 (18.4)
Separated/ Divorced	27 (13.8)
Other	2 (1.0)
Employment Status	
Full-time employment	23 (11.7)
Part-time employment	18 (9.2)
Student	20 (10.2)
Retired	3 (1.5)
Unemployed	90 (45.9)
Other	42 (21.4)

Adult participants had received a diagnosis, or met criteria for a diagnosis of, borderline personality disorder or emotionally unstable personality disorder. Adult participants had a persistent pattern of self-harm or suicidal behaviour, with the most recent episode having occurred within the six months prior to being referred to the intervention. Adolescent participants were individuals demonstrating emotional and behavioural dysregulation. Adolescents had either a persistent pattern of self-harm with an episode of self-harm behaviour/suicidal act having occurred within the prior 16 weeks **or** chronic suicidal ideation.

The sample utilised to answer the research questions in this study were recruited for a larger study, which the current study was a part of. The sample size was determined based on the requirements for the larger study which is reported in Flynn et al., (2018).

Instruments

A comprehensive battery of measures assessing both life-threatening and quality-of-life interfering behaviours were administered to participants as part of the larger project evaluation (Flynn et al., 2018). The selection of measures was chosen based on a thorough review of international research to identify common outcome measures across studies of individuals with BPD which directly mapped onto DBT treatment targets (Flynn et al., 2018). We chose a subset of this battery to assess the relationship between the QSI and other related variables in the present study. As affective instability (defined as repeated, rapid and abrupt shifts in mood)

is considered the core pathology in BPD, we chose the following measures which were clinically relevant for this sample in terms of their potential relationship with the construct of suicidal ideation (Nica & Links, 2009; Rizk et al., 2019).

Adult and Adolescent samples

Beck Hopelessness Scale. The Beck Hopelessness Scale (BHS; Beck et al., 1974) is a 20-item scale which measures constructs of affective, motivational, and cognitive aspects of hopelessness. Participants are invited to indicate if they feel each statement is either 'true' or 'false'. Internal consistency (Cronbach's α) for the BHS in the current study was .89 and .90 for the adult and adolescent samples, respectively.

Borderline Symptom Checklist. The Borderline Symptom List (BSL-23; Bohus et al., 2009) comprises 23 items measuring borderline-typical symptomatology. Respondents are asked to rate how much they experienced a set of difficulties or problems in the past week ranging from 0 (*Not at all)* to 4 (*Very strong).* In the current study, internal consistency for the BSL was .94 for both adult and adolescent samples.

Adult Sample Only

Beck Depression Inventory. The Beck Depression Inventory (BDI-II; Beck, Steer & Brown, 1996) is a 21-item self-rating tool that measures symptoms of depression in adults. Items are rated on a scale of 0 to 3. In the current study, the Cronbach's alpha coefficient was .91.

Adolescent Sample Only

Beck Depression Inventory – Youth. The Beck Depression Inventory for Youth (BDI-Y; Beck, Beck & Jolly, 2001) assesses depressive symptoms in children and adolescents. The self-report questionnaire contains 20 items about thoughts, feelings and behaviours associated with depression. Items are scored on a scale of 0 (*Never*) to 3 (*Always*). In the current study, Cronbach's α was .89.

Procedure

Data collection for this study was conducted as part of a larger study which evaluated the coordinated implementation and effectiveness of DBT in a public community mental health service (Flynn et al., 2019; Flynn et al., 2020). As part of the DBT intervention, participants attend a weekly group skills training session which is delivered by two DBT therapists. Participant recruitment took place onsite in community mental health services during the first group skills training session of the intervention. Data collection was carried out in a group format and typically took up to one hour. Participants who preferred to complete the measures outside of a group setting could do so independently if they wished. For those who needed more than the allocated group time, participants could complete the measures with a researcher or their DBT therapist. Participants who opted to complete the measures outside of the group or who needed additional time were required to complete the measures within two weeks of the group data collection date. Participants were provided with information leaflets and were also briefed on the nature of the study by members of the research team. Participants were informed that participation in the study was voluntary and non-participation would not affect their treatment. If participants were happy to proceed, they signed a consent form. Test administration was standardised across all study sites. Typically, two members of the research team (MJ and CS) conducted data collection at study sites. On some occasions, where MJ or CS were not available, another member of the research team accompanied either MJ or CS for data collection. A standard protocol was followed at each study site as outlined above to reduce the potential for test administration error. Participants were then administered a battery of measures which included the BDI-II (or BDI-Y for adolescents), BSL-23, BHS, and the QSI. Measures were administered at four time-points for adults (pre-intervention, mid- intervention, post-intervention, and follow-up) and three time-points for adolescents (pre-intervention, post-intervention and follow-up). As there was at least 16 weeks between pre- and post-intervention for adolescents, and 6 months between pre- and mid- intervention for adults, it was not possible to assess test-retest reliability in the current study. Therefore, data collected at pre-intervention will be reported.

Ethical approval was obtained from the following ethics committees: Clinical Research Ethics Committee of the Cork Teaching Hospitals, Galway University Hospital Research Ethics Committee, HSE North East Area Research Ethics Committee, HSE South East Area Research Ethics Committee, Linn Dara & Beechpark Ethics Committee; Naas General Hospital Ethics Committee; Saint John of God Hospitaller Ministries Research Ethics Committee, HSE Dublin North City Ethics Committee and Sligo University Hospital Research Ethics Committee.

Data Analysis

Item-level Descriptive Statistics

The mean and standard deviation of Likert-type responses were calculated for each item on the QSI for both adult and adolescents.

Missing Data

There were missing data for 10 participants at baseline, eight adults and two adolescents, who were unavailable for data collection. All other participants who consented to take part in the research study completed the full battery of measures at baseline, therefore missing data analysis was not required. There were no outliers identified in the dataset.

Factor Structure

Exploratory factor analysis was conducted on both the adult and adolescent samples separately to explore the factor structure of the QSI. Common factor analysis was the chosen method for this research as it is the most appropriate analysis when the researcher's intention is to interpret potential components as latent dimension or factors (Bandalos & Finney, 2010). Principal Axis Factoring was

the extraction method chosen. The methods employed to determine the number of factors to retain in this study include eigenvalues greater than 1 (Kaiser, 1960), Horn's Parallel Analysis (1965), and an inspection of Cattell's Scree Plot (1966) for the point of inflection. Horn's Parallel Analysis was conducted using a software programme developed by Watkins (2000) which generates 1,000 sets of random data and calculates the average eigenvalues for these 1,000 generated samples based on the real data files in this study. The eigenvalues obtained in the real data files in this study are then compared with the corresponding values from the random results generated by the parallel analysis. If the obtained value is larger than the random value from the parallel analysis, the factor is retained. If it is less, it is rejected.

Validity

Evidence of relations with other relevant variables was evaluated by correlating the QSI scores with measures of depression, hopelessness, and borderline symptoms. Strengths of association were classified as strong (.5 to 1.0), moderate (.3 - .49) and weak (.1 - .29) as per Cohen (1988). Based on studies of the relationship between negative mood intensity and suicidal ideation and behaviour in individuals with BPD (e.g. Links et al., 2007) we hypothesised moderate strengths of association between constructs.

Scale Responsiveness

The QSI was administered to participants at multiple time-points to assess responsiveness of the measure to clinical change by examining suicidal ideation scores over the course of the DBT intervention. Mean scores at pre- and post-intervention were examined to evaluate the questionnaire's performance in quantifying suicidal ideation at different stages of treatment. Paired samples 't' tests were conducted for both adult and adolescent groups who completed the intervention to determine level of significance.

Results

Descriptive Statistics

Descriptive statistics for the QSI are presented in table 3. Descriptive statistics are provided for male and female participants separately for both adult and adolescent samples.

Factor Structure

Initial screening to assess the suitability of the data for factor analysis was first carried out. Inspection of the correlation matrix identified that all coefficients were .46 and above for the adult sample and .40 for adolescents. The Kaiser-Meyer-Olkin statistic was .84 and .82 for the adult and adolescent samples respectively, exceeding the minimum recommended value of .60 (Tabachnick & Fidell, 2007), indicating that the sample size was appropriate. Bartlett's Test of Sphericity reached statistical significance ($p < .001$) supporting the factorability of the matrix.

a) Eigenvalues: The extraction analysis identified one factor with an eigenvalue of greater than 1 in both samples. This one factor represented 69.61% of the cumulative variance for the adult sample and 66.33% for adolescents.
b) Horn's Parallel Analysis. For this analysis, one obtained value from the real data files in this study was larger than the random values for both samples, thereby suggesting that one factor be retained.
c) Inspection of Cattell's Scree Plot indicated a one-factor selection for both samples consistent with the results of the parallel analysis.

As a result, it was decided to retain a one-factor model. As just one factor was extracted in the analysis, the solution could not be rotated, therefore no further analyses of the data were required.

Table 3
Questionnaire for Suicidal Ideation Descriptive Statistics for Adults and Adolescents and By Sex

Participant group	*n*	M	SD	*Mdn*	*Skew*	*Range*
Total Adult	188[a]	9.29	7.06	8.00	.57	0-24
Males	36	9.33	6.45	8.50	.39	0-24
Females	151	9.33	7.22	8.00	.59	0-24
Total Adolescents	150[a]	12.07	6.91	12.00	.04	0-24
Males	22	10.05	6.92	10.00	.11	0-21
Females	128	12.41	6.87	13.00	.03	0-24

[a] This refers to the total number of adult and adolescent participants for whom data were available at the first data collection time-point (pre-intervention). There were missing data for eight adult participants and two adolescent participants.

Reliability

The reliability of the QSI test scores was investigated by obtaining McDonald's omega coefficient of the 6-item scale for both the adult and adolescent samples. McDonald's omega coefficient was .91 and .89 for the adult and adolescent samples respectively, indicating that the reliability of the scores was high. The inter-item correlations for the six items of the QSI are presented in table 4.

For the adult sample, the inter-item correlations ranged from .46 - .84 with a mean of .63 showing a strong relationship between each of the items on the scale. Similarly, for the adolescent sample, inter-item correlations ranged from .40 - .80 with a mean of .59.

There were no improvements in McDonald's omega values for either sample when any item was deleted.

Sources of Validity Evidence in Relation to Other Variables

Evidence of relations with other variables was evaluated by correlating the QSI scores with measures of depression, hopelessness, and borderline symptoms. The results are displayed in table 5.

Significant correlations were found between the QSI and measures of depression, hopelessness, and borderline symptoms. The strongest correlation for the adult sample was between the QSI and the BSL-23 ($r = .61$, $p < .01$). A strong correlation was also evident between the QSI and BDI-II ($r = .58$, $p < .01$). There was a moderate correlation between the QSI and BHS ($r = .48$, $p < .01$). For the adolescent sample, there was a strong correlation between scores on the QSI and all other measures, the BSL-23 ($r = .68$, $p < .01$), BDIY ($r = .65$, $p < .01$) and BHS ($r = .61$, $p < .01$).

Table 4
Intercorrelations Between Items for QSI on Adult and Adolescent Samples

Item	QSI1	QSI2	QSI3	QSI4	QSI5	QSI6
Adult						
QSI1	-					
QSI2	.733*	-				
QSI3	.692*	.843*	-			
QSI4	.731*	.785*	.774*	-		
QSI5	.456*	.460*	.484*	.532*	-	
QSI6	.551*	.568*	.515*	.587*	.760*	-
Adolescent						
QSI1	-					
QSI2	.760*	-				
QSI3	.673*	.801*	-			
QSI4	.727*	.714*	.642*	-		
QSI5	.469*	.422*	.396*	.490*	-	
QSI6	.535*	.469*	.519*	.524*	.743*	-

* Significant at $p < .001$

Table 5
Intercorrelations Between the QSI and Other Measures of Psychological Distress

Measure	QSI	BDI-II	BHS	QSI-A	BDI-Y	BHS-A
Adult						
BDI-II	.58*	-	-			
BHS	.48*	.61*	-			
BSL-23	.61*	.71*	.45*			
Adolescent						
BDI-Y				.65*	-	
BHS-A				.61*	.67*	
BSL-23				.68*	82*	.61*

*Correlation significant at $p < .01$. QSI-A =Adolescent Scores on QSI, BDI-Y = Beck Depression Inventory – Youth, BHS – A = Becks Hopelessness Scale – Adolescent Scores

Responsiveness of Measure to Clinical Change

There was a statistically significant reduction in mean QSI scores for adults from pre-intervention ($M = 10.04$, $SD = 7.03$) to post-intervention ($M = 4.91$, $SD = 5.99$), $t(98) = 8.21$, $p < .0001$). Cohen's d revealed a large effect size (.43) as per Cohen (1988). Similar outcomes were observed for the adolescent group with a statistically significant reduction in mean QSI scores at pre-intervention ($M = 11.86$, $SD = 6.75$) to post-intervention ($M = 6.72$, $SD = 7.49$, $t(106) = 8.66$, $p < .0001$). The effect size was large (.35).

Discussion

This study set out to develop a brief measure of suicidal ideation that focuses solely on measuring thoughts about suicide and is suitable for administration to both adult and adolescent populations. The 6-item QSI achieved excellent scores of internal consistency in both samples and demonstrated evidence of relations with other relevant variables when compared with standardised clinical measures of depression and hopelessness. The results of the factor analysis suggest that this measure is unidimensional across adult and adolescent samples.

QSI scores of reliability and validity were comparable to those reported for the ASIQ and BSI in adult populations and for the SIQ and PANSI-Negative subscale in adolescent clinical populations (Brown, 2001; Gutierrez & Osman, 2009; Osman et al., 2002; Pinto et al., 1997). These findings suggest that the QSI could provide clinicians and researchers with a brief tool which may be suitable for inclusion as part of a risk assessment review, reducing the time needed for clinical evaluation and interpretation, while maintaining reliable and valid psychometric properties, similar to existing measures.

Given that the primary objective of this research was to develop a brief measure with an exclusive focus on thoughts of suicide, the results support the theory that the six items represent one underlying factor of suicidal ideation specific to thoughts. This compares with the 25-item ASIQ with three factors (suicidal ideation specific to thoughts and plans, anticipated response of others and suicidal wishes, telling others of intent; Reynolds, 1991) and the 21-item BSI, also with three underlying factors (desire for death, preparation for suicide, actual suicide desire; Steer et al., 1993). Within adolescent clinical populations, this finding is similar to the one factor structure of the 30-item SIQ and the one factor structure of the 8-item PANSI-Negative subscale (Osman et al., 2002; Pinto et al., 1997). The results of this study could be linked to the integrated motivational-volitional (IMV) model of suicidal behaviour (O'Connor & Kirtley, 2018). The IMV model is a three-phase biopsychosocial framework that delineates the final common pathway to suicidal ideation and behaviour. While the first phase describes the biopsychosocial context, identifying vulnerability factors and triggering negative events, the second phase, the motivational phase, is relevant here as it focuses on the emergence of suicidal ideation and intent. This is prior to the final phase, the volitional phase, which moves from suicidal ideation to suicide attempts/ suicide. It is possible that the one factor model of suicidal ideation specific to thoughts that was found in this study maps onto the second phase of the IMV model.

Reducing self-harm rates and implementing effective suicide prevention strategies are key goals in Ireland's national strategy for reducing suicide (*Connecting for Life;* Department of Health, 2015). The development of tools to identify risk factors associated with self-harm and suicidal behaviour is critical for detection and prevention strategies. Given its brief form, the QSI may be useful to help identify suicidal ideation in hospital-presenting self-harm patients and in other clinical settings.

The development of the QSI as a brief self-report measure of suicidal ideation has important clinical implications for potential use in mental health settings and in Emergency Department services. The brevity of the tool and its ability to detect differences in recovery over time in both adult and adolescent populations may reduce time spent measuring potential risk factors of suicidal behaviour, and assist with focusing questions in clinical interviews with this population.

This study has strengths and limitations that require consideration. The data reported here are from a large clinical cohort study of adults and adolescents who participated in their local community based DBT programme in Ireland. Participants

were recruited across multiple study sites and came from various geographical locations (including urban and rural settings). A limitation to this study is the absence of a control or wait-list control group to serve as a comparison for the changes in suicidal ideation as measured by the QSI. One might expect scores of the QSI to remain consistent over time in a clinical group awaiting therapeutic intervention. This would identify the potential of the QSI in terms of sensitivity to change over time and successful differentiation of those who are in treatment to those awaiting treatment. Test-retest reliability was not possible because the QSI was primarily used to assess change in suicidal ideation for participants over the course of a targeted intervention. Future studies could evaluate the intraclass correlation coefficient (ICC) values at baseline and two weeks after baseline to determine the test-retest reliability of the QSI. While we hope that the current measure of suicidal ideation will be suitable for use across adult and adolescent samples, we did not conduct measurement invariance with our two participant groups which is a limitation of this study. Finally, although information related to history of suicidal behaviour was captured as part of the wider evaluation within which the current study is placed, intensity of suicidal thoughts was not measured by the QSI. It may be beneficial for future studies to include an item to assess the intensity of suicidal ideation as this has been identified as a risk factor for eventual suicide (Beck et al., 1999).

Confirmation of the factor structure through confirmatory factor analysis will help to further our understanding of the ability of the QSI to detect suicidal ideation in high-risk clinical populations. Overall, as an exploratory view of how the measure may be utilised in clinical practice, the analysis of the properties of the questionnaire provides support for its use in identifying suicidal ideation in both adolescents and adults availing of mental health services. In summary, the QSI is a brief tool with demonstrated reliability that may be sensitive in identifying suicidal ideation in clinical populations.

Further research could pilot this measure with other clinical presentations such as those presenting with major depression. Should the QSI be found to be effective in detecting suicidal ideation in other clinical populations, this measure could have utility as an initial screening of suicidal ideation for participants entering mental health services. It is also recommended that the QSI be compared with other similar measures such as the BSI, ASIQ, SIQ and PANSI to determine concurrent validity.

Author Contributions

Mary Joyce: Conceptualisation, Methodology, Software, Validation, Formal Analysis, Investigation, Resources, Data Curation, Writing – Original Draft, Writing – Review & Editing, Visualisation, Supervision, Project Administration**. Conal Wrigley:** Software, Formal Analysis, Data Curation, Writing – Original Draft, Visualisation**. Mary Kells:** Conceptualisation, Methodology, Investigation, Resources, Writing – Review & Editing, Project Administration**. Catalina Suarez:** Conceptualisation, Methodology, Investigation, Data Curation, Writing – Review & Editing**. Daniel Flynn:** Conceptualisation, Methodology, Resources, Project Administration, Funding Acquisition**. Ailbhe Spillane:** Writing – Original Draft**. Abigale Owens:** Writing – Review & Editing.

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Declaration of Interests

The author(s) declare that there is no conflict of interest.

Data Availability Statement

The research data associated with this article are not publicly available. Requests can be submitted to the corresponding author and may be provided on reasonable request.

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