

## Sigma's 30th International Nursing Research Congress

### Development and Validation of the Parsimonious Screening Tool of Adult Health Promotion Scale

**Mei-Yen Chen, PhD, RN**

*Department of Nursing, Chang Gung University of Science and Technology, Chiayi, Taiwan*

**Purpose:** Cardiovascular disease (CVD) in adults is the number one cause of death globally, and is majorly caused by disorders of the heart and blood vessels, such as coronary heart disease, stroke, and hypertension. Considerable evidence indicates that risk factors are associated with cardiovascular disease and all-cause mortality includes smoking, physical inactivity, unhealthy diet, psychosocial stress, and less social participation. Fortunately, many chronic diseases are preventable through early adoption of healthy behaviors. The aim of the study is to develop a parsimonious, quick, and valid screening tools for early detection of unhealthy habits, cardiometabolic risks and validate the psychometric properties of the adult health promotion scale (AHPs).

**Methods:** A community-based cross-sectional study. Two rural townships in Southern Taiwan. A total of 765 community adults including 377 women and 388 men aged 20-64 years. Cardiometabolic risks, number of remaining teeth, perception of life satisfaction, cigarette smoking and adult health promoting scale were measured. Scale development involved a three-step process: (1) development of items based on the literature and consensus from experts; (2) exploratory factor analysis and confirmatory factor analysis to establish construct and discriminant validity; (3) test-retest reliability was used to explore the stability of the final version of the developed scale after three weeks. Before conducting this study, the institutional ethical committee review board was approved (No 103-6943).

**Results:** The findings indicated a 23-item AHPs was developed to explain 67.3% of the total variance. The simple version of the AHPs comprises six-dimensions: stress management, physical activity, health responsibility, life appreciation, healthy eating, and oral hygiene. The total scale alpha coefficient was 0.85. The intra-class correlation showed good stability of test-retest reliability (0.78-0.92). Discriminant validity indicated that the AHPs are significantly associated with life satisfaction ( $p < 0.001$ ), smoking habit ( $p < 0.001$ ), and number of remaining teeth ( $p < 0.05$ ).

**Conclusion:** The findings indicate that AHPs is a valid and reliable instrument to be used as a screening tool for early detection of adult's healthy behaviors. Healthcare providers in many community settings could use it to reduce unhealthy habits through regular assessment and initiation of health-promotion programs.

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#### **Title:**

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#### **Keywords:**

Parsimonious, adult health promotion and scale development

#### **References:**

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### **Abstract Summary:**

The AHPs is a valid and reliable instrument to be used as a screening tool for early detection of adult's healthy behaviors. Healthcare providers in many community settings could use it to reduce unhealthy habits through regular assessment and initiation of health-promotion programs.

### **Content Outline:**

#### 1. Introduction

1.1. Cardiovascular disease (CVD) in adults is the number one cause of death globally, and is majorly caused by disorders of the heart and blood vessels, such as coronary heart disease, stroke, and hypertension.

1.2. In Taiwan, seven of the top 10 causes of death are chronic diseases, such as stroke, cardiovascular disease, and type 2 diabetes; CVD has been ranked as the second or the third for more than 20 years.

1.3. Evidence indicates that risk factors are associated with cardiovascular disease and all-cause mortality includes smoking, physical inactivity, unhealthy diet, psychosocial stress, and less social participation. Fortunately, many chronic diseases are preventable through early adoption of healthy behaviors.

1.4. Primary healthcare providers have the opportunity to provide counseling and empower patients to change their behaviors. Using a short, valid, and comprehensive assessment tool for easy screening of unhealthy behaviors correlated with chronic disease is important.

1.5. The aim of this study was to develop a parsimonious, quick, and valid screening tools for early detection of unhealthy habits, cardiometabolic risks and validate the psychometric properties of the adult health promotion scale.

## 2. Methods

2.1. A cross-sectional and descriptive design was used. Convenience samples were selected from a community-based health screening held by the collaborating local hospital in Southern Taiwan from August 2014 to July 2016.

2.2. Before conducting this study, the institutional ethical committee review board was approved (No 103-6943B). The measurements included (1) Cardiometabolic risk factors and metabolic syndrome, (2) Cigarette smoking, and (3) Healthy lifestyle.

2.3. Cardio-metabolic risk factors and metabolic syndrome were based on the national standard; the presence of each following 5 biomarkers was classified as abnormal or cardio-metabolic risk factor. More than or equal to 3 abnormal items called metabolic syndrome: (1) waist circumference > 90 cm define as central obesity, (2) if systolic/diastolic blood pressure>130/85 mmHg, (3) high-density lipoprotein-cholesterol (HDL-c) < 40 mg/dL, (4) fasting blood glucose > 100 mg/dL, and (5) triglyceride level > 150 mg/dL.

2.4. Scale development involved a three-step process: (1) development of items based on the literature and consensus from experts; (2) exploratory factor analysis and confirmatory factor analysis to establish construct validity, discriminant validity, and reliability; (3) test-retest reliability was used to explore the stability of the final version of the developed scale after three weeks.

2.5. The majority of potential items were based on previous studies by the research team and the guidelines of the American College of Cardiology/ American Heart Association. The initial form of the AHPs comprised 40 items with 7 categories.

## 3. Conclusions

3.1. Of the 821 participants, 56 failed to complete the questionnaires. The resulting sample consisted of 765 participants. We randomly divided the total sample into two subgroups (training group = 383 and validation group = 382) of equal size and homogeneity of baseline characteristics (i.e., age, gender, education level, job status).

3.2. The mean age was 39.3 years ( $SD = 10.6$ ). The prevalence rate of smoking was 21.4%, central obesity 31.1%, abnormal systolic and diastolic blood pressure 35%, number of remaining teeth < 20, 10.2%, and low life satisfaction 42.2%. There were no significant differences between the training and validation groups

3.3. Firstly, using the sample in the training group, we performed item analysis to evaluate the homogeneity among the AHPs items. Items with a correct item-total correlation less than 0.30 were deemed to heterogeneous items.

3.4. Secondly, using the sample in the validation group, we conducted confirmatory factor analysis to validate and modify the factor structure developed in the previous exploratory factor analysis.

3.5. Finally, discriminant validity was examined by using logistic regression analysis regarding the whole sample to determine the association of the AHPs with the indicators relating to cardiometabolic risks, oral health-related diseases, and life satisfaction.

3.6. The initial 24-item confirmatory factor analysis using validation sample revealed excellent model fit indices, including comparative fit index (0.97), relative noncentrality index (0.92), standardized root mean squared residual (0.06), and root mean square error of approximation (0.05). Finally, a 23-item version of the AHPs was established and the total variance explained was 67.3%. In the second specified confirmatory factor analysis, the model fit indices were even better, and all factor loadings were greater than 0.30 and statistically significant (Figure 1).

3.7. The present study showed that the AHPs is a simple and comprehensive screening tool for early detection of unhealthy habits for prevention of cardiometabolic risks and oral diseases.

3.8. The validity of the AHPs was established through qualitative content validation by a consensus of metabolic/endocrine, cardiology, dental, and nursing experts. The quantitative construct validation used confirmatory factor analysis, and correlations with life satisfaction, smoking habit and number of remaining teeth indicated discriminated validity.

First Primary Presenting Author

**Primary Presenting Author**

Mei-Yen Chen, PhD, RN

Chang Gung University of Science and Technology

Department of Nursing

Professor

Putz City

Chiayi

Taiwan

**Author Summary:** 1. Distinguished Professor, Dean, College of Nursing, Chang Gung University of Science and Technology, Taiwan. 2. Invited speaker: Taiwan Nursing Association; Topic: Reports-Multi-Year Longitudinal & Inertia Nursing Research Program.