

A SYSTEMATIC REVIEW OF SCALES THAT
MEASURE ATTITUDES TOWARD SUICIDEMANAMI KODAKA, VITA POŠTUVAN,
MASATOSHI INAGAKI & MITSUHIKO YAMADA**ABSTRACT**

Background: Studies on attitudes toward suicide are of great interest to researchers worldwide. Although various instruments have been developed to measure attitudes toward suicide, psychometric properties of these instruments have not been systematically reviewed and organized.

Aim: We aimed to identify valid, reliable and feasible attitudinal scales by systematically reviewing published articles on scale development and validation studies. In particular, this study focused on scales used for a wide range of populations to measure multidimensional attitudes toward suicide and related issues.

Methods: Electronic searches of two databases, PubMed and PsychInfo, were performed. Scales with unique names were identified and listed after reviewing selected publications, and then evaluated for psychometric properties, multidimensionality and appropriateness for a wide range of populations.

Results: A total of 2,210 publications were identified by the first electronic search. In the final review process of the selected publications, three scales – the Suicide Opinion Questionnaire (SOQ), Suicide Attitude Questionnaire (SUIATT) and Attitudes Toward Suicide (ATTS) – were identified.

Conclusion: Each of these scales has its own characteristics and should be used in accordance with research purposes.

Key words: suicide, attitude, scales, psychometric properties, systematic review

BACKGROUND

Studies on attitudes toward suicide are of great interest to researchers worldwide. ‘Attitude’ is an evaluation of the entity, expressed in one’s affects, behaviour or cognition (Myers, 1993). Understanding attitudes toward suicide may be useful in suicide prevention and in providing intervention for suicidal individuals.

People with histories of suicide attempts or suicidal thoughts are reported to be more accepting of suicide compared to those without such a history (Limbacher & Domino, 1985–86). The more permissive attitudes toward suicide have been significantly associated with greater suicide ideation in adolescence (Stein *et al.*, 1998). In a study of university students, those with histories of suicide

ideation were more likely to agree with the notion that suicidal behaviour is normal and that people have the right to die by suicide (McAuliffe *et al.*, 2003). Thus, education aimed at changing attitudes toward suicide may aid in suicide prevention.

Attitudes of medical staff toward suicide affect their provision of care to suicidal patients (Bagley & Ramsay, 1989). Psychiatric nurses were more understanding and willing to provide care to suicidal patients compared to nurses working in physical disciplines (Samuelsson *et al.*, 1997b). Accordingly, education aimed at changing attitudes toward suicide may help professionals improve the quality of their care and influence others in the community to be more helpful toward suicidal individuals.

Attitudes of politicians toward suicide and suicide prevention were qualitatively studied for the first time by Knizek *et al.* (2008). A comparative study of the attitudes of politicians from five European countries revealed differences in beliefs on suicide and suicide prevention. Knizek *et al.* (2008) suggested that politicians need to increase their awareness and knowledge of suicide and suicide prevention because they are responsible for initiating and funding suicide prevention programmes.

Scales that assess attitudes toward suicide require adequate validity, reliability and high feasibility. Although various instruments have been developed to measure attitudes toward suicide, the validity, reliability and feasibility of these instruments have not been systematically reviewed. In the present study, we aimed to identify valid, reliable and feasible attitudinal scales by systematically reviewing published articles on scale development and validation studies. In particular, this study focused on scales used for a wide range of populations to measure multidimensional attitudes toward suicide and related issues.

METHODS

Process of scale selection

Electronic searches of two databases, PubMed (National Centre for Biotechnology Information) and PsychInfo (American Psychological Association), were performed. We searched for citations from the earliest years that the databases cover (1949 for PubMed; the early 1800s for PsychInfo) up until March 31, 2009. Notably, the earliest publications found through PubMed and PsychInfo and reviewed in this study were published in 1969 and 1928. Search terms were (suicid* OR suicide) AND (attitud* OR attitude) AND (survey* OR survey OR questionnaire* OR questionnaire OR instrument* OR instrument OR measurement* OR measurement OR scale* OR scale). Abstracts were reviewed by two independent researchers and full-text publications that met inclusion criteria were retrieved. Inclusion criteria were: (1) articles and book chapters that refer to attitudes toward suicide or related issues, including suicidal behaviour, suicidal patients and suicide prevention, but excluding attitudes toward self-harm, parasuicide, euthanasia, assisted suicide, suicide bombing, and life and death; and (2) published material written in English.

When choosing publications for further review we included studies that used or referred to instruments with unique names. A manual search was also performed by reviewing references listed in the selected publications; articles and book chapters referring to the named instruments were also included. Scales with unique names used to measure attitudes toward suicide and related issues were identified and listed after reviewing all selected publications.

Process of scale evaluation

Development or validation studies of the identified scales were reviewed and organized. We clarified study objectives and then characterized scale items, response options and development processes. Finally, scales were evaluated for validity, reliability, feasibility, multidimensionality and appropriateness for a wide range of populations based on the factors listed below:

- (a) Validity: adoption of the theoretical concepts of ‘attitude’ or ‘attitude towards suicide’; utilization of extensive literature reviews, expert consensus and/or focus group interviews during the process of scale development; interpretable results of factor analysis; correlations with external criteria; and any other information.
- (b) Reliability: internal consistency (e.g. Cronbach’s α); stability (e.g. results of test-retest or split-half reliability tests); reproducibility (e.g. replication of factor structure among different populations); and any other information.
- (c) Feasibility: the number of items and complexity of rating method, and any other information.
- (d) Multidimensionality: inclusion of comprehensive attitudinal dimensions based on extensive past studies or theoretical backgrounds of attitudes toward suicide, and composition of multiple factors.
- (e) Appropriateness for a wide range of populations: not limited for use among particular age groups, people with a specific cultural background, or those working in certain professional disciplines.

RESULTS

Scale selection

Figure 1 displays the process of scale selection and its results. A total of 2,210 publications were identified by the first electronic search. In the final review process of the selected publications, 18 scales that measure attitudes toward suicide and related issues were identified for detailed review.

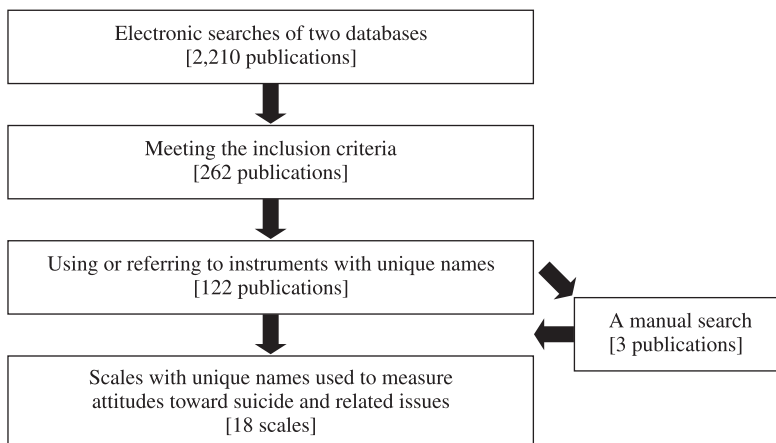


Figure 1. Process of scale selection and its results

Table 1 displays the 18 scales and their characteristics. Three of these scales – the Suicide Opinion Questionnaire (SOQ), Suicide Attitude Questionnaire (SUIATT) and Attitudes Toward Suicide (ATTS) – were identified as multidimensional scales that can be used for a wide range of populations.

Reviews of the three identified scales

Suicide Opinion Questionnaire

Validity No descriptions exist on theoretical backgrounds for attitudes toward suicide adopted in the development of items for the SOQ. The initial item pool consisted of approximately 3,000 items derived from extensive literature reviews related to suicide (Domino *et al.*, 1980, 1982). After redundant items and those with vague wording were excluded and opinions of professionals and graduate students were taken into account, 138 items remained (Domino *et al.*, 1982). The final 100 items were those for which test-retest reliability coefficients were higher than 0.68.

Various study groups have developed interpretable subscales of the SOQ through factor analysis or content analysis; however, they have not achieved a consensus on its psychometric properties. In the early years of SOQ history, content analysis identified eight item categories (Domino *et al.*, 1980), but subsequent factor analysis provided the 15-factor model (Domino *et al.*, 1982). Domino (2005) recommended the eight-factor clinical scale model, which was developed through statistical analysis as well as clinical perspectives (Domino *et al.*, 1988). Rogers and DeShon (1992) then developed a new five-factor model by performing item-total correlation and factor analysis. The most recent study was conducted by Anderson *et al.* (2008), in which exploratory factor analysis provided a two-factor structure. The SOQ has not been examined for correlation with any external criteria.

Reliability Various studies examined internal consistency by calculating Cronbach's α coefficients for different SOQ subscale models (Anderson *et al.*, 2008; Rogers & DeShon, 1992, 1995) (details in Table 1). Most α coefficients were lower than 0.70, which is considered the lowest acceptable value (Kaplan & Saccuzzo, 2005).

Test-retest reliability was examined for the eight-factor clinical scale model (Domino, 1996; Domino *et al.*, 1988) and five-factor model (Rogers & DeShon, 1995). Most reliability coefficients ranged from moderate to high (Table 1).

Consensus has not been reached on the reproducibility of SOQ subscales. Rogers and DeShon (1992) reported that Domino's eight-factor clinical scale model did not match their data from confirmatory factor analysis. However, Rogers and DeShon (1995) further examined the reliability of the five-factor model they had developed (Rogers & DeShon, 1992) and determined that it was reproducible. More recently, Anderson *et al.* (2008) concluded that confirmatory factor analysis failed to support the 15-factor model, eight-clinical-scale model or five-factor model. A confirmatory factor analysis conducted in their subsequent study provided no support for the two-factor model that they had developed themselves (Anderson *et al.*, 2008).

Feasibility The SOQ consists of too many items for use in clinical settings or large survey studies. It contains 100 five-point Likert items; 65 are considered attitudinal and the rest factual (Domino, 2005). In addition to the 100 Likert items, seven items ask respondents about their gender, history of suicidal thoughts or suicide attempts, whether they know anyone who died by suicide and the respondent's relationship to that individual, probability of respondent's future suicide attempt, and honesty of respondent's answers to the questionnaire (Domino *et al.*, 1982).

Table 1
Identified scales and their characteristics

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Suicide Opinion Questionnaire (SOQ) (SOQ-C)	<p>• SOQ (Domino <i>et al.</i>, 1982) Compares attitudes toward suicide among communities, evaluates training and education programmes for professionals, and other related research.</p> <p>• SOQ-C (Domino <i>et al.</i>, 1986) Measures children's attitudes toward suicide.</p>	<p>• SOQ (Domino <i>et al.</i>, 1982) Consists of 100+7 items. Respondents answer the items using a five-point scale; strongly agree; disagree; strongly disagree; undecided.</p> <p>• SOQ-C (Domino <i>et al.</i>, 1986) Consists of 56+5 items. Respondents answer the items using three categories; agree; disagree; undecided.</p>	<p>• SOQ (Domino <i>et al.</i>, 1980, 1982) Initial 3,000 items were derived from extended literature review. Redundant items and those with vague wording were excluded. Based on opinions of professionals and graduate students, 138 items were selected and administered to college students twice with a six-week interval. After excluding items with low test-retest reliability coefficients, 100 items remained.</p> <p>• SOQ-C (Domino <i>et al.</i>, 1986) Dropped items that required complex judgement or adult-level understanding.</p>	<p>• SOQ (Domino <i>et al.</i>, 1982) College students, Graduate students, medical professionals, and lay people [285] (Domino <i>et al.</i>, 1982) College students in New Zealand and the US [484] (Domino <i>et al.</i>, 1988) College students [237] (Rogers & DeShon, 1992) College students [452] (Rogers & DeShon, 1995) Students, mental health professionals, medical personnel, teachers and volunteers in eight countries [642] (Domino, 1996) College students, community adults and business people in the US and lay people in Taiwan [509] (Domino <i>et al.</i>, 2000) Study 1: Community people and graduate students [568]; Study 2: college students [288] (Anderson <i>et al.</i>, 2008) College students [288] (Lester, 2008)</p>	<p>• SOQ</p> <ol style="list-style-type: none"> Not mentioned. Based on extended literature review and opinions of professionals and graduate students (Domino <i>et al.</i>, 1982). No consensus on factor structure has been achieved. Content analysis based model: Eight-area-model (Domino <i>et al.</i>, 1980). Eight-factor clinical scale model (64 items) (Domino <i>et al.</i>, 1988). Factor analysis based model: Fifteen-factor model (82 items; cumulative proportion: 76.7%) (Domino <i>et al.</i>, 1982). Five-factor model (52 items; cumulative proportion: 72.0%) (Rogers & DeShon, 1992). Two-factor model (32 items; cumulative proportion: 14.86%) (Anderson <i>et al.</i>, 2008). Not mentioned. 'Undecided' was very commonly chosen (Lester, 2008). 	<p>• SOQ</p> <ol style="list-style-type: none"> $\alpha = 0.52, 0.30, 0.83, 0.63, 0.26, 0.56, 0.49, 0.40$ (eight-factor clinical scale model). $\alpha = 0.89, 0.75, 0.73, 0.73, 0.60$ (five-factor model) (Rogers & DeShon, 1992). $\alpha = 0.85, 0.66, 0.48, 0.56, 0.68, 0.59$ (five-factor model) (Rogers & DeShon, 1995). $\alpha = 0.41, 0.76, 0.67, 0.75, 0.31, 0.14, 0.13, 0.08, 0.42, 0.29, 0.19, 0.04, 0.54, 0.46, 0.21$ (15-factor model). $\alpha = 0.23-0.75$ eight-factor clinical scale model). $\alpha = 0.53-0.82$ (five-factor model) (Anderson <i>et al.</i>, 2008). $\alpha = 0.86, 0.86$ (two-factor model) (Anderson <i>et al.</i>, 2008). Estimates of test-retest reliability of eight-factor clinical scale model: 0.83, 0.86, 0.79, 0.82, 0.76, 0.77, 0.75, 0.75 (Domino <i>et al.</i>, 1988). Median estimates of test-retest reliability of eight-factor clinical scale model across eight countries: 0.91, 0.87, 0.89, 0.84, 0.85, 0.77, 0.75, 0.78 (Domino, 1996). 	A A

(continued)

Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
				<ul style="list-style-type: none"> • SOQ-C 6th–8th graders [116] (Domino <i>et al.</i>, 1986) 	<ul style="list-style-type: none"> • SOQ-C (Domino <i>et al.</i>, 1986) 1. Not mentioned. 2. Content analysis by professionals. 3. Nine-cluster model. 4. Not mentioned. 	Estimates of test-retest reliability of five-factor model: 0.92, 0.78, 0.55, 0.77, 0.34, 0.51 (Rogers & DeShon, 1995). 3. Failed to confirm eight-factor clinical scale model (Rogers & DeShon, 1992). Moderately supported five-factor model (Rogers & DeShon, 1995). The five-factor model neither received unique psychometric contributions nor showed superior characteristics compared to eight-factor clinical scale model (Domino <i>et al.</i> , 2000). Failed to support 15-factor model, eight-factor model and five-factor model (Anderson <i>et al.</i> , 2008). Failed to support two-factor model (Anderson <i>et al.</i> , 2008).	
						<ul style="list-style-type: none"> • SOQ-C (Domino <i>et al.</i>, 1986) 1–3. Not mentioned. 	

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Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Suicide Semantic Differential Scale (SSDS)	Examines justification of suicide (Droogas et al., 1982-83).	Consists of 10 adjective pairs (e.g. justified/not justified, cowardly/brave). Respondents read fictional stories and answer from one extreme to the other of each adjective on a six-point scale (Droogas et al., 1982-83). Fictional stories were modified from themes of the studies (Higgins & Range, 1996, 1999; Range & Martin, 1990; Werth & Liddle, 1994).	The fictional stories were developed on the basis of extensive literature review (Droogas et al., 1982-83).	<i>Scale development study:</i> College students [80] (Droogas et al., 1982-83) <i>Other studies:</i> College students [180] (Range & Martin, 1990); [306] (Higgins & Range, 1996); [192] (Marion & Range, 2003) Psychotherapists [186] (Werth & Liddle, 1994)	No validation study of the scale has been published.	1. 0.94 (Werth & Liddle, 1994), $\alpha = 0.85$ (Higgins & Range, 1996) and 0.95 (Marion & Range, 2003). 2. Not mentioned.	C B
Suicide Intervention Questionnaire (SIQ)	Measures attitudes toward intervening with suicidal individuals (Unpublished paper by Tierney (1988) cited in Chagnon et al. 2007).	Consists of 20 items rated on five-point Likert scale from 'agree completely' to 'disagree completely' (Unpublished paper by Tierney (1988) cited in Chagnon et al. 2007).	No scale development study has been published.	No scale development study has been published.	No validation study of the scale has been published.	1. No validation study of the scale has been published. 2. Split-half reliability coefficient: $r = 0.79$; Test-retest reliability coefficient: $r = 0.82$ (Unpublished paper by Tierney (1988) cited in Chagnon et al., 2007).	

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Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Suicide Attitude Vignette Experiences (SAVE-A; SAVE-L)	<ul style="list-style-type: none"> • SAVE-A (Stillion <i>et al.</i>, 1984) Measures attitudes toward suicide among adolescents. • SAVE-L (Stillion <i>et al.</i>, 1989) Measures attitudes toward suicide among the elderly. 	<ul style="list-style-type: none"> • SAVE-A (Stillion <i>et al.</i>, 1984) Consists of 10 vignettes describing different crisis situations which could lead to suicidal attempts. • SAVE-L (Stillion <i>et al.</i>, 1989) Consists of 16 vignettes. Ten used situations similar to those used in the SAVE-A and the rest were considered appropriate only for the elderly. <p>For both SAVE-A and SAVE-L, respondents use a five-point scale, ranging from low to high, to rate the extent to which they sympathize and empathize with the protagonists in the vignettes and the extent to which they agree with protagonists' suicide actions.</p>	<p>Vignettes describing crisis situations were read by a panel of judges to confirm their clarity, readability and adequacy of suicide motivations (Stillion <i>et al.</i>, 1984).</p>	<ul style="list-style-type: none"> • SAVE-A (Stillion <i>et al.</i>, 1984) <i>Scale development study</i>: Public high school students [198] • SAVE-L (Stillion <i>et al.</i>, 1989) <i>Scale development study</i>: Elderly people living in the community [40] and college students [40] 	<ul style="list-style-type: none"> • SAVE-A (Stillion <i>et al.</i>, 1984) <ol style="list-style-type: none"> 1. Not mentioned. 2. Reviewed by a panel of judges. 3. Three factors (cumulative proportion: 91%) confirmed the existence of sympathy, empathy and agreement factors. 4. Correlated significantly and in the predicted direction with external criteria (self-esteem, death concern, depression, suicide proneness and religiosity). • SAVE-L (Stillion <i>et al.</i>, 1989) <ol style="list-style-type: none"> 1. $\alpha = 0.96, 0.95, 0.89$. 2. Not mentioned. 	<ul style="list-style-type: none"> • SAVE-A (Stillion <i>et al.</i>, 1984) <ol style="list-style-type: none"> 1. Not mentioned. 2. Estimates of test-retest reliability: 0.65, 0.59, 0.52. • SAVE-L (Stillion <i>et al.</i>, 1989) <ol style="list-style-type: none"> 1. $\alpha = 0.96, 0.95, 0.89$. 2. Not mentioned. 	B C

(continued)

Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Suicide Attitude Questionnaire (SUIATT)	Compares attitudes toward suicide among various countries (Diekstra & Kerkhof, 1989).	Consists of 63 items with five-point Likert response scales (Diekstra & Kerkhof, 1989).	Affective, cognitive and instrumental components of attitude were adopted as the concept of attitude. Introduced different referents (respondent him/herself, loved one and someone else), both as suicide actor and as recipient of consequences of suicide, for a theoretical definition of attitudes toward suicide. A syntactic sentence consisted of three facets: actors, recipients and attitude components. Combinations of facets leading to absurdities or tautologies were excluded. The pre-test using the initial 133 items was performed; 70 items were excluded based on factor analysis and comments made by pre-test participants. (Diekstra & Kerkhof, 1989)	<i>Scale development study:</i> Graduate students [85] (Diekstra & Kerkhof, 1989). <i>Validation study:</i> Lay people selected from 11 medium urban and six small rural communities in the eastern Netherlands [712] (Diekstra & Kerkhof, 1989).	1. Adopted theoretical concepts on attitude and attitude toward suicide. 2. Not mentioned. 3. As a first step, the three-component attitude model was partially confirmed through explorative factor analysis. Second, by combining three referent levels with three attitude components (cognitive and instrumental components were broken into subdivisions), 19 subscales were manually constructed (e.g. affective-self subscale). Principal component analysis for the 19 subscales confirmed that the three attitude components were independent of each other and that attitudes differed depending on the referents. 4. Not mentioned. (Diekstra & Kerkhof, 1989)	1. $\alpha = 0.79, 0.79, 0.77$ (three referent subscales). $\alpha = 0.90$ (SUIATT). $\alpha = 0.42, 0.33, 0.36, 0.50, 0.52, 0.72, 0.45, 0.39, 0.36, 0.82, 0.83, 0.72, 0.75, 0.82, 0.82$ (19 subscales, excluding one-item factors). 2. Test-retest reliability coefficients: 0.81, 0.65, 0.67 for three referent subscales; 0.82 for SUIATT. Test-retest reliability coefficients: 0.60, 0.50, 0.40, 0.66, 0.68, 0.64, 0.59, 0.62, 0.63, 0.66, 0.61, 0.68, 0.53, 0.68, 0.66, 0.59, 0.71, 0.51, 0.56 for 19 subscales. (Diekstra & Kerkhof, 1989)	A A

(continued)

Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [<i>n</i>]	Validity	Reliability	M	W
Attribution of Causes to Suicide Scale	Measures components of attitudes toward suicide (Lester & Bean, 1992).	Consists of one set of components related to causes to which people attribute suicide – intrapsychic problems, interpersonal conflicts or societal pressures – and two sets of items that measure an individual's personal approval or disapproval of suicide, and measure attitudes among individual's peers and cultural groups (Lester & Bean, 1992). Composed of 18 items rated on a six-point Likert scale, ranging from 'strongly agree' to 'strongly disagree' (Loibl & Voracek, 2007; Voracek <i>et al.</i> , 2007; Walker <i>et al.</i> , 2006).	Not mentioned.	<i>Scale development study</i> : College students in the US [72] (Lester & Bean, 1992).	No validation study of the original English version has been published.	No validation study of original English version has been published.	C	C
Multi-dimensional Suicide Attitude Scale (MSAS)	Information not available.	Information not available.	Incorporated SAVE-A, SAVE-L and Save-M (measuring attitudes toward mid-life suicide), and added subscales (unpublished paper by Miller (1994) cited in Stillion & Stillion, 1998–99).	Information not available.	No validation study of the scale has been published.	No validation study of the scale has been published.	N/	N/
							A	A

(continued)

Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Self-Assessment of Attitudes Towards Suicide	Information not available. This scale was developed by the Crisis Intervention Centre, Minneapolis, Minnesota (no published paper available for this scale, but cited in Mokhovikov & Donets, 1996).	Information not available.	Information not available.	Information not available.	No validation study of the scale has been published.	No validation study of the scale has been published.	N/ A A
Understanding of Suicide Attempt Patient Scale (USP)	Measures attitudes of nursing personnel toward suicidal patients (Samuelsson <i>et al.</i> , 1997a, 1997b).	Consists of 11 items rated on a four-point Likert scale ranging from 'I agree completely' to 'I disagree completely' (Samuelsson <i>et al.</i> , 1997a, 1997b).	The initial item pool was developed based on the questionnaire created by Soukas and Lönnquist (1989). Of 16 items reflecting emotional attitudes, four with low corrected-item total correlations and one with low variance were excluded (Samuelsson <i>et al.</i> , 1997a).	<i>Scale development study</i> : Psychiatric nurses in Stockholm, Sweden [197] (Samuelsson <i>et al.</i> , 1997a). <i>Validation study</i> : Nurses/assistant nurses [816] (Aish <i>et al.</i> , 2002).	1. Not mentioned. 2. Based on a questionnaire by Soukas and Lönnquist (1989). 3. The data obtained by Aish <i>et al.</i> (2002) fitted the one-factor model for five items, but not for the USP scale. The scale had high validity, but relatively low reliability (Aish <i>et al.</i> , 2002). 4. Had significant correlations with 'understanding' and 'willingness' of the VAS scales developed by Samuelsson <i>et al.</i> (1997a) (i.e. stronger empathetic attitude on the USP scale was associated with greater understanding and willingness to nurse suicidal patients).	1. $\alpha = 0.74$ (Samuelsson <i>et al.</i> , 1997a). 2. Not mentioned.	C C
Suicide Attitude Questionnaire	Examines South African high school students' attitudes toward suicide (Peltzer <i>et al.</i> , 1998).	Consists of 35 items rated on a five-point Likert scale ranging from 'definitely yes' to 'definitely no' (Peltzer <i>et al.</i> , 1998).	Development was based on existing scales (Peltzer <i>et al.</i> , 1998).	South African junior high students [622] (Peltzer <i>et al.</i> , 1998).	1. Not mentioned. 2. Based on related studies (Peltzer <i>et al.</i> , 1998). 3. Not mentioned.	1. $\alpha = 0.85$. 2. Split-half reliability coefficient: 0.94 (Peltzer <i>et al.</i> , 1998).	B C

(continued)

Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Semantic Differential Scale Attitudes towards Suicidal Behaviour (SEDAS)	Measures attitude toward suicidal behaviour (Jenner & Niesing, 2000).	Consists of 15 seven-point rating scales with pairs of polar words or ideas regarding suicide in seven actor/situation sets: (a) my own suicide; (b) that of an adolescent; (c) that of an 81-year-old person; (d) that of a 34-year-old addict; (e) that of a person with an incurable tumour; (f) that of a suicide repeater; or (g) that of a person very dear to me (Jenner & Niesing, 2000).	The initial 36 seven-point rating scales with opposite adjectives at each end were selected based on mental health professionals' opinions and literature review. Respondents answer the same list of 36 scales for suicides in the seven actor/situation sets. After excluding items with little variance among and within the seven sets, items with skewed or kurtosis distributions, and those with very similar meanings, 15 items remained for further analysis (Jenner & Niesing, 2000).	Scale development and validation study (Jenner & Niesing, 2000); Hotline volunteers [136] Psychiatric nurses to examine test-retest reliability [41]	4. Significant associations with having a friend or relative who committed suicide, parasuicide, depression, stress events, ethnicity and attitudes towards suicide (Peltzer <i>et al.</i> , 1998). 1. Not mentioned. 2. Based on opinions of mental health professionals. 3. Simultaneous component analysis indicated two simultaneous interpretable components accounting for 47.3% of the total variance. Principal component analysis also yielded two components accounting for 48.5% of the total variance. 4. Respondents with history of suicidal ideation evaluated their own suicide as less negative. 5. The two components were significantly correlated higher with themselves across the seven sets than with the other component across the sets. This result supported adequate construct validity (Jenner & Niesing, 2000).	1. $\alpha = 0.84, 0.75, 0.86, 0.81, 0.83, 0.79, 0.85$ (first component); $\alpha = 0.78, 0.73, 0.80, 0.78, 0.83, 0.76, 0.83$ (second component). 2. Test-retest reliability: $r = 0.63-0.87$ (Jenner & Niesing, 2000).	A C

(continued)

Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Attitudes Toward Suicide Prevention (ASP)	Measures attitudes toward suicide prevention (Herron <i>et al.</i> , 2001).	Consists of 14 items rated on a five-point Likert scale from 'strongly agree' to 'strongly disagree' (Herron <i>et al.</i> , 2001).	A series of interviews were conducted with 36 health professionals. Interview questions were based on the previous literature. Preliminary attitudes [168] (Herron <i>et al.</i> , 2001). Finally, 28 items remained and were arranged as a series of statements. Factor analysis was conducted for the 28 items. Thirteen items with <0.5 loadings and one that led to lower internal reliability were eliminated (Herron <i>et al.</i> , 2001).	<i>Scale development study:</i> Psychiatrists in training [80] (Herron <i>et al.</i> , 2001). <i>Main study:</i> Front-line health professionals [168] (Herron <i>et al.</i> , 2001).	1. Not mentioned. 2. Interviews with health professionals (Herron <i>et al.</i> , 2001). 3. Not mentioned. 4. Not mentioned.	<i>Scale development study:</i> 1. $\alpha = 0.77$. 2. $r = 0.85$. (Herron <i>et al.</i> , 2001) <i>Main study:</i> 1. Not mentioned. 2. Not mentioned.	C C
Suicide Attitude and Attribution Scale (SAAS)	Examines the effects of variables including suicidal person's socioeconomic status, gender and marital status on attitudes towards suicidal behaviour (Sorjonen, 2002b).	Consists of fictional case stories followed by 49 seven-point rating items. (Sorjonen, 2002a, 2002b). In the study, each respondent randomly received one of the case stories (Sorjonen, 2002a, 2002b, 2004). Completion of a questionnaire took about 10 minutes (Sorjonen, 2004). Fictional cases were modified depending on the hypotheses of the studies (Sorjonen, 2002b; Sorjonen, 2004). Some of the original items were modified (Sorjonen, 2002a, 2004) or eliminated (Sorjonen, 2004).	Not mentioned.	College students in Sweden [293] (Sorjonen, 2002b) College students in Sweden [198] (Sorjonen, 2002a) College students in Sweden [325] (Sorjonen, 2004)	1. Not mentioned. 2. Not mentioned. 3. Six interpretable factors cumulatively accounting for 38% of the total variance (Sorjonen, 2002b). Seven interpretable factors cumulatively accounting for 42% of the total variance (Sorjonen, 2002a). 4. Not mentioned.	1. $\alpha = 0.83, 0.74, 0.54, 0.52, 0.69, 0.53$ (Sorjonen, 2002b); $\alpha = 0.81, 0.68, 0.64, 0.66, 0.65, 0.55, 0.77$ (Sorjonen, 2002a); $\alpha = 0.77, 0.72, 0.74, 0.69, 0.60, 0.66$ (Sorjonen, 2004). 2. Not mentioned.	B C

(continued)

Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Attitudes Toward Suicide (ATTS)	Measures attitudes toward suicide in the general population (Renberg & Jacobsson, 2003).	<ul style="list-style-type: none"> Version 1 Consists of 20 items rated on a five-point Likert scale from 'agree completely' to 'agree not at all'. Version 2 Consists of 34 items rated on a five-point Likert scale from 'strongly agree' to 'strongly disagree' (Renberg & Jacobsson, 2003) 	<ul style="list-style-type: none"> Version 1 Developed under the influence of SOQ. The 80 initial items were selected based on the opinions of professionals and lay people. After excluding items with low discriminative power or shortcomings in formulation, 62 items remained. The 62 items covered affective, cognitive and instrumental components. Version 2 Developed under the influence of SUJATT and other studies. The original 20 items were expanded to 69 items. After exclusion of important referent levels compared with the Diekstra and Kerkhof's study results, 40 items remained. (Renberg & Jacobsson, 2003) 	<p><i>Scale development study:</i> College students in Sweden [50]</p> <p><i>Validation studies:</i></p> <ul style="list-style-type: none"> Version 1 Lay people randomly selected from a northern county of Sweden [522]. Version 2 Lay people randomly selected from a northern county of Sweden [640] (Renberg & Jacobsson, 2003) 	<ol style="list-style-type: none"> Adopted theoretical concepts on attitude and attitude toward suicide. Based on the SOQ, SUJATT, related studies, and opinions of professionals and lay people. 	<p>Version 1 1. $\alpha = 0.66, 0.60, 0.40, 0.65, 0.34, 0.53, 0.45, 0.38, 0.51$.</p> <p>Version 2 1. $\alpha = 0.86, 0.72, 0.64, 0.63, 0.45, 0.51, 0.51, 0.45, 0.38, 0.54, 0.60$.</p> <p>2: Not mentioned.</p> <p>3: The eight-factor model of Version 1 fitted data from the 20 items from the Version 2 study, (Renberg & Jacobsson, 2003)</p>	A A

(continued)

Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Trinity Inventory of Precursors to Suicide (TIPS)	Measures adolescents' attitudes toward situational precursors to suicide (Smyth & MacLachlan, 2004).	Consists of 12 items (situations or events) rated on a five-point Likert scale ranging from 'very good reason' to 'very poor reason' for individuals who take their own life (Smyth & MacLachlan, 2004).	The preliminary version with 25 items was developed based on an extensive literature review of studies on suicide risk factors and events; it was used for the pilot study. Exploratory factor analysis was performed and items with <0.5 loadings were eliminated. Item-analysis and tests of kurtosis and skewness were also conducted. Finally, four interpretable factors were chosen, with three items each, accounting for 69.75% of variance (Smyth & MacLachlan, 2004).	<i>Scale development study</i> : College students, Dublin, Ireland [100] (Smyth & MacLachlan, 2004). <i>Validation study</i> : High school students [673] (Smyth & MacLachlan, 2005).	4. Had significant associations with respondents' suicidal behaviours. (Renberg & Jacobsson, 2003) 1. Not mentioned. 2. Extensive literature review. 3. Exploratory factor analysis yielded four interpretable factors accounting for 69.75% of the total variance (12 items total) (Smyth & MacLachlan, 2004). 4. The TIPS subscales were significantly correlated with 'depression', 'suicidality', and 'hopelessness'. Gender differences were observed (Smyth & MacLachlan, 2005). 5. A stepwise multiple regression analysis was conducted to examine the predictive validity of the TIPS for 'depression', 'suicidality' and 'hopelessness'. Gender differences in the results were observed. The overall percentage of variance was quite low (Smyth & MacLachlan, 2005).	1. $\alpha = 0.79, 0.77, 0.74, 0.81$ (Smyth & MacLachlan, 2004). 2. $\alpha = 0.795, 0.791, 0.798, 0.876$ (Smyth & MacLachlan, 2005). 3. Confirmatory analysis revealed that the original factor structure was replicated (Smyth & MacLachlan, 2005).	B C

(continued)

Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Suicide Behaviour Attitude Questionnaire (SBAQ)	Measures nurses' attitudes toward suicide (Botega et al., 2005).	Consists of 21 items rated on visual analogue scales ranging from 'strongly disagree' at one end and 'strongly agree' at the other (Botega et al., 2005).	Adopted cognitive, affective and behavioural components of attitude. Based on a literature review and focus group interviews of 25 nursing professionals; 54 propositions on suicidal behaviour were produced. Of these 25 items were selected by specialists and used for the pre-test. After excluding items with low variance or poor formulation, 21 items remained. (Botega et al., 2005).	Scale development study: Nurses [20] (Botega et al., 2005). Validation study: Nurses [317] (Botega et al., 2005).	1. Adopted three components of attitude. 2. Literature review, focus group interviews and expert consensus. 3. Three interpretable factors accounting for 43% of the total variance (16 items). 4. Not mentioned. (Botega et al., 2005).	1. $\alpha = 0.7, 0.6, 0.5$ (Botega et al., 2005). 2. Not mentioned.	A C
Suicide Attitude Survey	Examines attitudes toward suicide among Ghanaians living in the US (Eshun, 2006).	Consists of eight items rated on a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree' (Eshun, 2006).	Developed from research literature and existing questionnaires (Eshun, 2006).	Ghanaians living in the US [81] (Eshun, 2006).	Not mentioned.	1. $\alpha = 0.69$ (Eshun, 2006). 2. Not mentioned.	B C

(continued)

Table 1 (continued)

Scale names	Objectives	Scale characteristics	Scale development	Study participants [n]	Validity	Reliability	M W
Hong Kong version of Chinese Attitudes Toward Suicide Questionnaire (CASQ-HK)	Measures Chinese attitudes toward suicide (Lee <i>et al.</i> , 2007).	Part A: Consists of 73 items rated on five-point Likert scales ranging from 'greatly agree' to 'greatly disagree'. Part B: Consists of 12 scenarios rated on 5-point Likert scales. Respondents rate their likelihood of considering suicide in the scenarios. Part C: Consists of 13 questions about sociodemographics and presence of serious suicidal ideation, previous suicide attempt and having known someone who attempted or completed suicide (Lee <i>et al.</i> , 2007).	The CASQ (unpublished paper by Phillips (2004) cited in Lee, <i>et al.</i> , 2007) was used to develop the CASQ-HK. The CASQ was developed based on 101 focus group interviews and two pilot tests in 2,000 randomly selected subjects. Nine focus group interviews were conducted among 82 Chinese subjects for the HK. Participants included people of different ages, suicide attempters, healthcare professionals and policy-related personnel. The preliminary version of CASQ-HK consisted of 98 items and was pilot-tested with 96 people (Lee <i>et al.</i> , 2007).	Scale development study: Individuals of varied sociodemographic backgrounds [96] (Lee <i>et al.</i> , 2007). <i>Validation study:</i> A convenience sample of Chinese people born and living in Hong Kong [1226] (Lee <i>et al.</i> , 2007).	1. Not mentioned. 2. Extensive focus group interviews. 3. Part A: nine interpretable factors cumulatively accounting for 36.1% of the total variance. 4. Not mentioned. (Lee <i>et al.</i> , 2007)	1. Part A: $\alpha = 0.394$, 0.735, 0.693, 0.566, 0.623, 0.604, 0.511, 0.334, 0.308 (Lee <i>et al.</i> , 2007). 2. Not mentioned.	A B

Objectives: Objectives for scale development.

Scale characteristics: Item characteristics including the number of items and response methods.

Scale development: Methods used to develop the scale.

Study participants [n]: The number of study participants and their characteristics.

Validity: 1. Adoption of theoretical concepts of 'attitude' or 'attitude towards suicide'; 2. Performance of extensive literature reviews and use of expert consensus and/or focus group interviews during the process of scale development; 3. Interpretable results of factor analysis; 4. Correlations with external criteria; 5. Others, if any.

Reliability: 1. Internal consistency (e.g. Cronbach's α coefficient); 2. Stability (e.g. results of test-retest or split-half reliability tests); 3. Reproducibility (e.g. replicate of factor structure among different populations); 4. Others, if any.

M: Multidimensionality: inclusion of comprehensive attitudinal dimensions based on extensive past studies or theoretical backgrounds of attitudes toward suicide, and composition of multiple factors (A: meeting both criteria; B: meeting one of the criteria; C: meeting neither criteria).

W: Appropriateness for a wide range of populations: not limited for use among particular age groups, people with a specific cultural background, or those working in certain professional disciplines (A: meeting the criterion; B: partly meeting the criterion; C: not meeting the criterion).

Multidimensionality The initial item pool consisted of approximately 3,000 items derived from extensive literature reviews related to suicide (Domino *et al.*, 1980, 1982). Factor analysis and content analysis differentiated the SOQ items into two to 15 subscales (Anderson *et al.*, 2008; Domino *et al.*, 1980, 1982, 1988; Rogers & DeShon, 1992).

Appropriateness for a wide range of populations The SOQ has been widely used for attitudinal studies in various countries (e.g. Domino, 2002; Domino & Groth, 1997; Domino & Leenaars, 1989; Domino & Takahashi, 1991; Domino *et al.*, 2001). It is intended to compare attitudes toward suicide among communities, evaluation of training or education programmes for professionals, and other related research (Domino *et al.*, 1982).

Suicide Attitude Questionnaire

Validity Two types of theoretical concepts were used in the development of the SUIATT (Diekstra & Kerkhof, 1989). One was a three-component model of attitude, consisting of affective, cognitive and instrumental attitudes. The other concept defined the attitude toward suicide by different referent levels: the actors of suicide (respondents themselves, loved ones, or someone else) and recipients of suicidal actions (respondents themselves, loved ones, or someone else).

The preliminary item pool comprised 133 five-point Likert items that combined three components – actors, recipients and attitude – but excluded items leading to inconsistencies or tautologies in context (Diekstra & Kerkhof, 1989). A pre-test using these 133 items was administered to 85 graduate students majoring in clinical psychology. Based on factor analysis and comments made by the pre-test participants, 70 items were excluded and some of the remaining items were revised. The final 63-item scale was administered to 712 lay individuals selected from 11 medium-sized cities and six small rural communities in the Netherlands.

The identically formulated items regarding the referents were combined, and sum scores for each set of items were calculated (Diekstra & Kerkhof, 1989). Explorative factor analysis yielded five factors that cumulatively accounted for 55% of the total variance. Two factors consisted of purely cognitive components, two factors had instrumental components and one factor reflected both cognitive and instrumental components. Diekstra and Kerkhof (1989) reported that the three-component attitude model was only partially confirmed through the explorative factor analysis.

Based on combinations of referent and attitude components, 19 subscales of the SUIATT were constructed (Diekstra & Kerkhof, 1989). Results of principal component analysis for the 19 subscales confirmed that the three attitude components were independent from each other and attitudes toward suicide differed depending upon referents.

Reliability Internal consistency and test-retest reliability coefficients for the 19 subscales were adequate to prove reliability of the scales (Table 1). Six weeks after the first administration, the scale was re-administered to 256 participants randomly selected from the original group (Diekstra & Kerkhof, 1989). Correlation coefficients for test-retest reliability were 0.81 for the ‘respondent’ referent, 0.65 for the ‘beloved’, 0.67 for ‘someone else’ and 0.82 for the total SUIATT scale.

Feasibility The SUIATT would not be feasible for large survey studies because of the large number of items. Diekstra and Kerkhof (1989), who developed the SUIATT, also reported that a shorter, simpler form of the scale was needed for use in clinical settings.

Multidimensionality The three-component attitude model and different referent levels were introduced when developing the scale items (Diekstra & Kerkhof, 1989). Factor analyses supported the three attitudinal components as well as different referents with regard to attitudes toward suicide.

Appropriateness for a wide range of population The SUIATT was designed to compare attitudes toward suicide among various countries with different suicide rates and for educational studies (Diekstra & Kerkhof, 1989). Lay people were recruited for the scale development study.

Attitudes Toward Suicide

Validity The first version of the ATTS was developed under the influence of the SOQ (Renberg & Jacobsson, 2003). Professionals with broad experience in the field of suicide issues and a group of lay people both examined this version and made suggestions regarding the item pool. Based on their opinions, 80 items were selected and administered as a pre-test to a group of students. Sixty two items remained after excluding those with low discriminative power or shortcomings in formulation. Questionnaires were then mailed to 710 lay people who were randomly selected from a county in north Sweden. Twenty two items remained after items with extremely skewed or high kurtosis distributions or low correlations with other items were removed. An exploratory factor analysis was conducted, which yielded eight interpretable factors, including 20 items that cumulatively accounted for 63% of the total variance.

The second version of the ATTS was developed using related studies in the field of attitudes toward suicide (Renberg & Jacobsson, 2003). This version also adopted the theoretical concept of attitudes toward suicide with regard to different referent levels introduced by Diekstra and Kerkhof (1989), who developed SUIATT, and the original 20 items were expanded to 69 items. After comparison with results from the study by Diekstra and Kerkhof (1989), only necessary combinations of referents were kept and 40 items remained. The second postal surveys were distributed to 1,000 randomly selected lay people. An exploratory factor analysis yielded 10 interpretable factors, including 34 items that cumulatively accounted for 60% of total variance, after excluding items with <0.40 communality or loading. The study also revealed significant associations between attitudes and respondents' suicidal behaviours, which partially confirmed criterion validity.

Reliability The α coefficients computed for the first eight factors ranged from 0.38 to 0.66, and for the second 10 factors ranged from 0.38 to 0.86 (Renberg & Jacobsson, 2003). The original eight-factor model fitted the data obtained in the second study, using confirmatory factor analysis with the 20 items derived from the original eight factors.

Feasibility Renberg and Jacobsson (2003) aimed to develop a feasible instrument to measure attitudes toward suicide in the general population via large questionnaire surveys. In fact, the ATTS has been used to assess the efficacy of methodologies used by the European Alliance Against Depression (EAAD) (www.eaad.net). The EAAD aims to improve the care of people with depression by introducing community-based intervention programmes in 17 European countries (Hegerl *et al.*, 2009).

Multidimensionality The ATTS was developed using the earlier development studies of multidimensional attitudes toward suicide scales, such as the SOQ and SUIATT (Renberg & Jacobsson, 2003). The exploratory factor analyses in the two studies yielded interpretable factors to categorize attitudes toward suicide.

Appropriateness for a wide range of populations The ATTS was developed as a feasible instrument to measure attitudes toward suicide in the general population (Renberg & Jacobsson, 2003). Surveys for scale validation were administered to randomly selected lay individuals.

DISCUSSION

Through a review of publications regarding attitudes toward suicide, 18 scales were selected as instruments for use in the measurement of attitudes toward suicide or related matters. After reviewing validation studies and organizing scale characteristics, three instruments that are used to assess multidimensional attitudes toward suicide in a wide range of populations were identified: the SOQ, SUIATT and ATTS. Their psychometric characteristics were compared to identify a reliable, valid, multidimensional tool feasible for use in a wide range of populations.

Validity refers to adopting the theoretical concepts of 'attitude' or 'attitude toward suicide' and provides a guarantee that the correct measurements had been made. Validity of the SOQ scale was determined based on an extensive literature review; however, this was not based on a solid theoretical framework. The lack of consensus on psychometric properties has become a focus of criticism (Diekstra & Kerkhof, 1989). In contrast, two theoretical concepts were used to develop the SUIATT questionnaire (Diekstra & Kerkhof, 1989). It uses the three-component model of attitude and defines attitudes toward suicide with regard to different referent levels. Particular attention was paid to validity in the development of the ATTS, in which the SOQ, the SUIATT and broad professional knowledge in suicidology were taken into account (Renberg & Jacobsson, 2003). The ATTS revealed significant associations between attitudes and respondents' suicidal behaviours, which partially confirmed criterion validity.

Internal consistency, stability and reproducibility of the scales were reviewed for reliability in the present study. Results for all three questionnaires demonstrate relatively good reliability, although some factors were associated with very low α coefficients or lack of reproducibility. For instance, α coefficients for internal consistency of the ATTS and some of its subscales were low (Renberg & Jacobsson, 2003). Renberg and Jacobsson (2003) speculated that the area of attitudes measured by the ATTS may be too broad, the nature of these attitudes may be too ambiguous, and the ATTS is administered to a heterogeneous group of people. Thus, this survey requires additional studies, including test-retest reliability studies. Furthermore, we believe that attitudes are not completely stable over time. For this reason, computed measures do not provide as reliable a score as one would wish. Nevertheless, the original eight-factor model fitted the data obtained in the second study (Renberg & Jacobsson, 2003). This result supports the relatively high reliability of the ATTS.

Reliability is also linked to the structure of the questionnaires. The present study demonstrated that all commonly used scales that measure attitudes toward suicide were multidimensional. Nonetheless, consensus has not been achieved regarding the structure of the SOQ; some studies have two (Anderson *et al.*, 2008), while others have up to 15 subscales (Domino *et al.*, 1982). In contrast, the structure of the SUIATT questionnaire was supported by the three-component attitude model (Diekstra & Kerkhof, 1989). Given that its structure is relatively complicated, the SUIATT has been criticized for providing scores that are difficult to interpret (Botega *et al.*, 2005).

The number of items and complexity of rating usually predict the feasibility of the scale. The SOQ is a complex tool consisting of more than 100 items. For this reason, it is a tool that can be used only in complex studies and is not feasible for clinical use. The SUIATT has similar shortcomings;

it is composed of 63 multi-faceted items. To overcome the limitations of previous scales, the ATTS was designed to be a feasible instrument for use in the measurement of attitudes toward suicide in the general population via large surveys.

In addition, the range of populations for which the scales were designed were considered. The SOQ was optimized to serve as a wide-range tool, but as previously mentioned, its comprehensiveness poses problems in that it becomes a scale with low feasibility. The SUIATT was intended for similar use and for comparative and educational studies in particular. The ATTS is also appropriate for a wide range of populations; it is not limited for use among certain age groups, people with specific cultural backgrounds, or those working in certain professional disciplines.

When a new scale is developed, its construction should target the developer's specific research purposes. Developers should more actively explore relationships between attitudes and outcome variables, such as suicidal ideation or intervention skills for suicidal cases, as well as examine the scale's psychometric properties.

One of the limitations of this study is that only publications written in English were reviewed. There may be more valid, reliable and feasible attitudinal scales reported in non-English publications. Moreover, electronic searches were conducted using only two databases, PubMed and PsychInfo. However, the authors believe that the most important psychometric scales would be used or at least mentioned in studies listed in those major databases.

In conclusion, the three multidimensional scales used for a wide range of individuals in the population, the SOQ, SUIATT and ATTS, were selected from among 18 scales that measure attitudes toward suicide or related matters. Each has its own characteristics and should be used in accordance with research purposes. Of the three scales, the ATTS appears to be the most feasible and valid instrument, although additional reliability studies are needed. For this reason, future studies are recommended to further increase the understanding of these surveys and document insights gained from their usage.

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