

Clinical competence measurement in Mexican resident physicians for diagnosis and treatment of Chagas disease

Marina de Jesús Kasten-Monges, Carlos Enrique Cabrera-Pivaral, Felipe Lozano-Kasten, Hugo Marcelo Aguilar-Velasco, Ricardo Hidalgo-Ottolenghi and Marco Antonio Zavala-González*
Universidad de Guadalajara, University Center of Health Sciences, Department of Public Health, Guadalajara, Jal., Mexico

Abstract

Objective: Evaluate clinical competence of a Mexican resident physicians sample for diagnosis and treatment of Chagas disease. **Material and methods:** Cross-sectional and analytic study in 122 resident physicians of epidemiology, family medicine and internal medicine specialty, assigned to a third level medical unit from Guadalajara, Jalisco, Mexico, taking a sample for convenience. An instrument was designed and validated for to evaluate clinical competence in five dimensions: risk factors identification, clinical data identification, diagnostic test interpretation, diagnostic integration and therapeutic resources utilization; that classified competence level in four strata: random defined, low, medium and high, with 89% of reliability accord to Kuder-Richardson test. Descriptive and no parametric inferential statistics were obtained. **Results:** A total of 122 physicians, 55.7% males ($n = 68$) and 44.3% females ($n = 54$). Random defined clinical competence 4.9% ($n = 6$), low 49.2% ($n = 60$), medium 44.3% ($n = 54$) and high 1.6% ($n = 2$). Median significantly higher in epidemiologists ($p = 0.03$). **Conclusions:** Improve clinical competence level of resident physicians for diagnosis and treatment of Chagas disease is necessary. Intervention studies are required. (Gac Med Mex. 2016;152:464-7)

Corresponding author: Marco Antonio Zavala-González, zgma_51083@yahoo.com.mx

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Introduction

The Pan American Health Organization estimates that there are about 8 million people with Chagas disease, with 56,000 new cases every year, generating 12,000 annual deaths¹. In addition, 25% of the Latin American population is at risk of acquiring this disease². In 2013, in Mexico there were 1.1 million infected persons³. In the state of Jalisco, there were 87 cases reported from 1986 to 2006, out of which 53% occurred during 2002-2006⁴. Thus, Chagas disease is

common and has an elevated mortality rate and, therefore, it must be prevented and controlled.

The diagnosis of this disease is complex; it is based on the clinical presentation associated with its acute and chronic phases, history of residence in endemic areas, history of transfusions, carrier mother or organ transplantation, which should be confirmed with demonstration of the parasite or at least 2 positive serum tests; therefore, doctors must have the knowledge required to establish clinical, parasitological and serological diagnosis⁵. Treatment is equally complex, given that antiparasitic agents are only effective while the

Correspondence:

*Marco Antonio Zavala-González
Sierra Mojada, 950, Puerta 1, Edificio N, Planta Alta
Col. Lomas de Independencia
C.P. 44240, Guadalajara, Jal., México
E-mail: zgma_51083@yahoo.com.mx

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parasite is circulating, since once target organs are damaged, treatment is limited to address complications⁵. Therefore, doctors must have the required clinical competence for diagnosis and treatment of this disease, with competence being defined as a combination of capacities that involve reflection, discrimination between alternatives, election, decision and own judgment in the face of problematic clinical situations, as well as capacity for documental analysis and evidence criticism⁶. However, to date there are no known studies assessing doctors' clinical competence for the diagnosis and treatment of Chagas disease, or adequate and validated instruments allowing for such assessment to be made. The sparse investigations published on the subject⁷⁻⁹ have been limited to assess, by means of surveys, knowledge on this disease by certain groups of specialist physicians, obstetricians-gynecologists and pediatricians, making it clear that there is lack of knowledge about this disease among these specialists in USA^{7,8} and Spain⁹.

In this vein, having a validated instrument, integrated by real clinical cases covering diagnostic and therapeutic aspects, would allow to objectively assess physicians' clinical competence for the diagnosis and treatment of Chagas disease, which would result in educational interventions to improve it in case of deficiently evidenced, thus resulting in an improvement in the prevention, surveillance and control of this disease¹⁰⁻¹³.

By virtue of the above, this study was carried out with the purpose to assess clinical competence in a group of Mexican resident physicians for the diagnosis and treatment of Chagas disease, by means of an ad hoc instrument, designed and validated for this purpose.

Material and methods

An analytical crossover study was carried out in a universe of 122 resident physicians of the epidemiology, family medicine and internal medicine specialties assigned to a social security tertiary care hospital of the State of Jalisco, Mexico, out of which a convenience, non-probabilistic sample was taken, where all those who accepted to participate in the study were included, regardless of their age, gender, school of origin or year of residency.

The study variable was clinical competence of the specialist physician for the diagnosis and treatment of Chagas disease in 5 dimensions:

- Risk factors identification
- Clinical data identification
- Diagnostic tests interpretation

- Diagnostic integration
- Therapeutic resources use

Additionally, age and gender of the participants was recorded to demographically characterize the sample.

For the assessment of clinical competence for the diagnosis and treatment of Chagas disease, theory and practice were integrated by means of 4 real clinical cases that were questioned according to indicators referring to capabilities related to analysis, synthesis and clinical criticism⁶. The cases were condensed and adjusted for the purposes of the instrument, to later be divided into fragments, one for each dimension to be assessed. The contents and construct of this instrument were validated through three rounds of review by experts, selected by virtue of their disciplinary and methodological training, respectively, while the criterion validation was achieved by running a pilot test in ten physicians on post-degree training randomly chosen in a hospital, with adjustments made in the wording of the instrument items¹⁴.

An instrument comprised of 184 items was obtained, with answers of the type of "true", "false" or "don't know", with values of +1, -1 and 0, respectively, the theoretical maximum value of which was 184 points, distributed between its 5 integrating dimensions: risk factors identification 39 points, clinical data identification 22 points, diagnostic tests interpretation 59 points, diagnostic integration 48 points, and therapeutic resources use 16 points. The results of this instrument place the assessed physician in one of four clinical competence levels: high with a score > 120, intermediate with a score of 90 to 119, low with a score of 15 to 89 and random-defined with a score lower than 15. The reliability of the instrument thus constructed was 89% according to Kuder-Richarson test¹⁵.

The instrument was applied to resident physicians who met the selection criteria and was assessed by someone external to the investigation. Descriptive statistics were obtained to demographically characterize the participants and to define their level of clinical competence. Subsequently, these characteristics were compared between the different studied specialties by means of parametric and non-parametric tests, with ANOVA being used to compare 3 or more means, the chi-square test to compare 3 or more proportions, and the Kruskal-Wallis test to compare 3 or more medians. These statistics were obtained with a 95% confidence interval ($p \leq 0.05$) using SPSS[®] version 15.0 for Windows[®] environment.

Based on Mexico's General Health Statute on research for health, the present study was considered to

Table 1. Demographic characteristics of the physician residents

Variables	Epidemiology (n = 35)	Family medicine (n = 45)	Internal medicine (n = 42)	p-value	Total (n = 122)
Age*	27.4 ± 5	28.8 ± 3.7	27.8 ± 4.7	0.84	28.9 ± 3.8
Gender†					
Male	23 (65%)	22 (49%)	23 (55%)	0.93	68 (55.7%)
Female	12 (35%)	23 (51%)	19 (45%)		54 (44.3%)

*Means compared with ANOVA.

†Proportions compared with chi-square test.

Source: Created by the authors.

Table 2. Level of clinical competence of resident physicians by strata

Competence level	Epidemiology		Family medicine		Internal medicine		Total	
	n	%	n	%	n	%	n	%
High	1	2.9	1	2.2	0	0	2	1.6
Intermediate	19	54.2	14	31.1	21	50	54	44.3
Low	14	40	27	60	19	45.2	60	49.2
Random	1	2.9	3	6.7	2	4.8	6	4.9
Total	35	100	45	100	42	100	122	100

Comparisons between specialties using the chi-square test, epidemiology vs. family medicine p = 0.03; epidemiology vs. internal medicine p > 0.05; family medicine vs. internal medicine p > 0.05.

Source: Created by the authors according to results of the validated instrument.

be a risk-free investigation, since no interventions were carried out on the subjects; in addition, privacy of the participants was protected¹⁶.

Results

One-hundred and twenty-two resident physicians were studied, whose demographic characteristics are presented in table 1, which shows that there were no statistically significant differences in the number of doctors by specialty, or in age and gender of the study subjects.

The assessment of clinical competence for the diagnosis and treatment of Chagas disease revealed that 98.4% of participants were at intermediate, low or random-defined level, with statistically significance difference being found between the results obtained by the epidemiology specialty students when compared with the family medicine residents (Table 2). When the medians obtained in the test were compared, the mean obtained by students of the epidemiology specialty was significantly higher than the mean obtained by family medicine students (Table 3).

Discussion

This is the first study known by the authors where clinical competence for the diagnosis and treatment of Chagas disease is assessed in doctors⁷⁻⁹, which, additionally, provides a validated and reliable instrument for its assessment in different scenarios.

The results reveal the lack of competence in the studied sample of physicians for the diagnosis and treatment of the disease in question, which is consistent with preexisting literature that indicates the lack of knowledge in several medical groups on different theoretical aspects of this disease⁷⁻⁹, in whom, would clinical competence have been assessed, similar results would have been found in the practical aspect evaluated in this report. Considering that this study, added to the preexisting ones, evidence the same problem in USA^{7,8}, Spain⁹ and Mexico with regard to Chagas disease, it is plausible thinking that there is a widespread problem in the training of specialist doctors with regard to this condition, which may originate either in curricular contents¹⁷, or in the teaching techniques employed during under- and postgraduate training¹⁸, which

Table 3. Resident physicians' level of clinical competence median values

Competence or dimension	Epidemiology		Family medicine		Internal medicine	
	Median	Interval	Median	Interval	Median	Interval
Global competence (MTV = 184)	93	56-126	87	23-121	89	63-113
Risk factors identification (MTV = 39)	25	5-33	24	4-36	23	9-35
Clinical data identification (MTV = 22)	14	4-22	14	1-20	14	3-20
Diagnostic tests interpretation (MTV = 59)	29	6-42	23	1-43	27	11-35
Diagnostic integration (MTV = 48)	22	10-36	19	3-32	22	6-36
Therapeutic resources use (MTV = 16)	6	4-12	4	8-9	4	4-10

Between-specialty comparisons using the Kruskal-Wallis test, epidemiology vs. family medicine $p = 0.03$; epidemiology vs. internal medicine $p > 0.05$; family medicine vs. internal medicine $p > 0.05$.

MTV: Maximum theoretical value.

Source: Created by the authors according to results of the validated instrument.

should be explored on the short-term given the epidemiological importance of the disease¹⁻⁴.

In any case, interventional studies have to be conducted and documented, where improving the level of clinical competence of physicians on the diagnosis and treatment of Chagas disease is attempted; to accomplish that, using participative educational models is suggested. In addition, assessing physicians' clinical competence for the prevention, diagnosis and treatment of other epidemiologically relevant diseases is recommended.

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References

- Organización Panamericana de la Salud. Enfermedad de Chagas [monografía en Internet]. Washington, D.C.: Organización Panamericana de la Salud, Organización Mundial de la Salud; 2014 [consultado 25 de abril de 2015]. Disponible en <http://bit.ly/1u0C5Au>.
- Carabarin-Lima A, González-Vázquez MC, Rodríguez-Morales O, et al. Chagas disease (American trypanosomiasis) in Mexico: An update. *Acta Trópica*. 2013;127(2):126-35.
- Hotez PJ, Dumonteil E, Betancourt-Cravioto M, et al. An unfolding tragedy of Chagas disease in North America. *PLoS Negl Trop Dis*. 2013;7(10):e2300.
- Lozano-Kasten F, Magallón-Gastélum E, Soto-Gutiérrez M, Kasten-Monges M, Bosseno MF, Brenière SF. Conocimiento epidemiológico y situación actual de la enfermedad de Chagas en el estado de Jalisco, México. *Salud Publica Mex*. 2008;50(6):508-15.
- Secretaría de Salud. Norma oficial mexicana NOM-032-SSA2-2002, para la vigilancia epidemiológica, prevención y control de enfermedades transmitidas por vector. México D.F.: Diario Oficial de la Federación de los Estados Unidos Mexicanos; 2003.
- Viniegra-Velázquez L. La experiencia reflexiva y la educación. *Rev Invest Clin*. 2008;60(2):133-56.
- Verani JR, Montgomery SP, Schulkin J, Anderson B, Jones JL. Survey of obstetrician-gynecologists in the United States about Chagas disease. *Am J Trop Med Hyg*. 2010;83(4):891-5.
- Stimpert KK, Montgomery SP. Physician awareness of Chagas disease, USA. *Emerg Infect Dis*. 2010;16(5):871-2.
- Muñoz-Vilches MJ, Salas-Coronas J, Gutiérrez-Izquierdo MI, Metz D, Salvador-Sánchez J, Giménez-Sánchez F. Conocimiento de la enfermedad de Chagas por parte de los profesionales sanitarios de tres hospitales en la Provincia de Almería. *Rev Esp Salud Pública*. 2013;87:267-75.
- Robbins L, Hoke M. Using objective structured clinical examinations to meet clinical competence evaluation challenges with distance education students. *Perspect Psychiatr Care*. 2008;44(2):81-8.
- Baig L, Violato C, Crutcher R. A construct validity study of clinical competence: A multitrait multimethod matrix approach. *J Contin Educ Health Prof*. 2010;30(1):19-25.
- Boursicot KA. Structured assessments of clinical competence. *Br J Hosp Med*. 2010;71(6):342-4.
- Blumenthal D, Bernard K, Fras T, Bohnen J, Zeidman J, Stone V. Implementing a pilot leadership course for internal medicine residents: design considerations, participant impressions and lesson learned. *BMC Med Educ*. 2014;14:257.
- Solar-Huerta E, Sabido-Sighler C, Sainz-Vázquez L, Mendoza-Sánchez H, Gil-Alfaro I, González-Solis R. Confiabilidad de un instrumento para evaluar la aptitud clínica en residentes de medicina familiar. *Arch Med Fam*. 2005;7(1):14-7.
- Pérez-Padilla R, Viniegra-Velázquez L. Método para calcular la distribución de las calificaciones esperadas por azar en un examen del tipo falso, verdadero, no sé. *Rev Invest Clin*. 1989;41:375-9.
- Reglamento de la ley general de salud en materia de investigación para la salud. México D.F.: Diario Oficial de la Federación de los Estados Unidos Mexicanos; 1986.
- Schmunis G, Yadon Z. Chagas disease: A Latin American health problem becoming a world health problem. *Acta Tropica*. 2010;115(1):14-21.
- Nastasi BK, Schensul J, Schensul S, et al. A model for translating ethnography and theory into culturally constructed clinical practices. *Cult Med Psychiatry*. 2015;39:92-120.