

**Psychometric properties of the Functionality Assessment Instrument in the Treatment for Chronic Diseases (FACT-GP) in the general Mexican population****Propiedades psicométricas del Instrumento de Evaluación de Funcionalidad en el Tratamiento para Enfermedades Crónicas (FACT-GP) en población general mexicana****Propiedades psicométricas do Instrumento de Avaliação de Funcionalidade no Tratamento para Doenças Crónicas (FACT-GP) en población general Mexicana**

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**Abstract**

Quality of life is a relevant aspect of people's lives, even more so when high comorbidities are present in the general population, so its valid and reliable measurement is necessary. Objective: To determine the psychometric properties of the Instrument for the Evaluation of Functionality in the Treatment of Chronic Diseases (FACT-GP) in the general Mexican population. Method: A cross-sectional design was used, with a non-probabilistic sampling, based on availability. Statistical analysis: A confirmatory factorial model was performed. Results: 254 participants with  $M = 23.5$  years (21-32) were included. Four factors with 18 reagents were identified. The internal consistency of the global scale was 0.81, which explains 58.93 % of the variance. Confirmatory factor analysis present adequate indices (CFI, RMR, RMSEA), that prove a balanced and parsimonious fit of the model structure. Conclusion: The FACT-GP showed a structure similar to the original version with valid and reliable indicators for its use in clinical care and research aimed at the general Mexican population.

**Keywords:** quality of life; general population; psychometric properties; preventive health; Mexico

**Resumen**

La calidad de vida es un aspecto relevante en la vida de las personas, más aún cuando se presentan comorbilidades altas en población general, por lo que su medición de forma válida y confiable es necesaria. Objetivo: Determinar las propiedades psicométricas del Instrumento de Evaluación de Funcionalidad en el Tratamiento para Enfermedades Crónicas (FACT-GP) en población general mexicana. Método: Se empleó un diseño transversal, con un muestreo no probabilístico, por disponibilidad. Análisis estadístico:



Se realizó un modelo factorial confirmatorio. Resultados: Se incluyeron 254 participantes con  $M = 23.5$  años (21-32). Se identificaron 4 factores con 18 reactivos. La consistencia interna de la escala global fue .81, que explican el 58.93 % de la varianza. El análisis factorial confirmatorio presenta índices adecuados (CFI, RMR, RMSEA), que indican un ajuste equilibrado y parsimonioso de la estructura del modelo. Conclusión: El FACT-GP mostró una estructura similar a la versión original, con indicadores válidos y confiables para su uso en la atención clínica e investigación dirigida a población general mexicana. **Palabras clave:** calidad de vida; población general; propiedades psicométricas; salud preventiva; México

### Resumo

A qualidade de vida é um aspecto relevante na vida das pessoas, ainda mais quando ocorrem altas comorbidades na população em geral, sendo necessária sua mensuração válida e confiável. Objetivo: Determinar as propriedades psicométricas do Instrumento de Avaliação da Funcionalidade no Tratamento para Doenças Crônicas (FACT-GP) na população mexicana em geral. Método: Utilizou-se o delineamento transversal, com amostragem não probabilística, devido à disponibilidade. Análise estatística: Foi realizado um modelo fatorial confirmatório. Resultados: Foram incluídos 254 participantes com idade  $M = 23,5$  anos (21-32). 4 fatores foram identificados com 18 itens. A consistência interna da escala global foi de 0,81, o que explica 58,93 % da variância. A análise fatorial confirmatória apresenta índices adequados (CFI, RMR, RMSEA), que indicam um ajuste equilibrado e parcimonioso da estrutura do modelo. Conclusão: O FACT-GP apresentou estrutura semelhante à versão original com indicadores válidos e confiáveis para sua utilização na assistência clínica e em pesquisas direcionadas à população em geral.

**Palavras-chave:** qualidade de vida; população em geral; propriedades psicométricas; saúde preventiva; México

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Health-related quality of life (HRQoL) is an increasingly important measure in health care, reflecting the transition in disease burden from infectious diseases to chronic diseases (Murray et al., 1996). HRQoL allows studying and evaluating the health status of different populations as a predictor of personal quality of life according to different conditions from prevention to clinical care, which becomes the fundamental unit for measuring results in research within this field. HRQoL, in order to be evaluated, must be recognized in its multidimensional concept that includes physical and psychological function, level of independence, social interaction, personal beliefs and values, lifestyle, as well as economic situation (Tripathy & Myatra, 2020; Velarde-Jurado & Avila-Figueroa, 2002).

Poor quality of life is, together with a disability, functional impairment, and high costs of medical care, one of the main consequences of multimorbidity. It is also a valuable measure for the evaluation of health services (Makovski et al., 2019). Therefore, the coexistence of a growing number of chronic diseases is associated with a decrease in quality of life (Makovski et al., 2019) and in an environment where there is gradually a higher incidence of the population with chronic degenerative diseases associated with

unhealthy lifestyles, the evaluation of HRQL is key in making decisions to promote healthy lifestyles and prevention measures in the case of people with some morbidity.

The concept of HRQoL has gained such importance because the increase in survival of the population contrasts with reports of a greater number of people with some degree of disability, as well as people with chronic diseases who suffer from the effects of their disease and treatment (Velarde -Jury & Avila-Figueroa, 2002). Since the quality of life is based on measurements with a variable load of subjectivity, valid, reproducible, and reliable evaluation methods are required. Better knowledge of the evaluations to measure HRQoL will therefore allow the incorporation of these instruments in the comprehensive evaluation of individuals, in conducting clinical trials, and in health services research (Velarde-Jurado & Avila-Figueroa, 2002).

In this regard, various instruments assess the quality of life in the general Mexican population, among which the WHOQoL BREF Quality of Life Scale (Huerta et al., 2017) was identified, which showed a weak fit with the original 4-factor model, although it is one of the most used instruments in different populations. Another option is the SF-36 Survey (Zúniga et al., 1999), which is consistent with the validity and reliability indicators in the original version; however, it is relevant to examine in more depth the translation of some questions to determine subsequent modifications. Since the cross-cultural adaptation of the instruments to various languages and cultures must consider the attributes of quality of life that are important to people, such as family relationships, appreciation, and usefulness of life (Tripathy & Myatra, 2020).

While these instruments are options to improve the quality of measurements and the comparability of reported data, data analysis and interpretation are further benefited by using a reference for comparative purposes. Depending on the purpose of such comparison, a useful reference may come from data obtained from cancer patients or normative data collected from the general population (Scott et al., 2008). In this sense, the Instrument for the Evaluation of Functionality in the Treatment of Chronic Diseases (FACT-GP), in its version for the general population, represents an appropriate measure and one that has had more evidence in the international literature (Cella, 1997).

The FACT-GP is a derivative of the FACT-G, a version used to measure the specific quality of life for cancer patients. It was generated by eliminating irrelevant elements for people who do not have cancer from samples of the general population of the United States and Austria, obtaining adequate psychometric properties for the general population (Brucker et al., 2005; Holzner et al., 2004; Smith et al., 2007).

The FACT-GP has been designed as a short, self-administered questionnaire with the aim of evaluating the quality of life. It has 21 items that are divided into four factors: *physical well-being* (BF), *social-family well-being* (BSF), *emotional well-being* (BE), and *functional well-being* (BF). It has a 5-point Likert scale (with response categories ranging from 0 to 4). The overall summary score ranges from 0 to 104, with higher scores indicating better quality of life. Assessments of psychometric properties report good validity and reliability on all subscales, equivalent to the original version (Holzner et al., 2004; Janda et al., 2009). Although many studies have used disease-specific FACT questionnaires when studying HRQoL in patients, few studies have described HRQoL in a general population using FACT-GP for comparison purposes.

Several studies have reported validations of the FACT-GP in the general population; For example, in the Australian population, the instrument identified a similar quality of life between men and women within different age groups. Quality of life was clinically significantly lower among participants who were unmarried, with a body mass index that deviated from normal weight, and with one or more self-reported morbidities. A four-factor solution with adequate goodness-of-fit indices (RMSEA < 0.05 for age

groups) was confirmed (Janda et al., 2009). In the same sense, Lindqvist Bagge et al. (2020) have used the FACT-GP to study HRQoL in the general population, identifying a higher score associated with a higher quality of life, mainly in older men with higher incomes.

Given the limited research regarding the psychometric properties in the general Mexican population, due to the absence of reference instruments for comparative purposes, the objective was to evaluate the psychometric properties of the Instrument for the Evaluation of Functionality in the Treatment of Chronic Diseases (FACT-GP) in the general Mexican population.

## Method

### Participants

A non-experimental, cross-sectional, instrumental design (Carretero-Dios & Pérez, 2005) was used through non-probabilistic convenience sampling. The participants were invited to participate in public areas or spaces, as well as public and private universities in the city and the state of Mexico. A total of 254 participants were included, most of them women, single, with undergraduate studies, and residents of Mexico City (Table 1). Regarding the number of subjects needed in the evaluation and validation of psychometric instruments, the recommendation is that there be at least 10 participants for each item to be tested. In our study, the sample was 254, which exceeds that suggested by experts (Nunnally & Bernstein, 1994).

**Table 1**

*Sociodemographic and clinical data from a sample of 254 participants*

	F	%		f	%
<b>N</b>	254	100	<b>Occupation</b>		
<b>Age (years)</b> 28.9 ± 11.9			Housewife	13	5
Median 23.5 (21 – 32)			self-employment	9	4
Range = 50 (18 – 68)			Job	10	4
<b>Sex</b>			Student	125	49
Women	151	59	Professional activity	32	12
Men	103	41	Employee	51	20
<b>Marital status</b>			Others	14	6
single	172	68	<b>Place of residency</b>		
married	62	24	Mexico City	198	78
Separated/Widowed	10	4	Outside Mexico City	56	22
Free Union	10	4	<b>Comorbidities</b>		
<b>Educational level</b>			Yes	27	11
None	1	1	No	227	89
Primary School	4	2	<b>Disease type</b>		
Secondary School	19	7	No comorbidity	227	89
High School	65	26	Hypertension	5	2
Bachelor's degree	160	63	Diabetes	6	2
Postgraduate	5	2	Others	16	12
<b>Paternity</b>			<b>Sum FACT-GP</b>	58 (54 - 63)	
Yes	78	31			
No	176	69			

*Note.* The sum of the FACT-GP is expressed as medians (25th-75th percentile).

### ***Compliance with ethical standards***

The procedures of this research complied with the provisions of the Declaration of Helsinki regarding research in humans. Each participant agreed to participate by understanding and signing the informed consent.

### ***Participation criteria***

Participants were selected based on the following criteria. Inclusion: 1) know how to read and write, 2) Mexican nationality, 3) minimum age of 18 years. Exclusion: 1) with cognitive impairment, 2) visual and/or hearing impairment that prevents him from answering the instruments. Elimination: 1) that during or after filling out the instruments they decide not to continue participating.

### **Procedure**

For the present study, the Spanish version of the Instrument for the Evaluation of Functionality in the Treatment of Chronic Diseases (FACT-GP) was taken in the general population. The translation and cultural adaptation of this version has been developed under the guidance of FACIT.org which includes multiple translators, quality control steps, and cognitive interviewing.

### ***Expert evaluation***

An evaluation of the FACT-GP was carried out according to international criteria (Skjong & Wentworth, 2001) by 10 experts in psychometrics to determine criteria of relevance, wording, appropriate language for the population, theoretical validity, apparent validity, and content in all the reagents, instructions, and response options. The degree of agreement was 95%.

### ***Pilot test***

The objective of the pilot was to identify problems in the form and construction of the reagents, instructions, and response options adapted to the general population in 30 participants. The difficulty, difficult words, offensive language, and confusion of each item, instructions, and response options were evaluated according to international standards (Koller et al., 2007). The data collected indicated that only three participants had comprehension problems in two items, far from the 20 % criterion (Reyes & García, 2008) that is considered to modify it.

### **Instruments**

*Identification Card.* An identification card was designed that included sociodemographic data such as age, sex, educational level, marital status, paternity, and occupation.

*Instrument for the Evaluation of Functionality in the Treatment of Chronic Diseases.* The FACT-GP (Cella, 1997) is composed of 21 items (after the removal of 6 irrelevant items for noncancer populations from the FACT-G) rated on a 5-point Likert scale (ranging from 0: *nothing* to 4: *a lot*). Subscales and general summary scores were scored using the scoring algorithms provided in the FACIT manual to obtain scores comparable to the FACT-G items. With four factors that evaluate *physical well-being* (BF), *social-family well-being* (BSF), *emotional well-being* (BE), and *functional well-being* (BF). Higher scores represent a better quality of life.

### **Statistical analysis**

In the first place, an audit was conducted with 10 % of the database, to estimate the reliability and integrity of the data. The selection of the sample was carried out using a randomization system in the SPSS version 21.0 program. A total score of 99.76 % was obtained, which indicates that the database is reliable, to continue with the analysis of results.

Subsequently, a descriptive analysis of each item was made to ensure that there were no extreme data and that there was data in all the resulting cells. A new variable was generated with the sum of all the reagents and the extreme quartiles were identified, with which a Student's t-test was run for two independent samples, where significance was sought in all the reagents, thereby demonstrating that they were capable of discriminate between having or not having the construct measured (Lloret-Segura et al., 2014).

A crossover analysis was then run on all items to confirm that the identified extreme quartile scores ran in opposite directions. Finally, the factor structure was identified through confirmatory factor analysis, and the internal consistency was identified with Cronbach's alpha.

### **Confirmatory Factor Analysis (CFA)**

The sample adequacy used during the exploratory analysis was evaluated with the Kaiser-Meyer-Olkin (KMO) test. The corresponding confirmatory analysis was evaluated by the result of the Hoelter test.

Confirmatory factor analysis evaluated the model fit with the maximum likelihood method using the statistical program AMOS ® (version 23), to estimate the data through the global fit indices, the absolute chi-squared value, and then the chi-square ratio/degrees of freedom to confirm if there are null errors in the variances and covariances (Manzano-Patiño, 2018). The global fit against a null model was estimated using the Comparative Fit Index (CFI), the parsimony, and the equilibrium of the model with the Tucker-Lewis index (TLI). Finally, the ratification of the goodness of fit by calculating the standardized mean residual error rate (SRMR) (Byrne, 2010).

## **Results**

The reliability analysis of the FACT-GP obtained a global Cronbach's alpha of .81. The KMO value was 0.71 ( $p = .001$ ), confirming that the sample used was suitable for this analysis. For the confirmatory analysis (see Figure 1), the following procedure was conducted (Byrne, 2010):

*Identification.* The maximum likelihood method allowed to over-identify several parameters lower than the total number of non-redundant elements of the matrix, while no correlations were observed in the residuals, indicating a recursive model.

*Parameter estimation:* In the AMOS program, the maximum likelihood method was applied, with standardized estimators, R2 estimator (squared multiple correlations), covariances of the estimators, indices to be modified, and critical proportions for the differences.

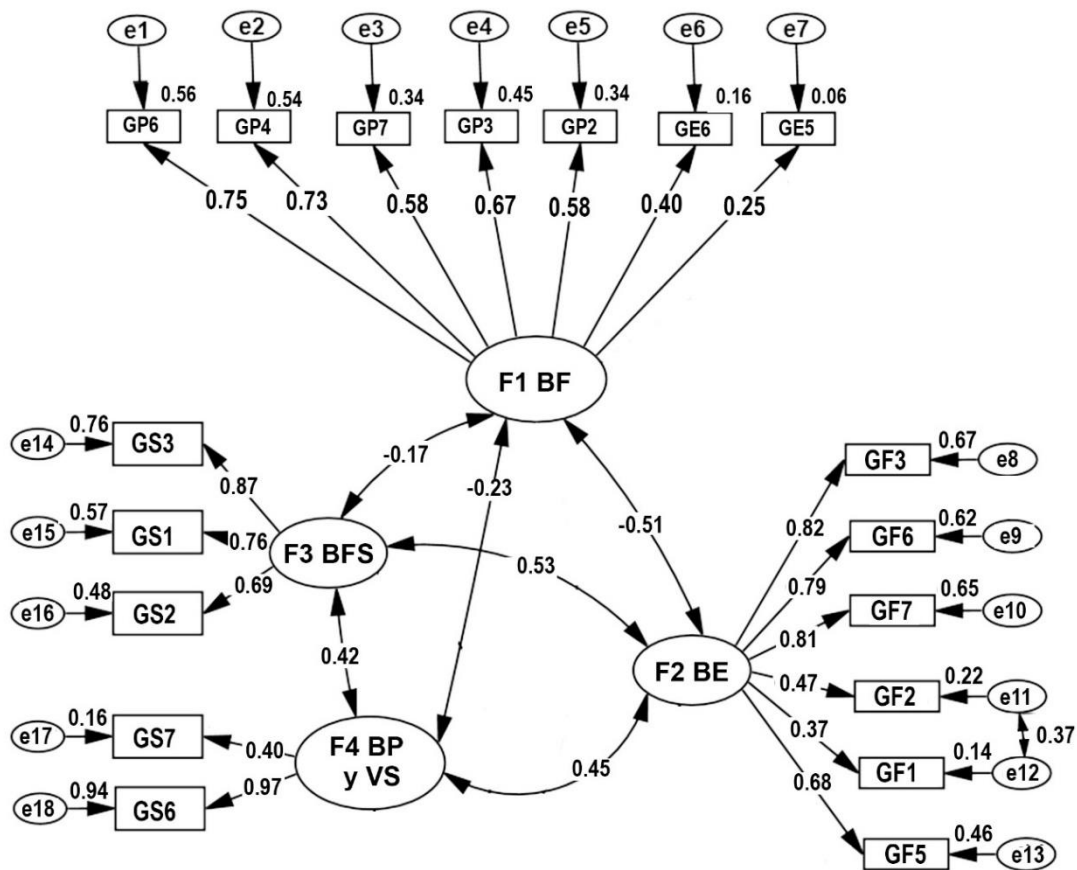
*Evaluation of the fit.* The objective was that the estimated coefficients did not exceed the acceptable limits (excluding negative or non-significant error variances, standardized coefficients greater than 1, or excessively high standard errors related to any estimated coefficient). At this point, no collinearity was observed in the measured variables, since the correlations were less than 0.3, nor extreme scores, neither univariate

nor multivariate. Additionally, excellent asymmetry was observed in all variables (values not greater than  $\pm 1.00$ ).

The parsimony and efficiency indices confirm an acceptable goodness-of-fit statistic (AGFI = 0.893), while the root mean square residual of approximation (RMSEA = 0.048, 95 % CI = 0.035-0.060), which penalizes the increase in the complexity of the model, indicates a very acceptable fit to the data as it is almost equal to or less than 0.08, reaffirmed by the value of the mean residual error (RMR = 0.051), which is clearly below the limit value (less than 0.08), indicating almost zero error and almost perfect fit, with practically zero difference between the observed and predicted covariance matrix, and with this, it is possible to assume almost zero discrepancy between the proposed model and the analyzed data. Finally, the Hoelter test  $N = 254$  ( $p = .01$ ) allows us to accept the hypothesis that the sample used is sufficient for the analysis as it theoretically does not exceed the number of real data.

**Figure 1**

*CFA model of 4 first-order factors for FACT-GP in the Mexican population (N = 254)*



*Note.* Chi-square = 202.47, 128 df, Chi-square/df = 1.582;  $p = .001$ ; CFI = 0.950; TLI = 0.940; AGFI = 0.893; RMR = 0.051; PNFI = 0.734; RMSEA = 0.048 (0.035-0.060). Hoelter,  $N = 254$  ( $p = .01$ ). F1 BF: *Physical well-being*; F2 BE: *Emotional well-being*; F3 BFS: *Family and social welfare*; F4 BPyVS: *Couple and sexual life*.

## Discussion

The purpose of this study was to determine the psychometric properties of the FACT-GP in the general Mexican population. The factorial structure identified is similar to those reported in the international literature (Janda et al., 2009) with four components: Physical well-being, Emotional well-being, Family and Social well-being; Couple and Sexual Life similar to the original version.

The physical component denotes symptoms associated with conditions of persistent work activity or illness, mainly of a chronic degenerative type and limitations previously reported in other studies (Alanis et al., 2015; Janda et al., 2009), as well as components of anxiety before the death, which has been identified in the general population (Magaña et al., 2018), suggesting the need to identify this population group and refer to health care programs.

A factor that remains constant is the emotional component that represents mental health in different areas of a person's life, expressed in satisfaction and enjoyment. This is particularly relevant since positive mental health contributes instrumentally to having an adequate standard of living, including, but not limited to, well-being (Keller, 2020). Mental health is an essential component associated with quality of life in different general and clinical populations, which emphasizes the postulate: that without mental health there is no health (Gálvez Olivares et al., 2020; Ruiz Martínez et al., 2018).

The family and social environment factor, on the other hand, corroborates what was identified in the original version. In this context, the family is a basic learning component for people. As an institution, it is the source of the most lasting relationships and the first social sustenance of the person, with relationship guidelines that are maintained throughout life, which makes it the instance with the greatest resources to produce changes (Fishman, 1988). The Mexican family has among its functions the care and satisfaction of the basic needs of its members, procreation, the development of potentialities of each of the members, the establishment of affective bonds, as well as providing socially accepted models (Ruiz- Cardenas et al., 2018). Family functioning intervenes in a positive family environment, in which communication, harmony, respect, and demonstrations of affection are intrinsic elements in relationships, favoring an adequate quality of life (García-Méndez et al., 2006).

Finally, the partner and sexual life component can be explained by the fact that the majority of the population is young and may be characterized by having an emphasis on the partner associated with the stage of life they are in. Although in young Mexicans differences by sex are identified in the age of the beginning of their sexual life, in the characteristics of the couple, and in the meanings given at the beginning of their sexual life (Menkes-Bancet et al., 2019), the range of age of the studied sample can explain this component. Although most of the participants were young and healthy, an increase in morbidity in the Mexican population is expected.

Developers and researchers of cultural adaptation of scales must ensure that the adaptation process fully takes into account the linguistic and cultural differences between the populations for which the adapted versions of the instrument are intended (Prakash et al., 2019). The real value of existing and potential new measures is determined by the trade-off between the quality and quantity of information that individualized measures offer, and the time, energy, and costs involved in collecting this information (Dijkers, 2003), even more so in Latin America, where the evaluation of the quality of life is a relevant issue to identify the well-being conditions of the population.



HRQoL is a significant measure in the evaluation of living conditions, especially in low- and middle-income countries such as Mexico, because it provides valuable information on people's satisfaction and their living conditions concerning accessibility, organization, and the living conditions of a society. HRQoL is influenced by factors such as employment, housing, access to public services, communications, urbanization, crime, environmental pollution, and others that make up the social environment and influence the human development of a community (Velarde-Jurado & Avila- Figueroa, 2002). The relevance of the findings of this study proposes the use of a valid and reliable tool for its measurement.

The FACT-GP, being an easy-to-apply, brief and reliable instrument for clinical practice and research, is relevant for determining the quality-of-life levels. The internal consistency and explained variance identified in the version in the Mexican population corroborates the psychometric background. The indices from the confirmatory analysis indicate that the proposed model is parsimonious and balanced in its adjustment to the empirical data used, with an error close to zero to estimate CV in the general population.

Among the limitations and future perspectives of this work is the lack of concurrent validity with other psychological and clinical variables that would be correlated. And additionally, establishing the stability over time of the FACT-GP scale is an objective to be determined. Finally, another aspect to consider is the possible bias due to the type of population of productive age, with a low percentage of comorbidity and with a productive occupation that, although it is similar to other studies that use the FACT-GP, it is recommended to have a larger sample. heterogeneous in future studies.

### Conclusion

The FACT-GP can be used in the general Mexican population in procedures for diagnostic, clinical, and research care. Being an easy-to-apply, brief and reliable instrument, it is relevant to determine the magnitude of quality of life in different social circumstances. The confirmatory analysis indicates that the instrument is parsimonious, with a structure similar to the original and balanced version to measure QoL in the general Mexican population.

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