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Perception of Cardiovascular Risk and Use of Technologies in Health in Adults with Obesity

Percepción de riesgo cardiovascular y uso de tecnologías en salud en adultos con obesidad

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ABSTRACT:

Objective: This paper determined the relationship between the perception of risk of a cardiovascular disease with the level of use of Information and Communication Technology or ICT, as well as the explanatory effect of these ICTs and the history of cardiovascular disease in the perception of risk of cardiovascular disease in adults with obesity.
Methods: This study is relevant since the relationship between the proposed variables, and the relationship of the ICTs and other variables about the risk perception of heart and brain disease is not very clear yet. An analytical-descriptive research was made on a sample of 260 obese adults. Questionnaires of risk perception of a cardiovascular disease and use of ICT in patients who receive care in a health center were used; ethical standards were observed and descriptive statistics and statistical inference were applied.
Results: A relationship between risk perception of a cardiovascular disease and the use of ICTs was found (rs=0,142, p=0,022). The level of use of ICTs and personal/family history of disease for the development of a cardiovascular disease explain a 14,3% in the perception of risk of the disease.
Conclusions: It was concluded that the perception of risk of cardiovascular disease was related to the level of use of Information and Communication Technologies regarding health, and it is partially explained by the level of use of the ICTs and health history.

Key words: Perception; Cardiovascular Diseases; Information Technology; Obesity.

RESUMEN:
En este articulo se determinó la relación entre la Percepción del riesgo de enfermedad cardiovascular con el Nivel de uso de Tecnologías de la Información y Comunicación (TIC´s), así como el efecto explicativo del nivel de uso de las TIC´s y antecedentes para enfermedad cardiovascular en la Percepción del riesgo de enfermedad cardiovascular en adultos con obesidad. Este estudio es pertinente dado que la relación entre las variables propuestas, así como la relación de las TIC´s y otras variables sobre la percepción de riesgo de enfermedad cardiaca y cerebral aún no es del todo clara. Se realizó un estudio descriptivo-analítico realizado en una muestra de 260 adultos con obesidad. Se usaron los cuestionarios Percepción del Riesgo de enfermedad cardiovascular y Uso de TICS en pacientes atendidos en un centro de salud, se respetaron las normas éticas y se utilizó estadística descriptiva e inferencial. Se encontró relación entre la Percepción del riesgo de enfermedad cardiovascular y el uso de las TIC´s (rs =0,142, p=0,022). El Nivel de uso de TICS y antecedentes personales/familiares para el desarrollo de enfermedad cardiovascular fue un 14,3% en la percepción del riesgo de enfermedad cardiovascular. Se concluyó que la percepción del riesgo de enfermedad cardiovascular se relaciona con el Nivel de uso de Tecnologías de la información y comunicación en salud y es explicada en parte por el Nivel de uso de tecnologías de la información y comunicación y antecedentes de salud.

Palabras Claves: Percepción, Enfermedades Cardiovasculares, Tecnología de la Información, Obesidad.

INTRODUCTION

Cardiovascular disease (CVD) is the first cause of illness, death, and disability across the world. It has been documented that in the world 7,4 million of deaths has been caused by coronary heart disease and 6,7 million by strokes. The situation in Mexico is not different; in 2015, 18,6% of fatalities were caused by CVD, placing this cause as the first one regarding mortality [1,2].

CVD are events caused by obstruction of fatty deposits on the walls of blood vessels, which prevent blood flow to the heart and brain, and most often affect adult population. However, currently more cases of CVD have been reported as occurring in young people, due to the fact that risk factors (RF) have increased in them, such as obesity (OB), dyslipidemia, physical inactivity, and alcohol and tobacco abuse [3].

In Mexico, the group of people among 20 and 39 years of age is characterized by having more risk for te development of CVD. Males show more prevalence of overweight and high blood pressure, while OB and physical inactivity prevail in women[4], which is causing concern since literature indicates that those who show OB have higher risk for complications of ECV.[5]

In a conventional way, studies that were carried out for the diagnosis of complications of this type do not by themselves explain the burden of disease; thus, risk factors (RF) of psychological type represent an area of opportunity to be studied. In that regard, the literature indicates that the perception of risk (PR) for cardiovascular disease (CVD) that adults with OB experience, has an impact on the intention to carry out preventive behavior for CVD. These findings indicate that more than 50,0% of people with RF for the development of CVD present an inadequate PRCD, which enhance the chances for the development of heart complications [6-10].

PR is significantly influenced by the information that the persons perceive from outside; accordingly, nursing professionals can participate with educational programs that include the use of ICT's, as means that facilitate the reach of content addressed to groups at-risk [10-13].

With respect to the foregoing, the ICTs are tools that include attributes that allow an effective communication of the information through electronic devices. In the field of health, the ICTs can build a space which without relaying on the place and time, allow a rapid sharing and dissemination of information. In recent years, the interventions of health promotion that use ICT cover a wide range of geographical areas, towns, and health areas [14].

The National Strategy for Prevention and Control of Obesity states that the use of ICTs are a priority at primary care level health units to offer solutions that motivates people to change their life style with the support of physical activity, carrying out an adequate eating plan, and being able to control their disease with the intention to prevent or delay of the occurrence of complications [15-18].

The objective of this study is to determine the relationship between the Perception of Risk of Cardiovascular Disease and the level of use of the ICTs in the health area, and to evaluate the explanatory effect of the level of use of the ICTs regarding health and antecedents for the development of cardiovascular disease on the perception of risk of cardiovascular disease in adults with obesity.

MATERIAL AND METHODS

Participants and Recruitment

It was a cross-sectional descriptive and analytical study where 260 adults, ranging from 20 to 39 years of age, participated. The size of the sample was estimated using the statistical program called nQuery Advisor 4.0 ®; a significance level of 0,05 was assigned, with a large size correlation coefficient according to a 2-sided alternative correlation of 0,20 and a strength of 90%[19]. Tables 1 and 2 show population and clinical characteristics.

Table 1 - Population Characteristics of the Participants

Variables	**n**	**(%)**
Age		
20 to 29 years	134	51,5
30 to 39 years	126	48,5
Schooling		
Elementary	8	3,1
Secondary	57	21,9
Higher education	92	35,4
Bachelor's Degree/Posgraduate Degree	103	39,6
Note: Population Data Card		*n* = 260

Table 2 – Clínical Characteristics

Medical History	Si		No	
	n	(%)	n	(%)
Personal Pathological Antecedents	38	14,6	222	85,4
High blood pressure	19	7,3	241	92,7
Dyslipidemia	19	7,3	241	92,7
Type 2 diabetes mellitus	6	2,3	254	97,7
Heart Disease/EVC				
Non Pathological				
Tobacco Use	58	22,3	202	77,7
Physical Inactivity	167	64,2	93	35,8
Family History				
High blood pressure	108	41,5	152	58,5
Dyslipidemia	58	22,3	202	77,7
Type 2 diabetes mellitus	114	43,8	146	56,2
Heart Disease	47	18,1	213	81,9

Note: Clinical Data Card *n* = 260

Participants were recruited through the suitable sampling technique in a second level of care health institution in the city of Tampico, Mexico. Every adult was invited to participate when he was attending consultation or when he requested information about health services in a primary health care center; those who accepted to participate in the study were led to a doctor's office specially adapted to fill surveys, the interview process, and measurements, which lasted 6 weeks (August to September 2016). Only adults aged 18 years of age and over were included and classified with OB by the health personnel (IMC $\bar{X}$ = 32).

Ethics

We had approval of the Ethics Committee regarding Research of the Nursing Faculty of the UANL as well as the Ministry of Health of Tampico Tamaulipas, Mexico. The study was conducted in compliance of Ethical Regulations of Research and Legal Requirements necessary to carry out this type of study, that is, Biomedical Research Law 14/2007; Organic Law 15/99, of December 13, Personal Data Protection, thus, confidentiality of personal data given by the patients was guaranteed, the Declaration of Helsinki (Seoul, October 2008), and Good Clinical Practices (GCP) [20].

Instruments

Population data, and personal and family background related to CVD was registered. When participants claimed to have antecedents, a value of 1 was assigned, otherwise a value of 0 was assigned. The assignment of values allowed us to add the amount of antecedents to have a continuous numeric value. (The higher the score, the higher the amount of antecedents).

The variable Level of Use of ICTs regarding health was evaluated with the questionnaire Use of Information and Communication Technologies Regarding Health (TICS) [21,22] (Annex 1), comprised by 8 items where the level of use of different TICS to look for information regarding health such as the use of PC/Laptop, Internet (search engines), social networks (Facebook, WattsApp, Twiter), cellular phone, and TV was

questioned. The participants assessed their level of use with the help of a graded analogue scale ranging from 1 “Never” to 10 “Always”, which indicated that the higher the score, the higher the level of use of the ICTs. Individual scores (from each ICT) were added and values from 8 to 80 points were registered.

For measuring the variable PRCD, the questionnaire Perception of Risk of Cardiovascular Disease was applied [23], developed to measure the perception of the individual to develop heart diseases. Comprised by 20 items with a Likert scale, which ranges from 1 “Strongly disagree” to 4 “Strongly agree”, the sum of the individual answers range between 20 and 80 points; higher values indicate a higher perception of the risk to develop cardiovascular disease. Acceptable internal consistency values Publisher by other authors range from 0,68 to 0,80. Since this questionnaire was used by the first time in Mexican population, a prior test was carried out in 50 participants, obtaining a Cronbach alphas for total scale of 0,78, similar to the result published in other study [21]. Additionally, a reverse translation was made by a certified professional with experience in health terminology since the questionnaire is originally produced in English.

Statistical Analysis

Data were analyzed using IBM SPSS for Windows. Descriptive statistics were used such as frequencies, proportions, measures of central tendency, and variability. Inferential statistics was applied using a Spearman r coefficient to know the relationship between the proposed variables. Additionally, a multiple regression model was applied where ICTs/Personal and Family Antecedents were considered independent variables, to assess their explanatory capacity over the independent variable (PRCD).[24]

RESULTS

Most of the participants were women (63,8%), with an average age of 30,10 years (*DE* = 6,28), most ranged from 20 to 29 years of age (51,5%), and 38,8% had undergraduate studies (Table 1). Main clinical antecedents of the adults with OB (IMC = 32,91, *DE* = 4,21) were sedentary (64,2 %) and hypertensive (14,6%); the main confirmed family antecedent was type 2 diabetes mellitus (43,8%), followed by the presence of high blood pressure in the family (41,5%) (Table 2).

With respect to the use of ICTs, the use of Internet (search engines) ($\bar{X}$ = 7,38, *DE* = 2,81), cellular phone ($\bar{X}$ = 7,30, *DE* = 2,86), and social networks (Facebook, WhatsApp, Twitter) ($\bar{X}$ = 6,33, *DE* = 3,11) were the most used technology. The level of perception of the risk of cardiovascular disease identified was “Median” ($\bar{X}$ = 52,09, *DE* = 7,25) (Table 3).

Table 3 – Level of use of Information and Communication Technology in the Health Area

use of Information and Communication Technology in the Health Area	$\bar{X}$	*Mdn*	*DE*	Valor	
				Min.	Max.
PC or laptop	5,76	6,0	3,29	1	10
Internet (search engines)	7,38	8,0	2,81	1	10
Social network (Facebook, WhatsApp, Twitter)	6,33	7,0	3,11	1	10

Cellular phone	7,30	8,0	2,86	1	10
TV	4,86	5,0	3,26	1	10
His idea about his heart health changed	7,11	8,0	2,40	1	10
Solutions to questions about his heart health	7,13	8,0	2,35	1	10
They are a good source to obtain information about his heart health	7,88	8,0	2,13	1	10

Note: Instrument: Level of use of Information and Communication Technology in the Health Area, Mdn = Median, $\bar{X}$ *= Average, DE = Standard Deviation, Min, Max Value = Minimum and maximum values*

A positive and significant relationship was found between PRCD and the Level of Use of ICTs (r_s = 0,142, p = 0,022).

In the logistics regression model used to explain the PRCD of adults with obesity, it was identified that the variables Level of Use of ICTs and personal and family antecedents of heart disease along with the personal antecedent of high blood pressure explain a 14,3% of the variance (F = 12,25, p < 0,001). See table 4.

Table 4 – Multiple Lineal Regression Model to explain the effect of independent variables on the Perception of Cardiovascular Risk in Adults with Obesity

Variables	***β***	***t***	***p***	**IC95%**	
				Inferior	**Superior**
Level of use of ITCs	0,186	3,168	0,002[a]	0,025	0,107
Personal antecedent of Heart disease	-0,194	-3,281	0,001[a]	-6,368	-1,589
Personal antecedent of high blood pressure	-0,189	-3,203	0,002 [a]	-6,266	-1,495
Family antecedent of heart disease	-0,225	-3,799	0,000 [a]	-6,428	-2,039

IC95%: 95% confidence interval
[a] *p < 0,01: Highly significant values*
TICS = Information and Communication Technology in the Health Area

DISCUSSION

This study allowed us to empirically verify the relationship between the variables Perception of Risk of Cardiovascular Disease (PRCD) and THE level of use of Information and Communication Technologies for Health (ICTH) in a sample of adults with obesity. The relationship found indicates that the greater the use of Information and Communication Technologies for Health, the greater is the Perception of Risk of Cardiovascular Disease, which can be explained by considering the benefits and attributes represented by the use of Information and Communication Technologies for Health, such as interactivity, ease of obtaining information, generation of self-diagnosis, recording data from body measurements such as waist, body weight, and blood pressure monitoring, plus having the virtual opportunity to assess the evolution or effectiveness of the treatment. There is a positive correlation between the acceptance of the use of the variable Information and Communication Technologies for Health and the perception of use [25, 26].

The possibility exists that by using Information and Communication Technologies for Health, geographic and temporal gaps will be reduced to be able to have a consultation with health professionals [27].

In Mexico and other developing countries, statistics on availability and use of Information and Communication Technologies indicates that a high percentage of the population has televisions, cell phones and computers with Internet access; in addition, those with Internet access participate in social networks where they can find information related to their health problems, mainly people between 18 and 44 years of age, among university students, professionals and workers who use the Information and Communication Technologies as a work tool [28]. Although, those who have access to computers and Internet are relatively young people with a high level of education, although they may not have health knowledge, which makes it difficult or impossible to select reliable information for the prevention of risks and/or consequences or for the management of their disease.

Therefore, the results of this study and the data from the use of the aforementioned Use of Information and Communication Technologies for Health show an opportunity to design and deliver health interventions, with the main objective of modifying the Perception of Risk of Cardiovascular Disease through the Use of Information and Communication Technologies for Health with the possibly to influence the modification of lifestyles in adults with obesity; likewise, it is considered pertinent to propose the design of targeted and mediated interventions for the use of Use of Information and Communication Technologies for Health as health applications due to their multiple benefits in terms of their use.

With the multivariate comparison it was found that the level of use of Information and Communication Technologies for Health, personal and family history of heart disease and personal history of hypertension contribute to the Perception of Risk of Cardiovascular Disease in adults with obesity.

The above can be explained considering the experiences, emotions, and individual and/or group interactions that adults with obesity have in their personal lives; therefore, the symbiotic interactions indicate that the behavior or activities of people are the result of the interaction with other individuals [29].

That is, the information that obese adults obtain and mentally process from their particularities and external agents, can be an influence to create the Perception of Risk of Cardiovascular Disease. In addition to this, it is possible that the closeness or contact with previous experiences of the disease and health expectations, especially those experiences of relatives with a history of heart disease, with or without complications, is an important factor to initiate a process of change and especially for heart protection.

In this vein, when adults with obesity perceive themselves at risk, a possibility opens up to behavioral change, in order to improve their health, because people act according to the importance they give to such things [29].

This panorama motivates health professionals to take advantage of these findings to produce positive effects on the health of people with characteristics similar to those of this study, considering the Information and Communication Technologies for Health as an information source.

The use of cell phones and social networks such as Facebook, WhatsApp and Twitter are the main technologies used to obtain and share health information, which borne out by other studies [30,31]. These similarities can probably be attributed to the fact that

some sociodemographic characteristics among the studies compared were similar, as the level of schooling and that the studies were carried out in developed and developing countries (Argentina and Spain). For that matter, contextual initiatives of the National Health Systems include among some of their actions and strategies for the promotion of health the use of Information and Communication Technologies, where users can access the technologies in order to increase their knowledge in preventive topics regarding cardiovascular diseases.

Other studies show the opposite, since they are characterized by a limited use of the internet to obtain health information, which could be explained by the predominance of participants with an average age of 60 years. It was found that the participants presented a medium level of Perception of Risk of Cardiovascular Disease, lower than other reported evidence [32,33], which can be explained by a lack of knowledge and use of digital information in health. Different studies report that people with diseases such as obesity have low levels of interest, motivation and desire to search for health information through the use of Information and Communication Technologies for Health to be able to make better decisions and control their medical condition, and that this situation is only improved when the complications worsen and imply disability and excessive financial costs; for example, in the case of people who require a heart transplant and must necessarily receive training in health to improve their awareness before the procedure.

Although the results of the study indicate the existence of a relationship between the variables studied (Perception of Risk of Cardiovascular Disease/Information and Communication Technologies for Health), as well as the explanatory capacity of the level of use of Information and Communication Technologies for Health, in conjunction with the personal and family history of hypertension to improve the Perception of Risk of Cardiovascular Disease, the results obtained by the correlation and logistic regression are considered relatively low, so caution is recommended in the management of the demonstrated evidence, so more evidence is required to increase the credibility of the results presented, as well as the consideration of variables that were not included in this research.

CONCLUSIONS

The Information and Communication Technologies for Health and Perception of Risk of Cardiovascular Disease variables presented a positive and significant relationship, evidencing that the higher the level of use of Information and Communication Technologies for Health, the higher the Perception of Risk of Cardiovascular Disease, which indicates that the main Information and Communication Technologies mentioned by the participants as the best sources of health information are the use of internet (search engines), cell phones and social networks (Facebook, WhatsApp, Twitter), which, "if used properly" can eventually function as a protective factor by increasing the Perception of Risk of Cardiovascular Disease.

The level of use of Information and Communication Technologies for Health, personal and family history of heart disease and having high blood pressure, explain discretely the Perception of Risk of Cardiovascular Disease of adults with obesity, which indicates that the higher the risk for the development of cardiovascular diseases, readiness of the person to use the Information and Communication Technologies for Health is higher, in order to prevent, slow and control diseases, especially cardiac and cerebrovascular diseases.

More studies are required to provide evidence, credibility and eventually support the generalization of the results in population groups with characteristics similar to those of this study.

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ANNEX 1

Use of Information and Communication Technologies for Health

Below are a series of situations related to the use of Information and Communication Technologies (pc or laptop, Internet, chat, cell phone and television), according to each question, choose the answer that best describes your situation.

1. On the scale of 1 to 10, indicate the level of use of Information and Communication Technologies **to perform your daily activities**. Choose your answers, where 1 means "never" up to 10 which means "always".	
Use of PC or laptop:	**1-2-3-4-5-6-7-8-9-10**
Use of Internet (search engines):	**1-2-3-4-5-6-7-8-9-10**
Use of social networks (Facebook, WhatsApp, Twitter):	**1-2-3-4-5-6-7-8-9-10**
Use of cell phone:	**1-2-3-4-5-6-7-8-9-10**
Use of television:	**1-2-3-4-5-6-7-8-9-10**
2. On the scale of 1 to 10, indicate the level of use of Information and Communication Technologies **to search health information**. Choose your answers, where 1 means "never" up to 10 which means "always".	
Use of PC or laptop:	**1-2-3-4-5-6-7-8-9-10**
Use of Internet (search engines):	**1-2-3-4-5-6-7-8-9-10**
Use of social networks (Facebook, WhatsApp, Twitter):	**1-2-3-4-5-6-7-8-9-10**
Use of cell phone:	**1-2-3-4-5-6-7-8-9-10**
Use of television:	**1-2-3-4-5-6-7-8-9-10**
3. In the scale from 1 to 10, indicate the level of achievement with respect to the **solution of your doubts when looking for health information** through the use of Information and Communication Technologies. Choose the number that best describes your particular situation Where 1 means "without achievement" up to 10 which means "the best achievement".	
	1-2-3-4-5-6-7-8-9-10
4. On the scale of 1 to 10, indicate whether the information obtained through the use of Information and Communication Technologies **changed the way you think about your health**. Select your answer, where 1 means "It did not change" up to 10 which means "It changed".	
	1-2-3-4-5-6-7-8-9-10
5. On the scale of 1 to 10, indicate if you consider that the Information and Communication Technologies **are a good source for obtaining health information**. Select your answer, where 1 means "No, never" up to 10 which means "Yes, always".	
	1-2-3-4-5-6-7-8-9-10

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