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Measurement properties of the Adolescent Quality of Life Mental Health Scale (AQOL-MHS)

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Abstract

Background—This article presents data on the psycho-metric properties of a new measure, the Adolescent Quality of Life Mental Health Scale (AQOL-MHS), designed to measure quality of life in clinical samples of Latino adolescents aged 12–18 years. Participants were recruited in Puerto Rico to have one of five prevalent mental health disorders. The initial instrument development was achieved through a grounded theory approach with the use of focus groups and in-depth interviews.

Methods—We conducted two stages of exploratory factor analyses (EFA) on 60 candidate items. The first stage was to establish the number of factors to extract, and the second was to improve the model by selecting the best items. A final EFA model retained 31 items and 3 factors labeled Emotional Regulation (11 items), Self-Concept (10 items) and Social Context (10 items).

Results—The instrument showed good internal consistency, test–retest reliability, and construct validity. The hypotheses-driven validity tests were all supportive of the AQOL-MHS. There was evidence for convergent validity and discriminant validity, and results for known-groups' validity were overwhelmingly supportive of the ability of the instrument to identify differences between groups.

Conclusions—These preliminary findings support our conceptual model and the use of the AQOL-MHS domain and overall scores. We believe that this instrument will provide clinicians additional insight into the different aspects of quality of life that are important to adolescents with

mental health problems. Therefore, we consider the AQOL-MHS a vital patient-centered outcome measure for assessment strategies in the prevention and treatment of this population.

Keywords

Quality of life; Adolescents; Mental health; Patient-centered outcome measure

Introduction

Improving health-related quality of life (HRQOL) is an important goal in the treatment for chronic illnesses and continues to be firmly established as an important outcome in clinical research. HRQOL has impacts on all levels of ecological domains (school, family, and community) and demands a comprehensive model of clinical outcome measurement. Research has shown that HRQOL is reduced in the presence of physical and mental health disorders [1]. The British National Child Development Study showed that individuals reporting emotional and behavioral problems during childhood at the highest levels (quartiles) had about double the mortality by age 46 years than those in the lowest levels [2]. However, generic measures of clinical outcomes and symptoms are primarily sensitive to a narrow range of the problems faced by children with mental health disorders.

Condition-specific measures have been shown to be necessary to detect small but important differences in treatment effectiveness between treatment groups [3]. The Adolescent Quality of Life Mental Health Scale (AQOL-MHS) was developed to suit such a purpose. To our knowledge, there are no other instruments specifically designed to assess Quality of Life in adolescents with psychiatric disorders. Our earlier work has yielded a new Spanish language instrument that focuses on the QOL of adolescents (12–18 years old) with mental health problems [4]. We sought to create specificity during instrument development by drafting items that used, whenever possible, the same words articulated by the adolescents when expressing their feeling toward quality of life. This instrument is intended to provide clinicians with additional insight into distinct domains of quality of life that are important to adolescents with mental health problems and therefore provide a vital patient-centered outcome measure for the assessment of strategies in prevention and treatment.

The initial development of the AQOL-MHS was achieved through a grounded theory approach with the use of focus groups and in-depth interviews of clinical samples of Spanish-speaking Latino adolescents aged 12–18 years in Puerto Rico who were recruited to have one of five prevalent mental disorders: attention-deficit hyperactivity disorder (ADHD), conduct disorder (CD), oppositional defiant disorder (ODD), generalized anxiety disorder (GAD), and major depressive disorder (MDD). Chavez et al. [4] provide a detailed description of the construct of QOL on which this instrument is based and the theoretical foundation that informed the methodology used in the development of the items. The purpose of this study is to evaluate the psychometric properties of the AQOL-MHS using established guidelines for measurement development [5, 6].

Methods

Study design

Both a community and a clinic sample of youth participants were recruited in Puerto Rico. For the clinical sample, participants needed to be previously diagnosed with one of the five study mental health disorders and were recruited through referrals provided by the mental health staff of participating mental health clinics. The referral process was supported by: Mental health outpatient clinics of the APS Healthcare system of Puerto Rico, the Pediatric

Hospital of the University of Puerto Rico, and clinicians (psychologist and psychiatrist) with private practices.

Parents bringing their children between the ages of 12–18 years to the participating outpatient mental health clinics were asked by their doctors and other clinicians if they were interested in participating in the study. Those expressing interest were asked to sign a release form to contact them, explained the research project, and were interviewed to determine eligibility of the adolescent. If eligible, a home visit was arranged to obtain informed consent as well as secure authorization for the release of medical information needed to verify the participant's diagnosis.

The community sample was recruited through the use of electronic media and posters placed at the Medical Sciences Campus of the University of Puerto Rico and at private and public schools located at the San Juan metropolitan area. Our general approach to our worksite recruitment began by sending e-mails through our internal list server that reaches both students and faculty and non-faculty personnel. Interested individuals, either from the schools visited or from the university advertisements, would call our study personnel to inquire about the details of the study and, if interested, to participate. Following the same method as for the clinic participants, if community participants were eligible, a home visit was arranged to obtain consent.

Both clinic and community participants were samples of convenience. Study exclusion criteria included cognitive impairment, history of severe brain injury, pervasive developmental disorder, or evident sensory impairment. All adolescents received a \$35 reimbursement for participation in the study. The protocol took approximately 1.5 h to complete and was administered by a lay interviewer. A random subsample of 46 participants completed the AQOL-MHS approximately 1 week (mean = 7.8 days) after the initial survey to assess test–retest reliability. The repeat survey took approximately 30 min to complete, and participants were offered a \$40 incentive for their participation. The surveys were administered in Spanish only.

Participants

The study included 254 Spanish-speaking adolescents 12–18 years of age, 111 had a mental health diagnosis, and 143 had no mental health diagnosis. Of the total sample, 186 were recruited from participating clinics and 68 were recruited from the community. To allow for analyses by diagnosis type, we had a target quota of at least 30 adolescents for each of the study diagnoses. We were successful in filling sample targets in all groups except one; MDD/GAD. Actual numbers obtained are as follows: ADHD ($n = 53$), ODD/CD ($n = 30$), and MDD/GAD ($n = 28$).

Description of the initial AQOL-MHS

The initial AQOL-MHS consists of 60 items corresponding to 5 core QOL domains: (1) Self, (2) Peers, (3) Family, (4) School, and (5) Environment. The Self domain refers to the youth's feelings about him or herself. The Family and Peers domain relate to the youth's social relationships. The School and Environment domains correspond to a youth's ecological ambience. All of the items were based on interviews with adolescents and were written as much as possible using adolescents' own words as they expressed their thoughts and concerns (in Spanish). We avoided using slang in the drafting of the items for comparability purposes, keeping in mind the possible translation, and adaptation of the instrument into other languages or cultures. All items in the scale were administered on an 11-point scale anchored at the top and bottom by “completely agree” (10) to “completely disagree” (0).

Study measures

Diagnostic Interview Schedule for Children (DISC)—The presence of a DSM-IV psychiatric disorder (during the last year) was assessed using the youth version of the DISC-IV for all adolescents [7, 8]. The DISC-IV is a structured diagnostic instrument for the assessment of psychiatric disorders in children and adolescents, designed to be administered by lay interviewers. Previous versions of both the English and Spanish DISC have generally shown adequate test–retest reliability in both clinic and community samples [9–11]. Criterion, concurrent, discriminant, and predictive validity for earlier versions of the DISC have been evaluated and reported [12–15]. The test–retest reliability of the current version of the DISC has been reported for Spanish (using Puerto Rican children) and English-speaking youth samples yielding comparable results [7, 8]. To ease response burden, only the modules for the 5 target disorders were administered.

The Parent Interviewer Children’s Global Assessment Scale (PIC-GAS)—Impairment in functioning was measured using the PIC-GAS [16]. This instrument provides a global measure of impairment or adaptive functioning at home, community, school, and with friends. The test–retest reliability of the Spanish translation of the PIC-GAS is moderate ($ICC = .69$) [7]. The discriminant, concurrent, and construct validity of the instrument have been reported, and score threshold of 69 indicates impaired functioning [16]. Youth with a score less than this cutoff score higher on the DISC, use more mental health services, have lower competence scale scores and lower school performance [16]. We used this cutoff to dichotomize this variable for analyses.

Sociodemographic variables—Basic demographic information including age, date of birth, school grade level, gender, race/ethnicity, family structure, child and parental education, and perception of poverty was obtained by either adolescent self-report or from the adolescent’s parents depending on the variable of interest.

Family Functioning Scale (APGAR)—The APGAR consists of five items assessing a person’s current satisfaction with family relationships including emotional support, communication, and use of leisure time. Higher scores indicate better family communication. The instrument has been used in several epidemiological studies carried out in Puerto Rico [17]. The instrument has good internal consistency and adequate construct and discriminant validity [18]. In the MECA study, a study of Puerto Rican children had a high mean comparable to other estimates for non-clinical samples [18, 19].

The Youth Quality of Life for adolescents-Research version (YQOL-R) [20, 21]—The YQOL-R is a generic QOL questionnaire for adolescents 12–18 years old from diverse backgrounds and physical and developmental disabilities. It measures four main domains of HRQOL: (1) sense of self, (2) social relationships, (3) environment, and (4) general quality of life [20, 22]. The psychometric evaluation of the YQOL-R results in a Cronbach’s $\alpha = .77$ –.96, an intraclass correlation coefficient of .74–.85. The ability to differentiate between known groups and an exploratory factor analysis, both provided support for the hypothesized domain structure [21]. The YQOL-R was included as a way to measure the concurrent validity of the AQOL-MHS with a generic HRQOL measure.

Statistical analysis

Prior to data analyses, values were checked for inconsistencies. We began by tabulating responses for each item to identify possible data entry errors. Item non-response was also examined and tabulated by characteristics of the youths to identify factors related to item non-response. After data cleaning, items worded negatively for the construct were reverse

scored and all items were recoded so that 10 indicated the highest possible QOL score. Overall and subscale scores were computed on a 0–100 point scale for ease of interpretation.

Items were evaluated in terms of means, standard deviations, percent of responses at the floor and ceiling, skewness, kurtosis, and inter-item Pearson product-moment correlation coefficients. For selecting the best items for the construction of the AQOL-MHS, we utilized the multivariate technique of exploratory factor analysis (EFA), estimated by means of maximum likelihood using an oblique rotation (GEOMIN). We considered a solution with correlated factors to be appropriate to our study domains. The decision of the number of factors to extract from the data matrix was based on both statistical model fit criteria and substantive theoretical considerations on the interpretability of the factor solution [23]. Parallel analysis was conducted and revealed three factors should be retained. We documented the improvement in the EFA model fit from one to three factors by the examination of several model fit criteria including the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). The final scale was chosen when all remaining items had good measurement properties including a strong relationship to a primary factor (strong primary loadings) and low ambiguity of measurement (small cross-loadings).

Internal Consistency was evaluated with Cronbach's alpha. A minimum coefficient of 0.70 was considered necessary for group comparisons [24]. Test–retest reliability was also computed using the 46 participant subsample previously described. No changes in QOL were expected during the 1-week period. Intraclass correlation coefficients (ICC) were used to assess the degree of agreement for the total scale and subscales. Generally, an ICC > 0.70 is considered adequate for group comparisons [24].

The *Construct Validity* of the scale was evaluated by assessing concurrent, convergent, and discriminant (known groups) validity. Concurrent validity was assessed by correlating scores on the AQOL-MHS to the YQOL-R and the APGAR. Convergent and discriminant validity were assessed by correlating the AQOL-MHS with the YQOL-R and PIC-GAS. We hypothesize that the correlation between the AQOL-MHS and the YQOL-R would be significant and greater than the correlation between the AQOL-MHS and the PIC-GAS. To perform these comparisons, we used methods that account for the dependent correlations. Known-group discriminant validity was assessed by comparing mean scores on the total scale and subscale scores for the following groups: clinic versus community adolescents, adolescents with psychiatric diagnosis (ADHD, CD, ODD, GAD, and MDD) versus no diagnosis, and adolescents that met criteria for functional impairment versus those that did not. Analyses were conducted with SAS version 9.1.3 software and with MPLUS version 6.12.

Results

Participant characteristics

The majority of participants were recruited from a clinic site (73.2 %), were male (55.9 %), and were in the younger adolescents age category (53.2 %). Approximately a third of participants had never sought mental health treatment (33.1 %), and almost half (48.4 %) had one or more years of treatment. Nearly all of the parents completing the survey were female (94.9 %), with some college or a college degree (63.8 %) and reported living from check to check or having just enough money to make ends meet (44.5 %). The largest category under marital status was married (39.4 %), and under age was 40–49 years (40.7 %). Details are provided in Table 1.

Factor structure

During the first stage of the exploratory factor analyses, we identified the most parsimonious number of factors underlying the original 60 items. Using statistical model fit criteria, parallel analysis, and the interpretability of the factors, we identified a 3-factor solution as the optimal model for our scale. Because some items violated the assumption of normality, we estimated models using traditional maximum likelihood estimation (ML) and robust maximum likelihood estimation (MLR); the results of both types of models were nearly identical; therefore, only results using ML estimation are presented. For second stage of the factor analysis, we selected the best items from the original item pool to measure each factor. Items were considered for elimination if the factor loadings on the primary factor were $<.40$ and cross-loadings on two or more factors were $>.40$. Following an iterative item elimination process, our final EFA model retained 31 out of the original 60 items and the 3 factors were labeled Emotional Regulation (11 items), Self-Concept (10 items), and Social Context (10 items). Table 2 shows the overall fit statistics for the final 31-item AQOL-MHS, and Table 3 shows the final three-factor loadings solution.

The Emotional Regulation (Emotional) factor had loadings ranging from .43 to .71, the Self-Concept (Self) factor had loadings ranging from .44 to .77, and the Social Context (Social) factor also had loadings ranging from .40 to .82. The correlations between the factors were positive and statistically significant with values of .30 (emotional and social), .33 (self and social), and .34 (emotional and self). Scale scores were computed by summing item scores within each scale.

Item descriptive statistics: means, floor, and ceiling effects

The item means for Emotional Regulation ranged from 4.3 to 7.3 and the percent of responses at the floor (score = 0) ranged from 7.1 to 27.6 % and the percent of responses at the ceiling (score = 10) ranged from 19.3 to 48.4 %. The item means for Self-Concept ranged from 7.4 to 9.2 and the percent of responses at the floor ranged from 1.6 to 5.5 % and responses at the ceiling ranged from 27.6 to 78.0 %. The item means for Social Context ranged from 7.9 to 9.1 and the percent of responses at the floor ranged from 1.6 to 6.3 % and responses at the ceiling ranged from 56.3 to 77.6 %.

Inter-item correlations and inter-scale correlations

To summarize the inter-item correlations matrix, we present the average, smallest, and largest inter-item correlations, respectively, as follows: 0.19, -0.18 , and 0.70. The correlation coefficients for the observed scales were as follows: for Emotional Regulation and Self-Concept, $r = .32$, for Self-Concept and Social Context, $r = .45$, and for Social Context and Emotional Regulation, $r = .23$. These correlations were sufficiently low to justify the use of these scales as separate dimensions of HRQOL.

Reliability

We obtained both internal consistency and test–retest estimates of reliability for the AQOL-MHS total score and for each of the subscales. Cronbach Alpha ranged from .80 to .85 by subscale and was .87 for the overall scale. Intraclass correlation coefficients (test–retest) ranged from .82 to .90 for subscales and estimated at .89 for the overall scale. For both types of reliability, a coefficient of $>.70$ is considered necessary to conduct group comparisons in randomized clinical trials and other clinical research. Both sets of estimates are very similar and indicate that the total scale score has excellent reliability, with subscales having good to excellent reliability (see Table 4).

Validity

The AQOL-MHS and YQOL-R were highly correlated ($r = .75$; $p < .0001$) indicating concurrent validity. The AQOL-MHS was also highly correlated with family functioning ($r = .59$; $p < .0001$) and functional impairment ($r = .60$; $p < .0001$) demonstrating criterion validity. As hypothesized, the correlation between the YQOL-R and the AQOL-MHS was significantly greater than the correlation between the AQOL-MHS and the PIC-GAS, providing evidence for convergent and discriminant validity.

Table 5 presents the summary results of our known-groups' discriminant validity analyses. The overall AQOL-MHS score and the Emotional and Self subscales discriminated between community and clinic youths. The effect size for the Emotional subscale was 0.75. The AQOL-MHS overall score and all its subscales also discriminated between youth with and without psychiatric diagnosis. The effect sizes for the overall, emotion, self, and social scales were .97, .98, .47, and .51, respectively. We further explored the differences between youth with and without internalizing versus externalizing diagnoses and between those with ADHD versus CD/ODD. There were no differences between youth with externalizing versus internalizing diagnoses (results not shown), but the overall score and Emotional and Self subscales were highly discriminating between youths with ADHD versus CD/ODD. The effect sizes for Emotional and Self subscales were 1.45 and .83. The overall and subscales discriminated between youth with and without significant functional impairment. The effect sizes for the overall (1.12) and the Emotional (1.09) and Self scales (.75) were also large.

Discussion

Assessing quality of life accurately is important for evaluating the effectiveness of treatment and crucial to provide a complete picture of children's physical and mental health status [25]. The results of this study are encouraging as they indicate strong preliminary evidence of the psycho-metric properties of the AQOL-MHS for a cross-sectional sample of clinic and community Spanish-speaking adolescents 12–18 years of age. The instrument showed good internal consistency, test–retest reliability, and construct validity. The exploratory factor analyses yielded three factors reflecting *Emotional Regulation*, *Self-Concept*, and *Social Context*. Emotional or Self-regulation has been defined as a complicated process that allows children to appropriately respond to their environment [26] and is reflected in positive social relationships, productivity, achievement, and positive sense of self [27]. In contrast, an inability to regulate one's emotions has been linked with the etiology and maintenance of diverse problems including depression, antisocial behavior, addictions, and suicidal ideation [28]. Adolescence also represents an important developmental stage where the evaluation of oneself or self-concept becomes more comprehensive and differentiated [29]. During early adolescence, children become more likely to compare themselves to others and to understand that others are making comparisons and judgments about them [30]. Having low self-esteem during adolescence predicts poor health, criminal behavior, and limited economic prospects during adulthood [31]. Our items also cover three key social contexts of adolescent life: family, peer group, and school. Greater social control in these contexts has been associated with lower levels of delinquency and drug abuse [32].

Items that form part of the Emotional Regulation factor include “When I feel sad, I am not interested in being with others” and “I have problems with my family because they are unfair to me.” For the Self-Concept factor items include “I am a person that feels happy” and “I value and accept myself as a person,” and for the Social Context factor items include “It is important for me to have someone that will be with me during good and bad times” and “I know I have to get along/have a good attitude toward others.” These resulting factors are all indicative of key aspects of an adolescent's life, specifically those with prevalent mental health problems, and are a direct product of using grounded theory and qualitative

methods. We believe this furthers our evidence for the Content validity of the items given that they were defined by the adolescents themselves and were written keeping as faithfully as possible to the adolescents' own words and expressions [4].

The hypotheses-driven validity tests were supportive of the AQOL-MHS. The YQOL, a general QOL instrument, had a significant high positive correlation with the AQOL-MHS as would be expected with two instruments measuring the same construct but for different populations. There was also evidence for convergent validity in that better family function was indicative of better HRQOL as measured by the instrument. There was a strong association between impairment and a diminished HRQOL in support of discriminant validity. In terms of known-groups' validity, the results were also overwhelmingly supportive of the ability of the instrument to identify differences between groups as expected. Adolescents with a mental health diagnoses reported a poorer QOL in all three factors and on the overall scale than those without a diagnoses. This same pattern was repeated for those with functional impairment (all reporting poorer QOL). Differences in QOL were also observed for those with ADHD in contrast to those with CD/ODD, indicating that the latter group was more severe in all but the social domain. Clinic adolescents reported worse QOL in the Emotional and Self domains and the overall scale than those from the community. The preliminary findings reported in this study support our conceptual model and the use of the AQOL-MHS domain and overall scores. Further testing of the instrument is in progress and includes a longitudinal design for testing of the usefulness of the 31 item AQOL-MHS measure for tracking changes in HRQOL during the course of service use, in evidence-based clinical practice. There are also future plans for an English version of the scale to be tested in both Latino and non-Latino white populations in the USA. In the more distant future, cross-national studies may be possible.

Limitations

This study was solely conducted with Spanish-speaking participants. In order to gain wide use in the United States, it will need to be replicated with English-speaking adolescents. Further, our design called for samples of convenience, but the samples were constructed to provide heterogeneity of HRQOL and of mental status. Nevertheless, this design does not allow us to provide either normative distribution of the subscales or estimates of naturally occurring population variances. These limitations allow us to identify items that are ambiguous or irrelevant, but they prevent us from reporting definitive estimates of reliability and validity. However, these limitations are shared by all studies using the same sampling method.

An additional limitation of this study is that the analyses are based on classical test theory. Future plans include the use of a larger sample to allow more extensive confirmation of the psychometric properties of the AQOL-MHS and modern test theory methods such as item response theory.

Conclusions

Health-related quality-of-life information aids in the identification of relevant problems in the lives of these adolescents that in turn, as identified by the instrument, will assist the provider in recognizing risk factors and the researcher in developing appropriate interventions based on the results obtained. The identification of such factors is especially relevant to minority children and adolescent populations since they are at a higher risk of developing mental health problems. Latino youth have among the highest rates of externalizing behavioral difficulties, substance use, sexual risk behaviors, and high school dropout rates in the USA [33–36]. These factors place children at a higher risk for lifetime economic, social, and health disadvantage [37]. A step toward understanding and mitigating

existing racial and ethnic service disparities requires measuring outcomes appropriately in these populations. Therefore, developing an outcome measure that focuses on Latino youth has substantial value and the potential to improve equity in the delivery of mental health services for Hispanic minority populations.

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References

1. Chen H, Cohen P, Kasen S, Johnson JG, Berenson K, Gordon K. Impact of adolescent mental disorders and physical illnesses on quality of life 17 years later. *Archives of Pediatrics and Adolescent Medicine*. 2006; 160(1):93–99. [PubMed: 16389217]
2. Jokela M, Ferrie J, Kivimaki M. Childhood problem behaviors and death by midlife: The British National Child Development Study. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2009; 48(1):19–24. [PubMed: 19218894]
3. Guyatt GH, Feeny DH, Patrick DL. Measuring health-related quality of life. *Annals of Internal Medicine*. 1993; 118(8):622–629. [PubMed: 8452328]
4. Chavez L, Mir K, Canino G. Starting from scratch: The development of the Adolescent Quality of Life-Mental Health Scale (AQOL-MHS). *Culture, Medicine and Psychiatry*. 2012; 36(3):465–479.
5. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*. Washington, DC: American Psychiatric Association; 1994.
6. Nunnally, JC.; Bernstein, IH. *Psychometric theory*. 3. New York: McGraw-Hill; 1994.
7. Bravo M, Ribera J, Rubio-Stipec M, Canino G, Shrout P, Ramirez R, et al. Test-retest reliability of the Spanish version of the Diagnostic Interview Schedule for Children (DISC-IV). *Journal of Abnormal Child Psychology*. 2001; 29(5):433–444. [PubMed: 11695544]
8. Shaffer D, Fisher P, Lucas CP, Dulcan MK, Schwab-Stone ME. NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): Description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2000; 39(1):28–38. [PubMed: 10638065]
9. Jensen P, Roper M, Fisher P, Piacentini J, Canino G, Richters J, et al. Test-retest reliability of the Diagnostic Interview Schedule for Children (DISC 2.1). Parent, child, and combined algorithms. *Archives of General Psychiatry*. 1995; 52(1):61–71. [PubMed: 7811163]
10. Ribera JC, Canino G, Rubio-Stipec M, Bravo M, Bauermeister JJ, Alegria M, et al. The Diagnostic Interview Schedule for Children (DISC-2.1) in Spanish: Reliability in a Hispanic population. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*. 1996; 37(2):195–204.
11. Shaffer D, Schwab-Stone M, Fisher P, Cohen P, Piacentini J, Davies M, et al. The Diagnostic Interview Schedule for Children-Revised Version (DISC-R): I. Preparation, field testing, interrater reliability, and acceptability. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1993; 32(3):643–650. [PubMed: 8496128]
12. Goodman SH, Schwab-Stone M, Lahey BB, Shaffer D, Jensen PS. Major depression and dysthymia in children and adolescents: Discriminant validity and differential consequences in a community sample. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2000; 39(6):761–770. [PubMed: 10846311]
13. Jensen PS, Salzberg AD, Richters JE, Watanabe HK. Scales, diagnoses, and child psychopathology: I. CBCL and DISC relationships. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1993; 32(2):397–406. [PubMed: 8444770]
14. Jensen PS, Watanabe HK, Richters JE, Cortes R, Roper M, Liu S. Prevalence of mental disorder in military children and adolescents: Findings from a two-stage community survey. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1995; 34(11):1514–1524. [PubMed: 8543520]

15. Schwab-Stone ME, Shaffer D, Dulcan MK, Jensen PS, Fisher P, Bird HR, et al. Criterion validity of the NIMH Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3). *Journal of the American Academy of Child and Adolescent Psychiatry*. 35(7):878–888. [PubMed: 8768347]
16. Bird HR, Andrews H, Schwab-Stone M, Goodman S, Dulcan M, Richters J, et al. Global measures of impairment for epidemiologic and clinical use with children and adolescents. *International Journal of Methods in Psychiatric Research*. 1996; 6:295–307.
17. Bird HR, Davies M, Duarte CS, Shen S, Loeber R, Canino GJ. A study of disruptive behavior disorders in Puerto Rican youth: II. Baseline prevalence, comorbidity, and correlates in two sites. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2006; 45(9):1042–1053. [PubMed: 16926611]
18. Good MD, Smilkstein G, Good BJ, Shaffer T, Arons T. The family APGAR Indices: A study of construct validity. *Journal of Family Practice*. 1979; 8:577–582.
19. Goodman SH, Hoven CW, Narrow WE, Cohen P, Fielding B, Alegria M, et al. Measurement of risk for mental disorders and competence in a psychiatric epidemiologic community survey: The National Institute of Mental Health Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) Study. *Social Psychiatry and Psychiatric Epidemiology*. 1998; 33(4): 162–173. [PubMed: 9567666]
20. Edwards TC, Huebner CE, Connell FA, Patrick DL. Adolescent quality of life, part I: Conceptual and measurement model. *Journal of Adolescence*. 2002; 25(3):275–286. [PubMed: 12128038]
21. Patrick DL, Edwards TC, Topolski TD. Adolescent quality of life, part II: Initial validation of a new instrument. *Journal of Adolescence*. 2002; 25(3):287–300. [PubMed: 12128039]
22. Chavez LM, Matías-Carreló L, Barrio C, Canino G. The cultural adaptation of the youth quality of life instrument-research version for Latino children and adolescents. *Journal of Child and Family Studies*. 2007; 16:75–89.
23. Brown, TA. *Confirmatory factor analysis for applied research*. New York: Guilford Press; 2006.
24. Nunnally, J.; Bernstein, L. *Psychometric theory*. New York: McGraw-Hill Higher Inc; 1994.
25. Matza LS, Rentz AM, Secnik K, Swensen AR, Revicki DA, Michelson D, et al. The link between health-related quality of life and clinical symptoms among children with attention-deficit hyperactivity disorder. *Journal of Developmental and Behavioral Pediatrics, JDBP*. 2004; 25(3): 166–174. [PubMed: 15194901]
26. Bronson, MB. *Self-regulation in early childhood: Nature and nurture*. New York: Guilford; 2000.
27. Blair C, Diamond A. Biological processes in prevention and intervention: The promotion of self-regulation as a means of preventing school failure. *Development and Psychopathology*. 2008; 20(3):899–911. [PubMed: 18606037]
28. Wyman PA, Cross W, Hendricks Brown C, Yu Q, Tu X, Eberly S. Intervention to strengthen emotional self-regulation in children with emerging mental health problems: Proximal impact on school behavior. *Journal of Abnormal Child Psychology*. 2010; 38(5):707–720. [PubMed: 20180009]
29. Harter, S. Causes, correlates and the functional role of global self-worth: A life-span perspective. In: Sternberg, R.; Kolligian, J., Jr, editors. *Competence considered*. New Haven, CT: Yale University Press; 1990. p. 67–98.
30. Sebastian C, Burnett S, Blakemore SJ. Development of the self-concept during adolescence. *Trends in Cognitive Sciences*. 2008; 12(11):441–446. [PubMed: 18805040]
31. Trzesniewski KH, Donnellan MB, Moffitt TE, Robins RW, Poulton R, Caspi A. Low self-esteem during adolescence predicts poor health, criminal behavior, and limited economic prospects during adulthood. *Developmental Psychology*. 2006; 42(2):381–390. [PubMed: 16569175]
32. Costa FM, Jessor R, Turbin MS, Dong Q, Zhang H, Wang C. The role of social contexts in adolescence: Context protection and context risk in the United States and China. *Applied Developmental Science*. 2005; 9(2):67–85.
33. Alicea S, Pardo G, Conover K, Gopalan GMM. Step-up: Promoting youth mental health and development in inner-city high schools. *Clinical Social Work Journal*. 2012; 40:175–186. [PubMed: 23564983]
34. Cataldi, EF.; Laird, J.; KewalRamani, A. High school dropout and completion rates in the United States: 2007 (NCES 2009-064). National Center for Education Statistics, Institute of Education

Sciences, U.S. Department of Education; Washington, DC: 2009. Retrieved [date] from <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2009064>

35. Center for Disease Control and Prevention. National Youth Risk Behavior Survey: Health risk behavior by race/ethnicity. MMWR-NS-R. 2007
36. Tyler JH, Lofstrom M. Finishing high school: Alternative pathways and dropout recovery. The Future of children/Center for the Future of Children, the David and Lucile Packard Foundation. 2009; 19(1):77–103.
37. Ruglis J, Freudenberg N. Toward a healthy high schools movement: Strategies for mobilizing public health for educational reform. American Journal of Public Health. 2010; 100(9):1565–1571. [PubMed: 20634448]

Table 1

Sample characteristics

	%
Adolescents characteristics (<i>N</i> = 254)	
Recruitment site	
Clinic	73.2
Community	26.8
Gender	
Male	55.9
Female	44.1
Age	
12–14 years old	53.2
15–18 years old	46.8
Time in mental health treatment	
None	33.1
< 1 year	18.5
1–5 years	25.6
5 or > years	22.8
Parents characteristics	
Gender	
Male	5.1
Female	94.9
Education	
< High school	17.3
High school	18.9
Some college or college degree	63.8
Economic status	
Live well/comfortably	33.1
Live from check to check	44.5
Almost poor/poor	22.4
Marital status	
Single	28.7
Married/living as a couple	39.4
Separated/divorced/widowed	31.9
Age	
39 or less	38.3
40–49 years	40.7
50 and above	21.0

Table 2

Overall fit statistics for the exploratory factor analyses for the one-factor to three-factor model

Measures of fit	One-factor model	Two-factor model	Three-factor model
χ^2	1611.62	1125.88	767.20
<i>Df</i>	434	404	375
<i>p</i> value	< 0.000	< 0.000	< 0.000
AIC	37663.28	37237.53	36936.86
BIC	37992.25	37672.63	37474.53
RMSEA	.10	.08	.06
(90 % CI)	.10–.11	.08–.09	.06–.07
CFI	.53	.71	.84
TFI	.49	.67	.80
SRMR	.11	.07	.05

Table 3

Final factor pattern matrix for AQOL-MHS for the three-factor model

Brief item content	Three-factor model		
	Emotional	Self	Social
Acting out of control	0.54	0.02	0.03
Gets even when angry	0.59	0.01	-0.09
Bother others when bored	0.63	-0.14	0.02
Has negative attitude when things do not work out	0.71	0.01	0.14
Does not ask for permission	0.58	0.02	0.14
Avoids responsibility when angry	0.52	-0.02	-0.01
Cannot think when angry	0.52	-0.04	-0.29
Distrusts others	0.48	-0.05	-0.05
Becomes isolated when sad	0.43	-0.09	0.04
Feels misunderstood	0.57	0.21	-0.15
Feels family is unfair	0.45	0.17	-0.12
Feels happy	0.23	0.60	-0.00
Feels able to control emotions	0.21	0.44	0.09
Feels able to achieve goals	0.01	0.46	0.24
Accepts self regardless of others	-0.29	0.55	-0.04
Self-confident	-0.09	0.62	0.18
Stands by decisions	0.02	0.66	0.06
Values self	0.02	0.77	0.21
Knows how to deal with problems	0.10	0.55	0.01
Feels energized to do things	-0.02	0.46	-0.03
Feels positive about future	-0.05	0.52	0.18
Feels grateful	0.05	0.22	0.48
Finds strength in faith	0.07	0.14	0.40
Enjoys sharing with family	0.26	0.02	0.40
Gets along with others	0.04	0.24	0.42
Needs the support of others	-0.05	0.07	0.44
Likes to get support	-0.05	0.19	0.42
Does well at school	-0.14	-0.01	0.82
Gets support of teachers	0.01	-0.16	0.60
Getting good grades	-0.09	-0.01	0.77
Makes extra effort at school	0.03	-0.16	0.46

Bolded numbers represent items that belong to the column factor

Table 4

Reliability estimates

	α	Intraclass
Emotional	0.82	0.82
Self	0.85	0.90
Social	0.80	0.83
AQOL-MHS	0.87	0.89

Table 5

Discriminant validity data

	Clinic M (SD)	Community M (SD)	Effect size	p value
Type of sample (clinic vs. community)				
Emotional	55.84 (21.74)	71.88 (19.86)	0.75	< 0.0001
Self	82.25 (17.55)	88.88 (9.68)	0.42	0.0002
Social	86.68 (16.35)	88.72 (10.95)	0.14	0.26
AQOL-MHS	74.31 (13.70)	82.75 (10.48)	0.65	< 0.0001

	Non-Dx M (SD)	Dx M (SD)	Effect size	p value
Diagnosis (non-DX vs. Dx)				
Emotional	68.76 (18.91)	49.02 (21.65)	0.98	< 0.0001
Self	87.22 (11.76)	79.90 (19.64)	0.47	< 0.001
Social	90.52 (10.57)	82.98 (18.65)	0.51	< 0.001
AQOL-MHS	81.73 (10.30)	69.93 (14.10)	0.97	< 0.0001

	CD/ODD M (SD)	ADHD M (SD)	Effect size	p value
Externalizing Dx (CD/ODD vs. ADHD)				
Emotional	30.26 (16.42)	57.81 (20.10)	1.45	< 0.0001
Self	70.53 (22.68)	86.00 (16.26)	0.83	< 0.01
Social	80.63 (17.97)	84.34 (19.44)	0.20	0.39
AQOL-MHS	59.47 (12.77)	75.44 (12.74)	1.25	< 0.0001

	No impairment M (SD)	Impaired M (SD)	Effect size	p value
Functional impairment CGAS < 69				
Emotional	69.12 (18.23)	47.58 (21.64)	1.09	< 0.0001
Self	88.74 (9.98)	77.44 (20.22)	0.75	< 0.0001
Social	89.82 (12.10)	83.61 (17.94)	0.42	< 0.01
AQOL-MHS	82.09 (9.76)	68.87 (14.08)	1.12	< 0.0001

The effect size was estimated using Cohen's *d* index = (Mean(group1) – Mean(group2)/SD (pooled)