Objective: to develop and validate a family functioning assessment instrument. Methods: validation study, conducted at the Family Medicine Unit No. 80 of the Mexican Institute of Social Security in Morelia, Michoacán, Mexico; from March 2018 to August 2019. Phase 1. The items were written using the McMaster model; phase 2. Test adequacy through qualitative analysis of items: presentation of the instrument, wording clarifying, relevance of variables to indicators, relevance of content and feasibility of application, application of statistical tests; item reduction, relevance, varimax rotation and variance; phase 3. Reliability and convergence validity against ff-sil. Results: phase 1. Construction of an initial instrument of 107 items with six domains. Phase 2. After a pilot test on one hundred individuals, 79 items with relevance >90 were chosen; and after a factorial analysis with a reduction factor, made by ten judges, a final instrument of 35 items was created with redistribution of the items by the varimax rotation method, six domains were assigned: problem solving (7 items), communication (10 items), roles (5 items), affective involvement (2 items), affective responses (8 items) and behavioral control (3 items); with a total variance of 74.1. Phase 3. Final instrument of 35 items that categorizes families into: functional (141-175 points), mild dysfunctional (106-140 points), moderate dysfunctional (71-105 points) and severe dysfunctional (35-70 points). Final instrument with Cronbach’s alpha of 0.962 vs. 0.905 of the ff-sil. Conclusion: a reliable 35-item instrument measuring family functioning was constructed.

Keywords: Family; Evaluation Study; Family Relations
Introduction

Family as an object of research has an importance that only few social institutions possess; this conformation has been the most historically studied, not only by the social sciences but also in all disciplines and scientific areas.1

Family functioning is defined as the set of attributes that characterize the family as a system and that explain the regularities found in the way in which the family system operates, evaluates or behaves.2 The evaluation of family functioning allows knowing if the functions of the members of a family are being fulfilled and helps to know how a crisis is being faced.3

Family Medicine is the medical specialty that arises to respond to the imperative social and health needs of the population, attending to individuals and families and not only to illnesses or diseases.4

The Family Medicine specialist must know how the family functions and provide guidance on this functioning in conditions that could organically affect a family member.5,6

There are several instruments to measure family functioning, some of them are applied by the psychologist, while others, such as the FACES IV and the FF-SIL,7,9 are commonly used by the family physician.

The FACES IV is a family cohesion and flexibility assessment scale that provides the “inside perspective” of family functioning. This instrument evaluates the two central dimensions of Olson’s Circumplex Model of Marital and Family Systems.7 It presents a structure that integrates three dimensions: cohesion, flexibility and family communication; it consists of 23 multiple-choice Likert-type items with five response options: strongly agree, generally agree, undecided, generally disagree and strongly disagree. It has a Cronbach’s alpha that ranges between 0.71-0.77.8

The FF-SIL is an instrument that allows to measure family functioning, designed in 1994 by a Primary Health Care group and validated in 20049, it categorizes families in: functional, moderately functional, dysfunctional, and severely dysfunctional. Its objective is to evaluate seven processes involved in intrafamily relationships: cohesion, roles, harmony, communication, affectivity, permeability and adaptability. It is composed of 14 items with Likert-type responses with five options as response alternatives. Scoring is done by assigning points according to the option selected on the scale: almost never 1, seldom 2, sometimes 3, many times 4, and almost always 5. It has a Cronbach’s alpha of 0.859.

On the other hand, the McMaster model, designed in 1979, proposes to measure family functioning through six dimensions: problem solving, communication, roles, affective involvement, affective responses and behavioral control.5

Problem solving refers to the family’s ability to solve problems to the degree that it maintains effective functioning;5 communication refers to the exchange of information among family members;10 roles refer to the patterns of behavior by which individuals are assigned their functions;11 affective involvement measures the degree to which the family values the activities and interests of each member;12 affective responses refer to the family’s ability to respond with appropriate feelings to a
stimulus, and behavioral control represents the patterns a family adopts to manage behavior in situations of danger, socialization and its needs.\(^{13}\)

Considering that there is no instrument that measures family functioning using the six dimensions above mentioned, the objective of this study was the developing and validating of a family functioning assessment instrument based on the McMaster model.

**Methods**

Study of construct and convergence validation conducted in the Family Medicine Unit (FMU) No. 80 in Morelia, Michoacán, of the Mexican Institute of Social Security, from March 2018 to August 2019. The work was carried out in three phases: construction of the instrument, adaptation of the instrument, and convergence validation.

The construction of the instrument was carried out in four stages: 1. Definition of the construct through a literature review on family functioning; 2. Identification of the domains using the McMaster model; 3. Drafting of the initial construct by a team of six experts that included: a family physician, two Masters in Education and Teaching, a Master in Pedagogy, a Doctor in Educational Sciences, and a Doctor in Psychology; and 4. Drafting of the initial instrument of 107 items, with Likert-type multiple-choice responses that included five response options.

The adaptation of the instrument had three stages: application of the first construct, item analysis, and final composition of the instrument.

For the application of the first construct, a pilot test was carried out on one hundred participants, aged 18 to 39 years, with prior informed consent, and beneficiaries of the IMSS FMU No. 80.

After the pilot test, the items were analyzed by a round of experts with a qualitative evaluation in which five characteristics of the instrument were rated: presentation, clarity in the wording of the items, relevance of the variables with the indicators, relevance of the content and feasibility of application. The round of experts included ten judges from the health area: five family physicians, one psychologist, two Masters in Education and Teaching, one Doctor in Educational Sciences and one Doctor in Psychology with Psychometrics expertise.

Statistical tests were applied for the final composition of the instrument, including relevance and variance, varimax rotation and factor reduction analysis. After this phase, a 35-item with Likert-type multiple-choice answers final instrument was obtained, including five response options: never, almost never, sometimes, almost always and always, with scores ranging from 1 (never) to 5 (almost always).

The final “FF Instrument” was applied, for the third phase, to 280 participants, companions of the FMU No. 80 beneficiaries, aged 18 to 59 years, in the waiting rooms. In addition, the participants were asked to answer the FF-SIT for convergence validity. Cronbach’s alpha and the Split-Half Method were used to measure the reliability of the instrument.

The SPSS v. 23 software for Windows was used to capture and code the responses to the instrument. The present study was authorized by the IMSS Local Health Research and Ethics Committee under registration number R-2017-1602-48.

**Results**

After reviewing the literature, the results of the construction of the initial instrument, served to establish six domains with their respective study variables, see Figure 1.

For the initial instrument 107 items were created, after the round of experts, and were assigned to the six domains as follows: problem solving (21 items), communication (4 items), roles (30 items), affective involvement (5 items), affective responses (20 items) and behavioral control (27 items).

The initial instrument was measured to have a Cronbach’s alpha of 0.64, after, the analysis of the results obtained from the pilot test carried out on 100 participants.

The results of the qualitative evaluation round of the initial instrument of 107 items by the judges on the first construct are shown in Figure 2, it was identified that most of the items were rated as fair and good, and a smaller number of items were measured as excellent.

The relevance calculation results of the 107 items showed that 79 presented a relevance >90, 21 items a relevance <90, and 7 items were categorized as “not assessable”, these seven were eliminated.

Only those items remaining above 0.64 were selected, obtaining a final instrument with 35 items, after the reduction analysis.

Subsequently, the 35 selected items were assigned to one of the six corresponding domains using a coefficient matrix.

Finally, the items were distributed by the varimax rotation method, assigning each of the corresponding domains and reorganized into: problem solving (7 items), communication (10 items), roles (5 items), affective involvement (2 items), affective responses (8 items), and behavioral control (3 items); see Table 1.
The results of the internal consistency of the final instrument of 35 items, after calculating Cronbach’s alpha and the Split-Half Method, were 0.962 and 0.970, respectively. The results of these two tests by domain were: communication 0.941 and 0.956; affective responses 0.918 and 0.929; problem solving 0.914 and 0.911; roles 0.889 and 0.857; behavioral control 0.798 and 0.776; affective involvement had a Cronbach’s alpha of 0.767.

Figure 3 shows the results of family functioning after the application of both instruments, final instrument (ff instrument) vs ff-SIL. The ff instrument identified more patients with functional category and fewer patients in the category of mild and severe dysfunction.

According to the obtained results, the overall rating of the final “ff Instrument” of 35 items allows measuring family functioning in four categories: functional 141-175 points, mild dysfunctional 106-140 points, moderate dysfunctional 71-105 points, and severe dysfunctional 35-70 points.

The instrument also allows identifying the results of family functioning by domain: communication (items 1 to 10): adequate 31-50 points or inadequate 10-30 points; affective response (items 11 to 18): adequate 24-40 points and inadequate 8-23 points; problem solving (items 19 to 25): adequate 19-35 points and inadequate 7-18 points; roles (items...
26 to 30): accomplished 16-25 points and not accomplished 5-15 points; behavioral control (items 31 to 33): adequate 9-15 points, inadequate 3-8 points; and affective involvement (items 34 and 35): with involvement 7-10 points, and without involvement 2-6 points.

Discussion
The present study was carried out to develop and validate a new instrument that assesses family functioning by the McMaster model through its six dimensions, and from the perspective of the family physician it could be applied during the comprehensive care of the patient to obtain a perception that approximates the reality of his or her family.

The psychometric properties of the scales for measuring the perception of family functioning are very varied. There are tools used by family physicians with the aim of providing comprehensive care to every individual seeking medical care.14-16

An adequate measurement instrument is one that records observable data that truly represent the concepts or variables of interest to the researcher, consequently it should have a series of stages to be considered a valid, reliable and objective instrument.17 In this study, construct and convergence validity and internal consistency of the instrument were performed.

The instrument here presented has 35 items, a Cronbach’s alpha of 0.926 and measures six domains: problem solving, communication, roles, affective involvement, affective responses, and behavioral control; and after its application it allows categorizing the family as: functional, mild dysfunctional, moderate dysfunctional, and severe dysfunctional with a score ranging from 35-175; unlike the ff-sil whose instrument has 14 items, a Cronbach’s alpha of 0.905 measures cohesion, harmony, communication, adaptability, affectivity, role, and permeability, it categorizes families as: functional, moderately functional, dysfunctional and severely dysfunctional with scores ranging from 14 to 70 points.12

In relation to the instruments that evaluate family functioning, these have been used mainly as a diagnostic support and not as a screening method to focus on interventions, which in some way prejudices and diminishes their real usefulness for those who are the subjects of intervention.18 Therefore, the construction of a new instrument should contemplate obtaining a practical tool that allows its application in less than fifteen minutes; the average time was eight minutes for patients who self-applied, and ten minutes for those who the researcher applied it, which is

Figure 2. Percentage of Qualitative Appreciation by Judges

- Presentation of the Instrument
- Clarity in the wording of the items
- Significance
- Relevance of the content
- Feasibility for application
A disadvantage in relation to the time it took to answer the FF-sil, during which the average time was 4.5 minutes. A strength of this study was the qualitative evaluation process of the instrument, since it measured the presentation, clarity in the wording, significance of the variables with the indicators, relevance of the content and feasibility for application, as well as the evaluation of the relevance and designation of domains using the varimax rotation method. In addition, the created instrument showed a high internal correlation, with a Cronbach's alpha of 0.962, in which “communication” and “affective response” were the two domains resulting with such high internal correlation.

Among the limitations of the study are that the sample of subjects for the pilot test included patients with and without comorbidities, and it was not identified whether they had any mental health problem that caused alterations in the responses. On the other hand, both instruments (FF Instrument and FF-sil) were administered on the same day, which may cause a bias due to the total number of items. Another limitation of the study is that the results shown are the perception of an individual about his or her functioning within the family, so it would be appropriate to apply this instrument to all members of the family in order to have a more realistic approximation of family functioning.

**Conclusion**

A reliable 35-item instrument was constructed to measure family functioning based on a model that includes six dimensions. This instrument can be very useful in medical practice, the community is invited to use it to assess one of the key structures within family medicine.
Authors Contribution
Muñoz-Cortés G: conceptualization, development, and writing; Barreras-Miranda MI: survey application and data analysis; Pérez-Flores LM: survey application, and data analysis; Gómez-Alonso C: conceptualization, analysis and discussion of results, and writing; Fulgencio-Juárez M: conceptualization, analysis and discussion of results, and writing; Estrada-Andrade ME: conceptualization, analysis and discussion of results, and writing. All authors approve the publication of this paper.

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Conflicts of Interest
The authors declare not having conflicts of interest.

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