# Psychometric Properties and Correlates of the Strength of Commitment to Life Style Self Management Instrument among Jordanians with Diabetes Mellitus Type II

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**Abstract: Aims** : This is a cross-sectional descriptive study designed to test the reliability, validity and exploratory factor structure of the Diabetes Commitment to Lifestyle Self-Management (CLSM) instrument* among Jordanians with Diabetes Mellitus type two (DMII). Besides it attempted to assess the correlations between the CLSM subscales and participants' clinical outcomes, i.e., Glycosylated hemoglobin (HBA1c), body mass index (BMI) and fasting blood sugar (FBS). **Methods:** A convenient sample of 560 Jordanian patients diagnosed with diabetes mellitus type II was included. Demographic data sheets and the CLSM Arabic translated version instrument were collected once. **Results:** Cronbach alpha of five subscales scored more than (0.8) but the sixth subscale entitled the Dedication to Social Support for Weight Control showed Cronbach alpha value of (0.57).The Jordanian results confirmed no correlation between the CLSM subscales and both clinical variables: the HbA1c and the BMI. Nevertheless, a significant correlation exists between the FBS and the commitment to diabetes type II self management.The findings also indicated that people with DMII on "diet only" have lower difficulty level in managing their diabetes. **Conclusion**: The CLSM instrument is a reliable measure of diabetes self management which has multiethnic prospects of application with populations rather than the African Americans and the American minorities. In parallel to that, the Jordanian culture has shown some distinctive diabetes related lifestyle behaviours especially in regard to social support and weight control.
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## 1. Introduction

More than half of the Jordanian patients with diabetes reported having unsatisfactory control over their blood sugar levels and life style behaviors (The National Centre for Diabetes, Endocrinology and Genetics, 2012). The traditional Mediterranean diet has been gradually replaced by unhealthy diet which is high in saturated fats and low in vegetables and fruits (Ajala, English and Pinkney, 2013).In fact, only 14% of the population in Jordan eats healthy food while certain inappropriate health practices seem to be on the increase such as excessive consumption of "Manasaf, a popular Jordanian dish which is highly rich in animal fat (World Health Organization, 2007).

*Instrument is available http://www.readbag.com/eurojournals-ejsr-26-2-02

Physical inactivity is also increasing among Jordanians due to sedentary work and life patterns (Ammouri, Neuberger, Nashwan and Al-Haj, 2007). Besides, there is an obesity epidemic in Jordan that can be attributed to increased consumption of food high in sugars and fat in conjunction with a low level of physical activity. Those factors are contributing to the 14.4% of patients diagnosed with diabetes in Jordan (Naffa and Fardous, 2011). Those alarms are reflecting the need to focus on diet and physical activity as well as weight management in the health campaign of controlling diabetes in Jordan as well as worldwide (Jarrad and AL Hadeed, 2014; Marcus et al., 2006 ).

Diabetes self-management means that people have to make choices and decisions about how to manage their life and their diabetes. Through good self-management practices such as regular physical activity and healthy diet people with diabetes can improve their quality of life, reduce the risk of complications, prevent hospital admissions, and reduce length of hospital stay (Diabetes UK, 2009; Alramly, Darawad and Khalil, 2013; Darawad and Khalil, 2012). Data highlight the importance of awareness of diabetes self-management barriers, identification of strategies and opportunities to overcome obstacles and solve problems in assistance with practitioners (Nagelkerk, Reick and Meengs,

2006). Therefore, there is an urgent need for reliable and valid measures of diabetes self-management (Toobert, Hampson and Glasgow, 2000; Shrivastava, Shrivastava and Ramasamy, 2013).

Certainly, identifying patterns in commitment to diabetes life style self-management in a sample of Jordanians will reveal important dimensions and schemas unique to this population and will be helpful to the therapeutic care settings in managing and controlling diabetes epidemic. Besides, there have been no studies evaluating the CLSM instrument among Jordanians. This study, which is the first in this domain in Jordan, was designed to test the validity and the psychometric properties of the (CLSM) instrument translated version among Jordanian patients diagnosed with DMII. While the specific aims were to (1) examine the reliability of the CLSM subscales (2) examine the exploratory factorial validity of the CLSM subscales (3) examine the predictive and discriminant validity of the CLSM subscales.

## 2. Material and Methods

### 2.1. Study Design

The study used a descriptive cross-sectional design in adult patients diagnosed with DMII. Demographic and clinical survey and CLSM questionnaire baseline were distributed and collected only once.

### 2.2. Sample and Sampling

This is a national Jordanian study which included a convenient sample of 560 participants recruited from diabetes outpatient clinics. There were no significant difficulties regarding recruiting the sample except the relatively longer time needed to recruit the participants from AL Mafraq City which is part of the Jordanian Badia. That place is characterized by higher poverty and illiteracy levels and a scattered population distribution compared to the counterparts (The Hashemite Fund For development of Jordan Badia, 2008).

The participants included were eighteen years or above, Arabic literate and had a confirmed diagnosis of DMII. There was an eligibility check carried out in order to make sure that the participants have the diagnosis of DMII. In regard to that, participants were asked about the treatment they were taking at the time of interview, and the treatment they were taking previously upon diagnosis. Specifically, the question investigated whether the participants were mainly taking oral anti-hyperglycemic agents or/and insulin only as adjacent management. If so, they were considered patients with DMII which is the target population of the study (Harper et al., 2013).The eligible subjects were asked to sign a consent form after being given a detailed explanation by a well qualified and informed research assistants about the scope of the study.

### 2.3. Setting

In order to enhance the generalizability of the findings**,** the study included five large hospitals, which are known to receive abundance of DM cases, covering governmental and educational sections. Those choices had enriched the study with variable geographic, social, economic, educational, medical insurance, and cultural backgrounds of participants.

### 2.4. Measure of Strength of Commitment to Diabetes Self Management (CLSM) instrument

This instrument is developed by Zoumenou et al., in 2009. It assesses the perceived positive attitudes and behaviors of adult patients with DMII to successful dietary and weight control management and assesses the correlations between the subscales and participants' clinical outcomes i.e., BMI and FBS. The tool included 70 items categorized into four major domains: diet difficulties, diet commitment, weight control difficulties and weight control commitment (Zoumenou et al., 2009). Those four domains revealed six interpretable and reliable factors. Two factors from dietary difficulties, one factor from diet commitment, one factor from weight control difficulties, and two factors from weight control commitment. The subscales created from the factors were: dietary attitudes 13 items (high score indicates poor attitudes towards appropriate food for diabetes self-management). Food and Life conditions 12 items (high score indicates difficulty managing the logistics of following a diabetic diet). Dedication to diabetic diet 20 items (high score indicates dedication to adhering to a diabetic diet). Weight control attitudes 14 items (high score indicates poor attitudes regarding exercise and diet for weight control). Dedication to social support for weight control 5 items (high score indicates strongly committed to using social and community support for weight control) (Zoumenou et al., 2009).

### 2.5. Data Collection Procedure

The participants were recruited from the internal medicine, endocrinology and diabetes clinics during the waiting time. The eligible approving participants were accompanied to a calm spot near the waiting room and filled both the demographic data sheet and the CLSM instrument. The whole process required 20 minutes. The confidentiality, right to withdraw and no harm principles were assured throughout the process. The sheets had been numbered and sealed to be entered afterwards into the SPSS system version 21.

### 2.6. CLMS instrument translation

The mission of translating the originally phrased in English tool was carried out by three PhD holders and three master degree holders who have significant knowledge and experience in the field of DM and its

relevant issues. Translation and back translation was also checked by a bilingual expert.

**2.7. Validity testing**

Face validity was evaluated by introducing the initially translated tool to a convenient pilot sample of 30 participants. The feedback notes assured the maintenance of simplicity, readability, cultural sensitivity and comprehensibility of the items for the public. Alongside, there was a content validity confirmation by five experts in the field of DM.

**2.8. Demographic Data Sheet**

The participants were asked to complete a demographic data sheet. The sheet is one page, phrased in Arabic, reviewed by clinical and language specialists, checked for face validity by piloting, anonymous, and only numbered for the registering purpose. It included data to provide the descriptive part of the study, like: age, gender, employment, medical insurance, education, height, weight.

The sheet also documented some clinical outcome variables to be utilized for checking the predictive validity of the tool including the last measured FBS and HbA1C, both as reported by client; and BMI as calculated by research assistants after the client recorded his weight by kilograms and height by meters. Finally the type of treatment taken for managing DMII (as reported by client) was considered for evaluating the discriminant and convergent validity of the tool subscales.

**2.9. Ethical considerations**

Ethical approvals were guaranteed from the institutional review boards of the Faculty of Nursing and the Deanship of Academic Research in the University of Jordan. Then ethical approvals were also collected from The Ministry of Health and The University of Jordan Hospital. Besides, consent forms were used to assure the voluntary participation of subjects. Besides, very early in the research process an e-mail was sent to the principal author of the instrument to inform her of the intention to conduct a reliability study. In response, she sent back a permission letter.

**2.10. Statistical Analysis**

Descriptive statistics were used to provide informative demonstration of the sample demographics and the CLSM subscales. While reliability testing was presented using Cronbach alpha coefficient, split half coefficient and standard error of measurement for each subscale.

To determine the appropriateness of factor analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was examined. The Bartlett test of sphericity was used for the CLSM subscales to test the overall significance of correlations within a matrix. Factor analysis was performed for the CLSM utilizing the principle axis factoring with oblique rotation. Inspection of the correlation matrix revealed the presence of several coefficients of 0.4 and above. If items were received with a loading less than 0.4 in any factor or loaded on two different factors with a difference of factor loadings less than 0.2, they were eliminated. Factor structure was conducted to assess number of factors that the six subscales are measuring.

To examine the convergence validity Pearson correlation was used to investigate the correlation between CLSM subscales; and the correlation between the CLSM subscales and HB1AC, FBS and BMI mean values. Discriminant validity was examined by investigating the ability of the CLSM subscales to differentiate between types of treatment regimens the participants were following (hypoglycemic agent, Insulin, hypoglycemic agent and insulin, or diet only) using ANOVA analysis. The Significance level of $<0.05$ was considered.

## 3. Results

**3.1. Descriptive characteristics**

The mean age of the 560 participants was 58.1 (±11.6) years. Almost half of the participants were male (52.1%), 419 (74.8%) currently unemployed, 426 (76.1%) with health insurance and 461 (82.3%) have secondary educational level or less.

Table (1) demonstrates that the mean value of BMI was 29 ± 5.3 and the mean of the HbA1C was 9.34 ± 2.3. It presents the means and standard deviations of the six subscales which ranged from the least for the Dedication to Social Support for Weight Control Scale (1.9 ±0.5) to the most for the Food and Life Conditions Assessment Scale (2.5 ± 0.5). Worth telling that those values are less than the reported ones in the original study that was conducted for the development and psychometric testing of the tool among African American with DMII (Zoumenou et al., 2009).

**3.2. Reliability of the CLSM subscales**

The Cronbach alpha values for the CLSM measurement subscales are presented in table (1). Dietary Attitudes Assessment Scale\13 items (DAAS), Weight Control Attitudes Assessment Scale \14 items (WCAAS), Food and Life Conditions Assessment Scale \12 items (FLCAS), Dedication to Diabetic Diet Assessment Scale \20 items (DDDAS), and Dedication to Weight Control Attitudes Assessment Scale\6 items (DWCAAS), possessed good internal consistency with a Cronbach alpha of more than (0.8) in the current sample. However, the Dedication to Social Support for Weight Control Scale\5 items (DSSWCAS) showed satisfactory Cronbach alpha (0.57) when compared to the rest of the subscales.

Table 1. Reliability coefficients of CLSM subscales and correlations with clinical parameters

| **Subscales** | DAAS | WCAAS | FLCAS | DDDAS | DWCAAS | DSSWCAS | Cronbach α | M ± SD | Inter-item correlation |
|---|---|---|---|---|---|---|---|---|---|
| DAAS | 1 | | | | | | .82 | 2.4 ±.4 | .25** |
| WCAAS | .57** | 1 | | | | | .83 | 2.3 ±.4 | .27** |
| FLCAS | .66** | .61** | 1 | | | | .81 | 2.3 ±.5 | .27** |
| DDDAS | .10* | .24** | .24** | 1 | | | .88 | 2.4 ±.5 | .26** |
| DWCAAS | .06 | .05 | .07 | .53** | 1 | | .86 | 2.1 ±.8 | .52** |
| DSSWCAS | .21** | .29** | .25** | .25** | .35** | 1 | .57 | 1.9 ±.5 | .19** |
| HbA1c (%) | .05 | .01 | -.02 | -.04 | -.02 | -.06 | | 9.3 ± 2.3 | |
| FBS (mg/dl) | 014** | 0.11* | 0.10* | -.12** | -0.04 | 0.02 | | 232 ± 112 | |
| BMI | .06 | .03 | .05 | -.05 | -.01 | -,05 | | 29 ± 5.3 | |

Note. Pearson correlation coefficients *p <.01, **p <.001

### 3.3. Factor analysis

The factor analysis of the tool and its subscales was found to be appropriate based on the Kaiser Meyer-Olkin Measure of Sampling Adequacy (KMO) value > 0.7 and the Barlett's Test of Sphericity value for being significant (p < 0.001). This indicates that the sample size was sufficient for factor analysis. Besides, most items loading quit strongly above (0.4) on the first 6 components.

Table 2. Description of the CLSM subscales in Jordanians with DMII (n=560)

| Subscales | Eigen value | % of variance | Cumulative % |
|---|---|---|---|
| DAAS | | | |
| I | 4.2 | 32% | 32% |
| II | 1.7 | 13.8% | 46% |
| WCAAS | | | |
| I | 4.6 | 32.6% | 32.6% |
| II | 1.7 | 12.3% | 44.9% |
| FLCAS | | | |
| I | 4.0 | 33.5% | 33.5% |
| II | 1.4 | 12.2% | 45.7% |
| DDDAS | | | |
| I | 7.4 | 36.8% | 36.8% |
| II | 1.8 | 9% | 45.9% |
| DWCAAC | | | |
| I | 3.7 | 61.2% | 61.2% |
| II | 1.3 | 21.7% | 82.9% |
| DSSWCA | | | |
| I | 1.9 | 37% | 37% |
| II | 1.2 | 24.8% | 61.8% |

Table 2 and table 3 present eigen values and factor loadings for the CLSM subscales for Jordanian patients with DMII. Evidently, most items of the six subscales loading quit strongly above (0.4) on a first factor. The first factor explained almost 33% of the variance and the associated plots supported that only one factor is retained above the elbow of the scree plot for each subscale. Few items loaded on a second factor, suggesting that the "one factor solution" for each subscale is the most appropriate. The conceptual interpretations of factor one for each subscale was consistent with the original study analysis of the CLMS subscales.

However, the percentage of variance accounted for the second factor ranged from 9% (DDDAS) to 24.8% (DSSWCAS), which may support the two factors loading for the DSSWCAS. In addition, the number of items emerged from the DDDAS subscale was 17 in the present sample instead of 20 items when compared to the original study. Indeed, number of items failed to factor upon current analysis. The failing items were: "item 13"eat any food and then take medication, "item 17 " cook for myself" and item 20 " ask for help from friend".

### 3.4. Convergent and discriminant validity

Pearson correlation analysis was used to assess the associations between the six subscales. Inter-correlations between the six CLSM subscales ranged from low to strong (Table1). Specifically, the FLCAS was significantly and positively correlated with the WCAAS and the DAAS. And the DAAS correlated strongly and significantly with WCAAS. However, there were no significant association between DWCAAS and DAAS, WCAAS, and FLCAS.

The HbA1c, FBS and BMI were used to assess the diabetes related treatment and weight control among this Jordanian sample. The HbA1c and the BMI showed no significant correlation with any of the six subscales. However, the FBS correlated significantly and positively with DAAS, WCAAS and FLCAS and negatively with DDDAS (r = -.12, p =.001).

Using ANOVA test, the mean scores from the six subscales were compared between treatment regimen groups (hypoglycemic agent, Insulin therapy, hypoglycemic and insulin therapy, and "diet only"). This comparison indicated that only the FLCAS clearly distinguished between the treatment

Table 3. Factor loadings of the CLSM measurement subscales in Jordanian patients

| Subscale\ Item number | I | Subscale\ Item number | I | Subscale/ Item number | I |
|---|---|---|---|---|---|
| DWCAAS1 | .90 | DSSWCAS3 | .77 | DAAS2 | .72 |
| DWCAAS3 | .90 | DSSWCAS2 | .68 | DAAS10 | .69 |
| DWCAAS2 | .90 | DSSWCAS4 | .67 | DAAS3 | .67 |
| DWCAAS4 | .76 | DSSWCAS5 | .41 | DAAS4 | .65 |
| DWCAAS6 | .61 | DSSWCAS1 | .40 | DAAS6 | .60 |
| DWCAAS5 | .52 | | | DAAS1 | .59 |
| | | | | DAAS12 | .58 |
| | | | | DAAS9 | .56 |
| | | | | DAAS5 | .54 |
| | | | | DAAS11 | .47 |
| | | | | DAAS8* | .45 |
| | | | | DAAS7 | .36 |
| | | | | DAAS13 | .35 |
| FLCAS5 | .69 | WCAAS10 | .74 | DDDAS3 | .80 |
| FLCAS8 | .68 | WCAAS9 | .72 | DDDAS4 | .78 |
| FLCAS9 | .65 | WCAAS8 | .71 | DDDAS9 | .78 |
| FLCAS6 | .64 | WCAAS3 | .61 | DDDAS7 | .77 |
| FLCAS4 | .61 | WCAAS14 | .59 | DDDAS1 | .77 |
| FLCAS7 | .57 | WCAAS2 | .57 | DDDAS8 | .76 |
| FLCAS12 | .56 | WCAAS1 | .56 | DDDAS2 | .75 |
| FLCAS1 | .55 | WCAAS5 | .55 | DDDAS6 | .74 |
| FLCAS3 | .54 | WCAAS13 | .53 | DDDAS10 | .70 |
| FLCAS2 | .54 | WCAAS6 | .49 | DDDAS5 | .69 |
| FLCAS10 | .49 | WCAAS11 | .48 | DDDAS18 | .63 |
| | | WCAAS12 | .47 | DDDAS19 | .58 |
| | | WCAAS7 | .47 | DDDAS16 | .51 |
| | | WCAAS4 | .41 | DDDAS11 | .35 |
| | | | | DDDAS12 | .34 |
| | | | | DDDAS14 | -.34 |
| | | | | DDDAS15 | .33 |
| | | | | DDDAS17 | - |
| | | | | DDDAS13 | - |
| | | | | DDDAS20 | - |

*i.e., DAAS8 means item number 8 in the dietary attitude subscale, etc. groups (Table 4). The patients on" diet only" significantly showed the least score of difficulty in following diabetic diet based on the FLCAS. The rest of the subscales failed to discriminate between the diabetic treatment groups. Notably, the group that followed "diet only" composed 3.4% (n = 19) from the studied sample.

**4. Discussion**

To begin with, the descriptive statistics section confirmed a balanced representation in regard to gender. Though, the majority of the participants didn't have a high educational degree which could be considered a kind of limitation. The HBA1C and the BMI values of the sample are generally consistent with the documented Jordanian Diabetes values in comparable studies of a considerable sample size of around 1000 subjects (Adham, Froelicher, Batieha, Ajlouni, 2010).

When looking to the Cronbach alpha values for the CLSM measurement subscales presented in table 1, it is obvious that the first five subscales possessed good internal consistency with Cronbach alpha values of 0.81 to 0.88 in the Jordanian sample. Those results are comparable to the alpha values denoted in the American study which ranged from 0.71 to 0.85 on a sample of 360 subjects.

However, the Dedication to Social Support for Weight Control Scale\5 items (DSSWCAS) failed to score as high as the other subscales with Cronbach alpha of (0.57). Item five of this subscale (smoke to lose weight) may have affected the result, evidenced by that it double loaded. It could be said here that the popular idea about smoking in the Jordanian culture is "I am afraid to gain weight if I stop smoking" especially among women; but the idea of "I shall smoke to lose weight" is not common (Roberts and Marvin, 2011). Moreover, item one of the same subscale (get support from my family) also loaded differently. In particular, literature discusses the influence of social environment and the views of peers and 'significant others' like family members; as people tend to engage in behaviors which are practiced, supported and valued by their significant others (Shtaiwi, 2014). Unfortunately, there are no studies describing the social support status for weight control among Jordanians that might help explain the statistical behavior of this item, this issue could be recommended for investigation in future research.

On the positive side, Eigen values and factor loadings for the CLSM subscales (tables 2 and 3) for Jordanian patients with DMII assured the "one factor solution" which is generally consistent with the original study analysis of the CLSM subscales (Zoumenou et al., 2009). Yet, the percentage of variance accounted for the second factor ranging from 9% (DDDAS) to 24.8% (DSSWCAS), could be attributed, at least partially, to cultural differences between the American and Jordanian cultures. Hold in mind that the Jordanian culture is masculine in nature and tends to relay on daughters, mothers and wives in regard to cooking issues (Shaughnessy, 2006). This, may explain the failing of items 13 (eat any foods then take medications), 17 (cook myself), 20 (ask for help from friends) of the DDDAS subscale.

The HbA1c, FBS and BMI were used to assess the diabetes related treatment and weight control among Jordanians while the American study used: BMI, FBS, systolic and diastolic blood pressures. The Jordanian sample results confirmed no correlation between the subscales and the HbA1c. This finding was previously anticipated by the original tool author who didn't include the HBA1c in the analysis rationalizing this by arguing that HBA1c reflects glycemic control over the past 6-8 weeks, making it difficult to establish a relationship between barriers to self management and HBA1c (Zoumenou et al., 2009). Moreover, this Jordanian study showed no significant correlation between the BMI as a clinical

physiological outcome with any of the six subscales, the finding that doesn't confine with the original study. Thereby, it is recommended to conduct further research work that adopts a longitudinal repeated measures design. Such design may capture the relationships that could be difficult to appoint between physiological and attitude/ behavioral indicators (Pollack, Chastek, Williams, Moran, 2010). However, the FBS correlated significantly and positively with DAAS, WCAAS and FLCAS and negatively with DDDAS ($r$ = -.12, $p$ =.001). In conclusion, it could be said that both studies agree on certain correlation between the FBS and some of the commitment to DMII self management subscales (table 1).

Table 4 showed that the patients on" diet only" significantly showed the least score of difficulty in following diabetic diet based on the FLCAS which is the only subscale distinguishing between the diabetic treatment groups. It is necessary to point out that the CLSM subscales don't include or discuss any aspect of pharmacologic treatment of DMII. It is well known that diet management is one modality of diabetes treatment regimens (Khardori, 2014); and evidently the FLCAS discusses mainly diabetic diet commitment difficulties. The ANOVA analysis results suggest that those on "diet only" experiences less diet commitment difficulties. This could be attributed at least in part to the decreased complexity of the diabetes management regimen Pollack, Chastek, Williams and Moran, 2010).

Table 4. Discriminant validity testing of the CLSM subscales based on the treatment regimens for patients with DMII (Analysis of variance *$p$ < 0.05)

| | Hypoglycemic agents (n = 353) Mean ± SD | Insulin therapy (n = 104) Mean ± SD | Hypoglycemia & Insulin therapy (n = 84) Mean ± SD | Diet only (n = 19) Mean ± SD | $F$-value |
|---|---|---|---|---|---|
| **DAAS** | 31.6±5.8 | 30.9 ± 6.3 | 31.4 ± 5.8 | 30.6 ± 7.5 | 0.56 |
| **WCAAS** | 33 ± 6.4 | 31.7± 5.8 | 32.4 ± 6.8 | 31.9 ± 6.3 | 1.5 |
| **FLCAS** | 30.6 ± 5.7 | 29.4 ± 6.1 | 29.4 ± 5.9 | 27 ± 7.9 | 3.6* |
| **DDDAS** | 48.3 ± 10.7 | 47.5 ± 12.2 | 46.2 ± 10.8 | 47.5 ± 13.2 | 0.85 |
| **DWCAAS** | 12.8 ± 4.5 | 12.2 ± 4.9 | 12.3 ± 4.7 | 12.6 ± 4.6 | 0.53 |
| **DSSWCS** | 9.8 ± 2.6 | 9.3 ± 2.3 | 9.3 ± 2.3 | 10.1 ± 3.1 | 1.9 |

**Conclusion**

This paper discusses DMII self management measurement instrument which will provide the care givers with considerable data related to the clients behavioral difficulties and strategies, they usually use, in managing multiple diabetes self management facets like: diet, weight, exercise and support systems. This data will guide the health crew in special tailoring of clinical, psychological and educational interventions to meet clients' demands and ultimately enhance clinical diabetes outcomes. Besides, the article discloses the multiethnic potential of CLSM instrument to assess diabetes self management in populations rather than the African-Americans and the American minorities. Finally, the statistics confirm that the CLSM instrument constitutes a valid and satisfactorily reliable tool to be used in measuring commitment to diabetes self-management.

**Declaration of Conflict of interest**

The authors declare no conflict of interest of any kind.

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**Authorship consent**

The authors allow the Journal to fulfill its publishing policy upon acceptance. It is confirmed that this work is original and has never been published elsewhere of any mean.

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