

Effect of an educative intervention on the clinical ability of physicians in the management of metabolic syndrome

Carlos E. Cabrera-Pivaral,^{*,***} Roberto Anaya-Prado,^{**} Guillermo González-Pérez,^{***}
María Guadalupe Vega-López,^{***} Ninel Mayarí Centeno-López^{**}

* Unidad de Investigación en Epidemiología Clínica y

** División de Investigación, Centro Médico Nacional de Occidente, IMSS de Guadalajara. *** Centro de Enseñanza en Salud y Desarrollo Poblacional y Humano, Departamentos de Ciencias Sociales y Salud Pública, Universidad de Guadalajara.

ABSTRACT

Purpose. To measure the effect of an educative intervention on the clinical ability of Family Physicians of two Family Units of the Mexican Institute of Social Security (IMSS) in the diagnosis and treatment of patients with metabolic syndrome. **Material and methods.** A quasi-experimental study was conducted with a control group using basal and final measurements. The educative intervention of the experiment group included one in-the-classroom work and another at the doctors' office. The instrument was validated by a panel of experts and included 140 items and five case-oriented problems, reaching a reliability index of 0.87. **Results.** There was no significant difference at base measurement among the different levels of clinical ability between the two groups ($p = 0.82$), both the experimental and the control groups showed a higher frequency of medium level abilities (33.3 vs. 36.8% respectively). At the end of the follow-up, a significant increase in the experimental group (98 with 49-106 over 69 with 26-94) was observed. **Conclusions.** The educative intervention utilized in this study improved the ability of Family Physicians to diagnose, treat and apply preventive measures in patients with metabolic syndrome.

Key words. Clinical ability. Metabolic syndrome. Educative intervention.

Efecto de una intervención educativa en la competencia clínica de médicos para el manejo del síndrome metabólico

RESUMEN

Objetivo. El objetivo de la intervención educativa fue medir la competencia clínica en el diagnóstico y manejo de pacientes con síndrome metabólico de los médicos familiares que laboran en dos Unidades de Medicina Familiar del Instituto Mexicano del Seguro Social (IMSS). **Material y métodos.** Se desarrolló un estudio cuasi experimental con un grupo control y medición antes-después. En el grupo experimental se aplicó una intervención educativa que incluyó actividades teóricas en aula y talleres con guías de discusión y pacientes. Se construyó un instrumento validado por un panel de expertos con un índice de confiabilidad de 0.87 y contempló cinco casos problematizados y 140 preguntas. **Resultados.** La medición de la variable "competencia para diagnosticar y manejar el síndrome metabólico" no mostró diferencias significativas en la medición inicial para ambos grupos ($p = 0.82$). Al final de la intervención educativa se mostró un incremento significativo en el grupo experimental; mediana de 98 con rango de 49-106 vs. 69 con rango de 26-94 en el grupo control. **Conclusiones.** La intervención educativa utilizada en este estudio produjo una mejoría en la capacidad de los médicos para diagnosticar, tratar y tomar medidas preventivas en pacientes con síndrome metabólico.

Palabra clave. Aptitud clínica. Síndrome metabólico. Intervención educativa.

INTRODUCTION

Metabolic syndrome (MS) has been called the epidemic of the 21st century. This is because an increased incidence of the syndrome has been described in the last ten years, in different countries. Additionally, it has been shown that the higher the body mass index (BMI), the greater the likelihood of developing this condition.^{1,2}

In Mexico, prevalence of MS in the adult population is higher than in Caucasians. More than 6 and 14 millions of Mexicans are considered to be affected if we consider the criteria of either the World Health Organization (WHO) or the third adult treatment panel (ATP III) of The National Cholesterol Education Program (NCEP), respectively.^{2,3}

Recent observation indicate that people over 65 years old have five times the likelihood of developing MS as compared with people between 20 and 34 years old. It has also been demonstrated that prevalence of MS tops its maximum in males 50 to 70 years old, and in females between 60 and 80 years old.⁴

The main components of the MS are: abdominal obesity, high arterial blood pressure, glucose intolerance as well as dyslipidemia (high triglycerides and low HDL cholesterol). Furthermore, malnutrition and absence of physical activity favor the development of insulin resistance: a proposed parameter by the WHO for the diagnosis of MS.^{5,6}

On the other hand, weight loss is the only measure that has been demonstrated to improve all risk factors observed in patients with MS. This is a clear indication to put into practice preventative measures as well as to alert physicians about the MS, which involves two main goals:⁶

- To decrease underlying causes, such as obesity and physical inactivity, and
- To manage lipid and non-lipid issues.

This syndrome requires timely recognition and clinical management by Family Practitioners. Developing these skills will allow the physician to identify all risk factors, the elements to integrate a diagnosis and management alternatives. All together should lead to a decreased risk for type 2 diabetes and cardiovascular disease development.

Education of health personnel requires adequate means to assess the scope and limitations of clinical abilities achieved during formation and their own professional practice. Assessment of physicians has

traditionally been carried out in a stereotyped manner, memory-oriented, and much of the time centered on matters unrelated to clinical practice. It is occasionally performed with clinical cases almost always retrieved from a book and with a multiple choice test format. Being able to assess the ability and competence of physicians in solving clinical problems that they may face has always been a major concern for educators.⁷⁻⁹

Clinical competence and ability of Physicians are defined as the way they perform their duties under problematic clinical situations. A competent medical practitioner is that who has the necessary skills, knowledge, attitudes and is able to synthesize these features by a complex set of behaviors to deliver high-quality medical care.¹⁰ Thus, it is necessary to develop instruments to evaluate certain abilities that involve reflection, discrimination between diagnostic alternatives, choice and decision of therapeutic actions where physician's own criteria may be at risk. Also, these measures should be able to assess the effect that a participative educative intervention has on Family Physician when he/she faces a real problematic situations of MS.^{7,8,11}

OBJECTIVE

The aim of this study was to evaluate the effect of an educative intervention on the clinical ability of Family Physicians in the diagnosis and management of patients with metabolic syndrome.¹²

MATERIAL AND METHODS

This quasi-experimental study involving basal and final measurements was conducted on two different Family Units, (FU) of the Mexican Institute of Social Security (IMSS) in Guadalajara, México from January to October 2008. Two groups of physicians were included: group A included a control group from one Family Unit (n = 19) and group B included the intervention group from another Family Unit (n = 21). This study was registered and approved by the Institutional review board.

- **Control group (A).** Physicians permanently working at one FU (n = 19), with any level of seniority. This cohort of Practitioners did not receive any intervention. Physicians not included in this study were either those having a weekend shift, those changing department and those not receiving or not completing the measuring instruments.

- **Intervention group (B).** Physicians permanently working at one FU (n = 21), with any level of seniority. Practitioners included in this group received the educative intervention. Physicians not included in this study were either those having a weekend shift, those changing department and those not receiving or not completing the measuring instruments.
- **Sample.** The choice of FU's included in the study was carried out based on their capability to provide patients with diagnosis of MS. Both Units were similar in terms of the number of consulting and support services (laboratory, X-ray, etc.). All family physicians enrolling the study group signed a written consent after accepting the invitation to participate.
- **Variables Investigated:**
 - **Independent variable.** Participative educative intervention in the experimental group (Group B).
 - **Dependable variable.** Clinical ability. This clinical ability is defined as the competency of a Family Physician to face a problematic case and to deal with difficult situations of clinical experience or variable complexity.

This competency puts the physician's own criteria at risk when deciding on the best alternative of interpretation and actions concerning risk factors for MS, the identification of clinical data, diagnostic integration, as well as the use of means for diagnosis and employment of therapeutic resources.

Study Stages

- **Stage 1.** Development and validation of an instrument to assess the clinical ability of Family Physicians in the management of the patient with MS. An instrument to explore the degree of competence and clinical ability was then implemented and applied on a first stage. This instrument measures the Family Physician's ability to carry out interpretations, judgment and proposals in the face of four real clinical cases theoretically prepared. The instrument was then presented to a panel of 5 experts: three Endocrinologists and 2 Internists. These specialists analyzed concept, contents, criteria and validated its applicability and pertinence. The instrument includes 140 items divided in 5 different indicators: identification of risk factors, integration of clinical diagnosis, labora-

tory studies for diagnosis, treatment proposals. After considering the experts' observations, a 140 question instrument was implemented that included either 70 true correct and 70 false correct answers, respectively. A glossary of terms was worked out with the precise meanings of the terms utilized in the questions. Instrument reliability had a Kuder-Richardson coefficient of 0.89.^{13,14}

- **Stage 2.** Development and validation of contents, criteria and management standards for the MS patient. A study guideline that includes explicit criteria and standards in a systematic manner was created for the diagnosis and treatment of MS. This algorithm is supported on the Mexican Consensus for the Management of Metabolic Syndrome.^{14,15}
- **Stage 3.** Implementation of the experimental educative strategy. The scope of this educative strategy is based on the participative focus of students through communication; which uses dialog, exchange of ideas, and sharing of common actions in the diagnosis and treatment of MS patients. This educative intervention took 6 months to implement, with 5 hours a week divided in two weekly sessions: 1.5 hours in the doctor's office and 2 hours in the classroom. The process included the following steps:⁷

a. **Classroom activities.** After previously selected topics had been read by Family Physicians, classroom sessions were followed by the next specific activities:

1. Theoretical topic presentation by the expert (40 min) which included the Mexican Consensus for the Management of Metabolic Syndrome.¹⁵
2. Small group discussions. Students discussed the topic presented on the previous session, which included analytical revision of literature. Each group examined points of agreement and disagreement and the arguments that strengthen diagnosis and treatment of MS. This activity took 30 min to complete.
3. Debate. After the small-group discussion exercise, students present to the entire group a synthesized version of their ideas, comments, discrepancies and arguments. All these were confronted with other versions. This activity took 30 min to complete.
4. Review of clinical cases. Physicians then presented a clinical case in an orderly

fashion, allowing for everyone to have the opportunity to participate.

5. Commented critical review of the literature, discussion and analysis of clinical cases, global result, identification of risk factors, recognition of signs and symptoms, clinical diagnosis integration, and treatment proposals.

- b. Activities at the Doctor's office.** The whole purpose of this activity was to provide care to patients with MS to strengthen the use of diagnostic criteria, risk factor identification and treatment. Consultations were carried out by the group of instructors, ensuring participation of all physicians included in the study.

Different scientific texts and articles were reviewed for the construction of theoretical contents and pedagogy materials. The strategy was developed by one Internist with a Master's Degree in Public Health Sciences, one Family Physician with a Master's Degree in Medical Sciences, one Nutritionist with a Master's Degree in Education, and two Family Physicians with a Master's Degree in nutrition. All of them with plenty experience in research activities.

Statistical analysis

All values in the text include mean (25-75% percentile) \pm average standard deviation (SD), for parametrical or non-parametrical distribution of variables, respectively. Nominal variables are shown as numbers or percentages. Comparison between groups A and B was performed with chi square for nominal and categorical variables, respectively. The Mann-Whitney U-test for two independent samples was utilized for quantitative measures. For explainable scores by random effect, the Perez-Padilla and Viniegra Formula was utilized.¹¹ To evaluate the changes observed in ability, the Wilcoxon rank test (before-after) was utilized. A value of $p < 0.05$ was accepted as statistically significant. However, when possible, accurate numbers were presented. The analysis was performed using SPSS (release 10.0).

Ethical considerations

The ethical aspects of the present investigation are in accordance with the General Principles and Guidelines of the *Reglamento de la Ley General de Salud en Materia de Investigación para la Salud* (pu-

blished in the Official Diary of the Federation dated February 7th 1984). In accordance these Guidelines, this research was considered to be a minimum risk investigation. In any case, however, absolute discretion was kept when handling physicians' and patients' anonymous information.¹⁶

RESULTS

Clinical ability

Forty Family Physicians willing to participate were included in this study, 21 from one FU (B) who received the educative intervention, and 19 Family Physicians from another FU (A) who did not receive any intervention and were the control group.

Table 1 shows sociodemographic characteristics of groups A and B. Average age was similar in both groups: 43 ± 8 vs. 44 ± 6 y/o, respectively ($p = 0.85$). There was no significant difference in gender distribution between groups ($p = 0.94$). Eighty-six percent and 78% of physicians in the experimental and the control group were specialists, respectively. There was not a statistically significant difference ($p = 0.73$). Work category and seniority within the IMSS was not different ($p = 0.53$ and 0.34 , respectively).

The level of clinical ability reached by each one of the groups is shown in table 2. The base global measurement score was 65 (range 23 to 85) and 63 (range of 6 to 86) for the control and the experimental groups, respectively. This numbers were credited by the random effects of ≤ 24 in the global score. Different levels of clinical ability were not different between groups ($p = 0.84$) when base measurements were analyzed. Medium scores of clinical ability dominated in the experimental and control groups (33.3 vs. 36.8%, respectively). At the end of follow-up, a significant increase of 9.5% was observed in the experimental group, reaching higher clinical abilities when compared to the control group. Also, medium scores increased significantly in the experimental group, moving from 33.3 to 52.4% by the conclusion of the study. Whereas in the control group medium scores moved from 36.8 to 31.6%; thus, increasing the proportion of Physicians with a low level of clinical ability: 26.3 to 47.4% in the experimental group.

Comparison of mean scores obtained by indicators

Indicator-obtained differences for each group are shown in table 3. During base measurement, the

Table 1. Sociodemographic characteristics of Family Physicians in both group.

Variables	Group A	Group B	p value
	No educative intervention (n = 19)	Educative intervention (n = 21)	
• Age (years)	44 ± 6	43 ± 8	0.81*
• Gender, N			
Male	11 (58%)	12 (57%)	0.96**
Female	8 (42%)	9 (43%)	
• Specialization, N	14 (78%)	18 (86%)	0.74**
• Labor category, N			
Permanent	16 (84%)	16 (76%)	0.52**
Temporary	3 (16%)	5 (24%)	
• Seniority	14 ± 7	12 ± 7	0.32*

* Students' t test. ** χ^2 .

Table 2. Different levels of clinical ability by scores in both groups of study.

Level (score)	Experimental group		Control group	
	Base	Final*	Base	Final
Very high (125-150)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
High (100-124)	0 (0%)	3 (14.3%) ^{†,*}	0 (0%)	0 (0%)
Medium (75-99)	7 (33.3%)	11 (52.4%) ^{†,*}	7 (36.8%)	6 (31.6%)
Low (50-74)	5 (23.8%)	7 (33.3%) ^{†,*}	5 (26.3%)	9 (47.4%)
Very low (25-49)	6 (28.6%)	0 (0%) ^{†,*}	6 (31.6%)	4 (21.1%)
Explainable by random effect < 25	3 (14.3%)	0 (0%) [†]	1 (5.3%)	0 (0%)

* p < 0.05 vs. control group in same evaluation, Wilcoxon. [†] p < 0.05 vs. base of same group, Mann Whitney U test.

markers that identify risk factors, signs and symptoms, clinical diagnosis integration, treatment proposals and global results showed no significant difference between groups.

At the end of the educative intervention, the experimental group showed an increase in the indicators for global result, identification of risk factors, clinical diagnosis integration. There was a significant trend in treatment proposals. For the control group none of the indicators showed statistically significant differences when base and final measurements were analyzed.

DISCUSSION

In regards to the educative process, it was observed that both groups have a homogenous distribution at the beginning of the educative intervention as far as competence levels of clinical ability is concerned. After the intervention, a downward displacement in clinical ability was observed in the control group. No case was attributed to the random effect; whereas the control group showed no modifications concerning levels of ability. This lack of improve-

ment may be due to the traditional teaching-learning models utilized in the informative learning process.⁷

In the experimental group an upward displacement was observed in competence levels of clinical ability regarding decision making in patient management. It is important to point out that only one Physician was at a very low level and/or was explainable by the random effect. Additionally, there was a 30% increase in medium level in clinical ability and two Physicians topped the high level of competence.^{17,18}

While the communicative-participative strategy, which was presented to the Family Physicians in the experimental group was marked by reflection-action over the interpretation of risk factors, judgment of diagnostic and therapeutic measures, and the proposed management of the patient with MS; these indicators of clinical ability show a relationship with the results of global clinical ability. These observations are similar to those reported by González,³ which measured the effect of an educative intervention in critical readings of investigation

reports. There was an outstanding improvement on all indicators except for those that identified signs and symptoms of metabolic syndrome. Because of the persistent prevalence of these indicators in both groups, this did not modify despite the intervention.

This educative strategy, which is an alternative to the traditional model of education, allows for the improvement of Family Physicians at different levels. Because educative methodology encourages Physicians' participation in the construction of their own knowledge; created by confronting difficult, real clinical cases (situations).

The improvement observed at different levels in the experimental group demonstrates that the impact of the alternative educative program needs to be a programmatic guide for future educative interventions for health care personnel seeking to change their own clinical practice. A weak part of this study might be the control group since an intervention was not applied to it. However, in order to better demonstrate the strength of our intervention would be to compare it with a different one.

Of utmost importance is the proposal to modify the educative processes concerning the formation of human resources as well as the continuous education to transfer the clinical practice to higher levels of ability. This demands the adequate living reality as the first level of attention with the objective of delivering integral services.

The use of human behavior measurement instruments along with clinical practice have become more and more useful to assess the processes of human resources formation and health care service delivery. This sort of instruments aims at discrimina-

ting control over one particular issue; namely, competence of clinical ability, which demands a level of reliability within its construction to avoid information biases. All these elements are covered by this study; which allow control of these biases along with discrimination of several levels of clinical ability. It must be recognized, however, that this system does not allow identification of qualitative variables that could support a difference which is assumed to be controlled through homogenization of groups.^{19,20}

This educative model encouraged the involvement of Family Physicians through recognition of their own knowledge constructed in a mainstream fashion and which unchained and directed refined proposals in the clinical practice.

In this study, the experimental group was made up by specialist in Family practice. This could explain the good effect of the educative strategy in improving the levels of clinical ability. Before the intervention scores of clinical ability were homogeneous; which is a good indicator of base control for these variables. Thus, improvement in the experimental group was due to the effect of the educative intervention and not to a probable confusion variable.

The participation of the leader in the experimental group was due to the learning commitment in the reflection-action mode. He was responsible for the development of strategies that ensured Family Physicians' participation. The aim of this participation was to build their own knowledge from reflection-action patterns which were not present in the control group.

Finally, the use of this educative investigation as a learning tool (which allows feedback of the educa-

Table 3. Mean scores obtained by indicators in physicians receiving and not receiving the intervention.

Indicator (Teorical Value)	Experimental group		Control group	
	Base/ Final Median Range	Differences Median Range	Base/Final Median Range	Differences Medians Range
Global results (TV = 140)	63/98* (6-86) (49/124)	33.7** (22-41)	65/69 (23-85) (26-94)	4.1 (1-7)
Risk factor identification (TV = 40)	26/29* (14-32) (20-23)	3.9 ** (3-5)	27/29 (19-34) (24-33)	2.3 (0-7)
Identification of signs and symptoms (TV = 40)	33/38 (18-41) (26-40)	6.3** (4-9)	32/35 (17-39) (15-40)	3.4 (3-5)
Integration of Clinical diagnosis (TV = 30)	18/20* (15-24) (14-24)	3.4 ** (3-5)	17/19 (13-22) (13-21)	1.8 (0-3)
Treatment proposals (TV = 30)	13/17* (6-17) (14-19)	4.8** (3-6)	14/14 (7-16) (8-15)	0.7 (1-2)

*p ≤ 0.05 vs. base of same group, Mann Whitney U test. **p ≤ 0.05 final group control, Wilcoxon test.

tive process) allows consolidation of the learning strategies which encourages family physicians' participation within the scope of formative schemes for their clinical practice. These methods support the development of competence concerning clinical ability at different levels and can be applied not only in patients with metabolic syndrome but in any other condition which requires the physician's clinical ability to reach an accurate diagnosis and timely treatment.

CONCLUSIONS

This study demonstrates an improved ability in Physicians receiving and educative intervention as compared to the control group. The proportion of Physicians with medium ability scores increased from 33.3 to 52.4% at the end of follow-up in the experimental group; whereas in the control group a reduction from 36.8 to 31.6% was observed. This increased the Physicians with a low level from 26.3 to 47.4% in the control group.

By the final measurements, indicators demonstrating a significant difference in the experimental group included the global results, identification of risk factors, clinical diagnosis integration. Additionally, there was a significant trend when it came to treatment proposals. Meanwhile, in the control group, none of the indicators were different at final measurement as compared with base results.

Because the prevalence of the Metabolic Syndrome in Mexico is high as in other countries as well as the cardiovascular and metabolic consequences of this syndrome, we highly recommend that Family Physicians should be trained on a regular basis with the proposed educative strategy. Since lack of early diagnosis and timely treatment can lead to catastrophic and costly consequences.

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Correspondence and reprint request:

Carlos Cabrera Pivaral
San Juan Bosco, Núm. 3782
Col. Chapalita
45040, Guadalajara, Jal.
Tel.-Fax: 01-3-121-0345
Correo electrónico: carlos.cabrera@imss.gob.mx,
carlos_cabrera@prodigy.net.mx

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