

## Reviewer Comments:

Reviewer #2: Re. "A new self-report measure of self-management of Type I diabetes for adolescents"

### Background and purposes

This manuscript reported the development and tests of an instrument measuring self-management in adolescents with type I diabetes. The conceptual definition of self-management was provided; similarities and differences between the concept and adherence compared and contrasted. The existing measure of self-management - DSMP was critiqued as insufficient as it didn't evaluate the process aspects self-management. The authors cited two advantages of the new measure: broadened the scope of measurement of self-management and provided an option of a self-report instrument.

What is weak in this section is the significance/importance of this instrument. What could the additional aspects of self-management contribute? Why do researchers and practitioners needed to know them?

### Research design and methods

The authors did a great job using a three-step process in developing this instrument. The concept analysis and qualitative study provided solid theoretical foundation for measuring self-management. The content validity assessment was thorough and yielded good results.

In the field testing, the sample included youth from 13-21 years old. As the name of the instrument said it is for adolescents, a definition of adolescents is needed. Also, the rationale for including young adults is also needed.

For characteristics of participants, how many had normal HBA1c? What is the range for duration of diabetes?

### Procedures

How was the sample size determined as sufficient for stability (n=187)? What is the rationale for testing stability at 3 months? Was self-management considered relatively stable over a three month period? Generally, test-retest reliability was performed at an interval of 2 weeks. If it is too long, it is difficult to decide whether the change reflects the stability of the measurements or real change in self-management.

### Measures

How long did it take to complete the instruments?

For SMOD-A, what is the potential range of score? Is higher score indicating higher self-management?

### Results

Page 9, second line, "but items distracting from reliability were then dropped". How many items were dropped? How many were retained? Were factor analysis re-performed for the final retained items?

The report of "Construct Validity Testing" was confusing. Given the conflicting results in table 3, it is difficult to think that the five subscales in the SMOD-A measured the same concept. What were the correlations among the five subscales of SMOD-A? Were the association between "collaboration with parents" and other subscales negative?

I would suggest that the authors re-write this section to clearly specify that was the expected relationship between the existing measures and the new measures, and how the testing results supported those hypothesis, thus supporting construct validity.

For the relationship between DSMP and SMOD-A, since the n is really small, effect sizes should be interpreted rather than the significance level.

#### Summary

This study is well designed with adequate sample size. The authors defined self-management as a multi-dimensional concept and developed an instrument reflecting this conceptual definition. The factor analysis and internal consistency test were appropriate for evaluating psychometric property. However, the results section was not well organized and presented. The discussion of the results was superficial and didn't connect back to the conceptual definition.

#### Reviewer #3: Summary of Comments

This is an important topic but there are a series of flaws in the construction of the instrument and the data analysis. Conceptually, there is a lack of specification and it is difficult to tell if the analysis was forced because of a conceptual bias into a 4 factor solution. Exploratory analyses do not have a priori decisions and the incorrect foator procedures were used for psychometric development. Until some of the following issues are addressed, the manuscript is not ready for publication.

Coments are....

Page 2 Line 17, the concept of self care is incongruent with the inclusion of families. Family care, health care collaboration and family collaboration and self management seem to be distinct elements.... Inclusion leave one to wonder about the lack of conceptual specificity

Page 2 line 20 Is not full responsibility the concept of self care management?

Page 3 line 1 So self care overlaps with doing what health care says?

Page 3 line 8 This is a developmental process. Not to be confused with the outcome of self management and degree of self management.

Page 4 line 13 How was the content validity determined? Were the items correlated with percent agreement? this is unclear

Page 4 How was the content validity index calculated?

Page 5 line 4 Any statistics or characteristics of those who refused?

Sequence number: 2

Page 5 line 8 What were the N's. There were only 8 African Americans here and it needs to be noted...

Page 5 line 11. Why are the Hispanic group n=30 presented separately from the ethnic breakout of the rest of the sample. ?

Page 5 line 13 CSII What is this ? the first time it is mentioned

Page 6 line 21. How many (n) completed only the DSMP

Completing questionnaires does not assess construct validity. Using them to test validity statistically does Specify predictive concurrent etc....

Page 6 line 9. Were all items positive or were some reverse coded in order to control for systematic response bias. Were items randomly assigned or was there a systematic response bias in the presentation?

Page 6 line 17. Were these in other studies or this one? Please cite from prior uses...

Page 6 line 22. Were these in other studies or this one? Please cite from prior uses...  
Page 7 line 8 This is how all prior alpha"s should be noted  
Page 7 line 13.. Was this in Harris et al"s study? Please provide citation  
Page 7 line 14 Where is there evidence Please provide citations  
Page 7 line 18 So the sample is now down to 484? what groups did they fall out of?  
Page 7 line 22 What categories were the items in that were eliminated?  
Page 8 line 2 Can you explain why 4 different analyses were used. 1 Exploratory should have been adequate to determine the eigen values and loadings. Which default was used? Were Means substituted? Please be specific for readers unfamiliar with the updates in the program.  
Page 8 line 4 Based on what... Factor Loadings? Eigen Values???  
Page 8 Do you mean the Alpha from the factor analysis?  
Page 8 line 8. Alphas are based on average scores. You can not do an individual alpha. Are you trying to set cut points using an ROC analysis for specificity and sensitivity?  
Page 8 line 9 Using what.. test retest? Split Half? were repeated measures effects calculated?  
Page 8 line 18 Using what, Maximum likelihood, orthogonal rotation??  
Page 8 line 20 Varimax rotation maximizes You should used the maximum likelihood. This was a confirmatory and not exploratory analysis then? This is not exploratory and can not be done on the first analysis....

Reviewer #4: In this paper, the authors report on development and testing of a new self-report measure to assess self-management of type I diabetes in adolescence (SMOD-A). Overall, this is a well-written paper and analysis that may ultimately provide clinicians with a new practical and useful tool for evaluating and monitoring adolescent self-management of type I diabetes.

Problems Statement: The authors provide a good description of the overall need for a more comprehensive assessment on how youth care for their type I diabetes.

Background Literature: Brief, but adequate in relation to the Problems Statement. The description and distinction of the concepts of "adherence" and "self-management" is informative.

Theoretical Framework: The rationale for the instruments used to assess construct validity should be expanded upon. In particular, it is not self-evident why the quality of life instrument (DQOL) would be expected to be strongly associated with the SMOD-A. Indeed, correlations between the 5 subscales of the SMOD-A and DQOL subscales (table 3) were generally weak.

Research Design and Methods: The sample selected is appropriate and the overall response rate (90%) and completion rate was high. The following additional comments should be considered in revising the paper:

1. Page 9: The method of estimating annual household income by address seems of limited value to the presentation, and perhaps should be omitted.
2. While it is recognized that use of the Diabetes Self-Management Profile (DSMP) instrument is highly desired for evaluating construct validity, two concerns exist. First, as stated on page 7, the 5 subscales of the DSMP have marginal test-retest

reliability (.34 to .47). This alone could bias assessment of the SMOD-A downward.

Second, the sample size of just 16 participants (see table 3) who provided data from this instrument is very small with respect to providing useful inference. For the correlation coefficients presented in table 3, the authors should consider providing 95% confidence intervals to illustrate the lack of precision with this small sample. In addition, the Discussion section should comment on the limited inference available by use of this instrument and small sample.

3. On page 7, last paragraph, the sentence stating that items with "limited or no variability" were eliminated is vague and should be clarified.

4. As stated on page 8, Part II of the SMOD-A consisted of just 12 items. This calls into question the appropriateness of a separate factor analysis for this section of the instrument. Indeed, as might be expected, the factor analysis for this section yielded a single factor solution.

Results: Suggested revisions and concerns include:

1. On page 9, section on temporal stability, presenting  $P = 0.0001$  is not useful as this is a test of whether test-retest reliability is different from a value of 0.0 (no reliability). The authors should relate the findings (and possible statistical significance testing) to established norms for acceptable reliability coefficients.

2. On page 10, last paragraph, the p-values alone are not particularly informative. If the authors wish to contrast results of the SMOD-A subscales by specific characteristics of subjects (e.g. age, gender, etc.), descriptive statistics (e.g. mean, SD) should be provided to get a sense of the magnitude of variation.

3. The authors should consider including a flowchart, perhaps in an Appendix, as to ultimate selection of the 52 items for the SMOD-A. Specifically, the original instrument started with 99 potential items and was subsequently reduced to 86, 73, and then 52 items - showing these steps in the item selection process would be helpful.

4. In table 1, for the "Diabetes Care Activities" subscale, the first 2 items read nearly identical in concept. It is surprising that both items add significantly to the reliability of this scale - the authors should confirm whether both items are truly needed.

Discussion: The potential concerns identified above should be discussed, principally as part of the limitations section

Organization and Style of Presentation: Excellent.

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CHECKLIST FOR STYLE

ACKNOWLEDGEMENTS -- Supply the titles of those acknowledged.

REFERENCES -- Provide date of retrieval for US Census Bureau reference.