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Use of Facebook in Health Care System: an Overview of Asian Countries

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Abstract:

Social media represent a new way (additional) to "cure" patients. Nevertheless, it appears that not all people (patients and doctors) are ready to use Facebook in Healthcare. For this reason, we would like to analyze which the true perception of social media among Asian population (doctors and patients). Through an empirical study is conducted on a sample of Asian physicians and patients we will analyze some items, measured with Logit and Probit method to compare variables that can have a positive or a negative effect on the perception of Facebook utility.

1. Introduction

Today Facebook can represent a strategy to improve human and communicative relationships between patients and healthcare structures. Facebook provides opportunities for users to generate, share, receive, and comment on health issues (Dawson, 2010).

There are numerous benefits of using social media for health communication such as the accessibility of health information, the emotional support to individuals, including those with various illnesses (Scanfeld et al., 2010; Hwang et al., 2010). The literature highlights that the use of Facebook can be an important social support for patients. It includes informational, emotional, instrumental (tangible), appraisal (feedback), and network support exchanged among peers (Mo et al., 2008) or between patients and doctors. Keitzmann et al. have suggested that Health organizations need to recognize and understand the potentialities offered by social media landscape, and developing strategies that are suitable to their management. Patients like to exchange information on their pathologies, to cooperate, to interact, to share and to act through a continuous sharing of information. With Facebook's use they can find answers to their specific informational needs in a less conventional way than in the real world, using simple language and within limited time. In this way patients become active partners in their own healthcare and as citizens become equal partners in improving the health system. In this context patients interact with physicians for second opinions, and they check the ratings of physicians and hospitals online. Of course, the incorporation of social media into healthcare system has to be approached with the greatest of caution.

The use of social networks within hospitals raises a few issues regarding legal matters. For example there are a lot of personal health records, which must be managed with attention and then if a doctor who belongs to a hospital "adds" a patient on a social network, patient also has the right to access all the information that the person concerned or his/her friends have posted on his/her profile and, so too, his/her friends have the possibility of accessing all the information that the patient exchanges with the doctor on his/her wall infringing, in this way, the patient's right to privacy. An inappropriate use of Facebook, then, may create serious problems also in the relationship between healthcare operators or between administrators and healthcare operators.

Sharing confidential information, inadequate qualifications can have a negative influence (Lorenz, 2009), persuading a patient to choose a specific healthcare structure or healthcare operator rather than others.

The problem, however, is not only the legal issue but also rather the ethical-moral aspects. The information published could be the same as "nosing" into other people's lives, even if you don't want allow others to get to know specific things, these very same things should not be published.

In the light of the fact that Facebook can be perceived as an advantage or a limit, this study intends to analyze which is the true perception of social media among Asian population (doctors and patients).

2. Method and Hypotheses

This study is an exploratory study on the use of Facebook by Asian doctors and patients. We start from the idea that perception of social media's utility in Health communication, as shown by Figure 1 below, is determined by two independent variables, socio-demographic profile and presence of disease.

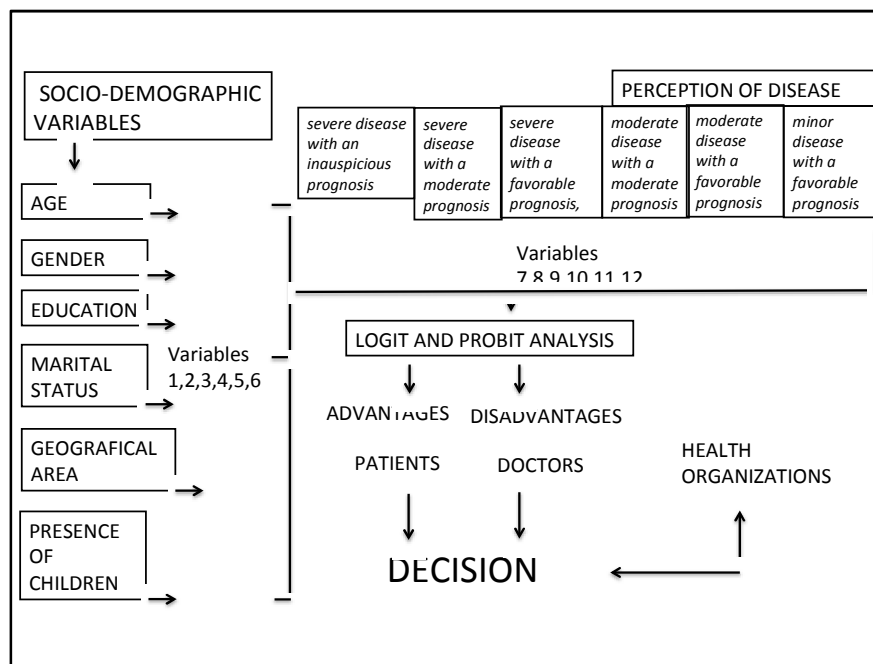


Figure 1: Model of Analysis

In this paper it is hypothesized that:

- There is a relation between the presence of disease and the use of Facebook's communication in Healthcare system (Hypothesis 1)
- The presence of differently serious diseases affects the perception of the advantages resulting from using a new communication tool (Fb) (Hypothesis2).

To analyze these Hypothesis the research is subdivided into two parts.

In the first there has been the identification of all healthcare structures present in Asian Countries in 2015. This phase has required a 3 month study with the aim of evaluating the communicative systems used by hospitals. We have use the data of "World Hospitals' ranking on the Web" an initiative of the Cybermetrics Labwebanking. So we have constituted our sample: 45Asian countries in which there are 386 Health Organization that use social media. Each Organization has been controlled, analyzing the web site of each structure. So it has possible confirm the presence of Facebook page to communicate.

The second part of the research was administered to doctors and patients to evaluate if there was a correspondence between the real use by Health Organization and the potential benefits' perception of the use of Facebook for them. The research was developed directly on the Internet by distributing a questionnaire among physicians and patients, randomly selected from Facebook. We have used the same method of a previous research conducted for European countries (Gravili, 2014). So, in order to facilitate the accurate and consistent acquisition of information we have posted the questionnaire in the message form on Facebook page for physician and patients.

The questionnaire has been initially tested on a limited number of users (15 physicians and 15 patients), in order to understand at which point the questions were correct and the presentation form was accepted. Then it has been posted to the entire sample.

3. Methodology

3.1. Sample

The data were collected through a pilot project which involved 640 people, including doctors and patients who have been asked to make some choices using an unidirectional preference pattern.

Originally, the sample of study has consisted of 2.000 members, constituted by 1.000 physicians and 1.000 patients. After having trasformed the quality variables in dummy, they will be used as explanatory variables.

As for the subjective variables, in order to analyze the dummies and to gain true accurate results, the sample has been made so to have an equal distribution of the population relating to the different kinds of diseases, independently from other variables. For this reason the sample was significantly reduced.

The sample at last was composed of N=265 physicians and N= 225 patients.

3.2. Empirical Model

The pilot project has the aim to identify among the different variables those with a superior explanatory power, that is, those which are determinant about the possession or not of a quality: according to the fact that they are linked in a positive or negative way to the observed phenomenon, they can whether be considered risk elements or benefits elements.

The pattern used in this work aims to explain the perception of the use of Facebook in Healthcare as a result of a pattern which

evaluates the probability that this event occurs in the presence of a series of variables which influence the preferences.

Three types of variables have been analyzed:

1. The dependent variable: Facebook's perception
2. The control variables include gender, age, education, marital status, geographical area and presence of children;
3. The Independent variables, that is, the presence or absence of diseases.

3.3. Dependent Variable

The dependent variable is closed related to socio-economical variables, to presence of diseases and to elements which can not be observed, defined by "u"="margin of error".

Therefore,

$$U_i = a + bx_i + u \quad u = \text{error}, \quad E(u) = 0$$

$E(u_i + x_i) = a + bx_i = \Pr(U_i = 1/x_i) \quad P(U_i = 1/X) \Rightarrow \square$ Given a set of explanatory variables

It has been evaluated the utility for each alternative. The difference among these utility levels expresses the positive or negative perception about the alternative. In such a manner, the advantage of using Fb in Healthcare will be analyzed only in relation to the choice the individual has made.

The variable, which assumes a modality of binary response, has a value between

$$0 < U_i < 1$$

U = discrete variable

0: if the event does not occur – no :Value read as "negative sign/ unfavourable to the use"

1: if the event occurs – yes $\Rightarrow \square$ Value read as "positive sign/favourable to the use"

In particular, the estimate of the variables has been obtained from the individual choices of interviewed people who answered the questionnaire. The principles of the theory of random utility have been the basis for this type of patterns, whose starting hypothesis are (Ortuzar e Willumsen, 2001):

- individuals belong to two homogeneous populations, they are rational and have a perfect information;
- the choice options x_j are defined by a set of attributes x_k (with a number of attributes which range from 1 to K). In our choice the attributes are: sex, age, education, marital status, presence of children;
- a certain level of individual net utility U_{jq} is associated for each option of choice X_j (where the index "q" refers to the "q-th" individual).

The analysis models used are that one of "binary logit" and that one of "ordinal probit".

The logit model is based on the assumption that the random components are identically and independently distributed among them according to the Gumbel distribution function IID.

In the logit model we will analyze "ODDS", that is the ratio between the probability of success and of failure:

$$\text{ODDS: } \frac{P(Y_i = 1/X)}{P(Y_i = 0/X)}$$

The ordinal Probit model relies instead on the hypothesis that the random variable is distributed as a normal one with average zero and a matrix of arbitrary co-variation.

3.4. Control Variables

The determinants of the use of Fb, analyzed as explanatory variables, are gender, age, education, marital status, and geographical area. Sex is a dummy that indicates the gender of the respondent (the value 1 is associated with male gender and the value 0 to the female gender).

Age shows the age of the respondent at the time of the interview. For the purposes of this analysis individuals under the age of 25 and above 77 have been excluded. They were divided equally among 24-34 years; 35-54 years; over 55 years .The lowest age limit has been taken into account by determining the minimum number of years required for the attainment of a medical degree, while the highest limit has taken into account the retirement age. In order to compare the responses, we have adopted the same values for patients.

The variable education expects one answer for doctors (graduation) and five options for patients (primary school, secondary school, degree, PHD, other).

The variable marital status defines two categories: married, not married (including actually separated, legally separated, divorced, widow).

The variable geographic residence assumes three categories (East Asia= value 3, West Asia = value 2, South Asia = value1).

Presence of children is a dummy that indicates if the respondent has children (the value 1 is associated with presence and the value 0 to absence)

3.5. Independent Variables

The variables used in this study take into consideration a number of aspects that can have a significant influence on the necessity to use Fb in the Health Organization. In particular, it was assumed that the presence or absence of diseases can affect the emotional perception of the interviewee. The latter - due to the presence of more or less serious diseases- could feel the necessity to have a faster and immediate communication with the doctor: these are typical characteristics of the social communication. For this reason, six dummies were inserted: minor disease with a favorable prognosis, moderate disease with a favorable prognosis, moderate disease with a moderate prognosis, severe disease with a favorable prognosis, severe disease with a moderate prognosis,severe disease with an inauspicious prognosis (Hypothesis 2).

In the second phase of the test, the interviewees indicated the order of preference (ranking exercise) of the reasons that could lead them to implement the use of Fb (except for those attributes which they consider absolutely not acceptable), indicating, on a scale from 1 (not important) to 4 (extremely important), the importance assigned to each of the attributes.

The answers given during this phase are used to analyze the veracity or not of the Hypothesis 1 and 2 of the conceptual model.

4. Data Analysis and Results

In Asia we have analyzed 45 regions for a total of 386 Health Organizations that have a Facebook page. The research was very complex because the territory of analysis is various. Asian countries are at different stages of development when it comes to healthcare. In fact while many countries adopt new models of organization others try to learn from the mistakes of others: Singapore, Indonesia, Thailand and the Philippines have an advanced healthcare system and there have ambitious and innovative plans to reform their systems. China began health-care reform in 2009 but this reform doesn't regard social media communication, because there is a strong control of government in each communication's system.

The use of logit and probit models showed very similar values of probabilities. Both models provide an indication of the possibility that the considered variables influence positively or negatively the choices of the sample analyzed. Using the dummy, a ranking of the variables has been defined according to the degree of influence on the probability of choice, and for analysis macro-classes.

In the Logit model (Table n.1,2,3,4) all the observed coefficients show a significance level very close to zero (Hypothesis 1). The signs of the coefficients confirm the expectations of a utility function (for doctors) decreasing with increasing age, marital status and residence in the West or in the South increasing for residents in the East.

As for the subjective variables, being male has a statistically significant effect. The perception of the usefulness of Fb decreases for men.

Logit doctors						
Socio-demographic variables	Coef.	Std.Err.	z	P > z	[95% Conf.	Interval]
intercept	2.389	1.227		<0.001		
age	-0.59	.243	-1.29	<0.023	-0.90	-0.08
X sex	0.43	.124	3.41	<0.041	0.21	0.823
education	0.02	.523	3.02	<0.02	0.01	0.67
X marital status	-0.23	.70388	-4.14	<0.03	-0.65	-0.12
EST Asia	0.071	.67548	6.20	<0.001	0.05	1.2
West Asia	-0.52	.002	-2.29	<0.012	-0.743	-0.02
South Asia	-0.437	.100	-1.23	<0.01	-1.2	-0.23
X children	0.63	.00243	6.20	<0.001	0.14	1.356
* variables with initial X are of the type "dummy" (0; 1)						

Table 1: Results Socio-demographic variables

Table 1 Results of socio-demographic variables for doctors

Logit patients						
Socio-demographic variables	Coef.	Std.Err.	z	P > z	[95% Conf.	Interval]
intercept	2.6350	0.198374		<0.001		
age	-0.53	.263	-2.256	<0.001	-0.7240	-0.1
X sex	0.34	.0198	2.13	<0.023	0.14	0.823
education	0.7431	.492	2.72	<0.085	0.561	1.934
X marital status	0.01	.6983	-3.44	<0.02	0.0065	1.12
East Asia	0.091	.0932	2.32	<0.01	0.05	1.2
West Asia	-0.023	.74536	-1.829	<0.053	-0.43	-0.01
South Asia	-0.021	.84632	-2.42	<0.031	-1.2	-0.013
X children	0.46	.01245	4.620	<0.001	0.14	1.356
* variables with initial X are of the type "dummy" (0; 1)						

Table 2: Results of Socio-demographic variables for patients

With regard to patients, the results in terms of age and sex are the same as those shown by the doctors; while considering the level of education, the effect is significant only for graduates: the probability of using Fb increases of 0.7 compared to the base category of people with no qualifications (Hypothesis 1).

With regard to the geographical area, it can be seen that the West and South Asia inhabitants have a lower perception than people of the East Asia area. These values allow to make an identikit of the Asian user most inclined to the use of Fb in healthcare: woman, aged between 30 and 55, living in East Asia, with a degree.

Then, observing the presence of diseases in the surveyed people, it can be seen that there is a significant effect for all types of diseases (Hypothesis 2). The perception of Fb as an useful tool for communication increases in people with severe illnesses. A different situation is when patients and doctors are in presence of several diseases with inauspicious prognosis: the use of Facebook decreases.

Logit doctors						
Disease	Coef.	Std.Err.	z	P > z	[95% Conf.	Interval]
Intercept	1.8122	.13245		<0.001		
minordiseasewithfavourpro	0.223	.23	2.29	<0.0342	0.134	1.53
moderdiseasewithfavourpro	0.34	.1593	1.23	<0.01	0.04	0.2763
moderdiseasewithmoderapro	0.431	.84986	2.92	<0.0324	0.135	1.524
severdiseasewithfavourpro	0.45	.07970	2.54	<0.001	0.05	1.23
severrdiseasewithmoderapro	0.53	.070388	3.51	<0.01	0.125	1.254
severdiseasewithinauspicio	-0.98	.1098	-1.79	<0.001	-1.601	-0.023

Table 3: Results in presence of diseases for doctors

Logit patients						
Disease	Coef.	Std.Err.	z	P > z	[95% Conf.	Interval]
Intercept	1.9235	.362548		<0.0023		
minordiseasewithfavourpro	0.35	.3001325	3.67	<0.0243	0.12	1.151
moderdiseasewithfavourpro	0.95	.84078438	1.25	<0.001	0.14	1.051
moderdiseasewithmoderapro	0.356	.7342	2.46	<0.03	0.262	0.995
severdiseasewithfavourpro	0.765	.69341	6.44	<0.001	0.143	1.321
severrdiseasewithmoderapro	0.9027	.008	2.20	<0.0123	0.824	1.546
severdiseasewithinauspicio	-0.923	.01287	-2.49	<0.02	-1.351	-0.43

Table 4: Results in presence of diseases for patients

The coefficients estimate of the attributes studied with the Probit are depicted in Table n. 5,6,7,8 (second column). Instead, the indexes of statistics reliability of these coefficients are shown in the last three columns.

Similarly to what we have observed for the estimates obtained with the Logit model, all the coefficients of the studied attributes are statistically significant (Hypothesis 1 and Hypothesis 2). The signs of the estimated coefficients are consistent both with the estimates obtained and with the Logit model.

Probit doctors						
Socio-demographic variables	Coef.	Std.Err.	z	P > z	[95% Conf.	Interval]
intercept	2.53746	.64536		<0.001		
age	-0.55	.3243	-3.24	<0.023	1.230	-0.1
X sex	0.31	.2958	2.43	<0.001	0.13	0.657
education	0.724	.2384	2.232	<0.085	0.421	1.452
X marital status	0.034	.6352	-2.43	<0.02	0.015	1.034
East Asia	0.0882	.0853	1.32	<0.01	0.0234	1.185
West Asia	-0.0143	.4569	-2.456	<0.053	-1.043	-0.003
South Asia	-0.0178	.284632	-3.45	<0.031	-1.3	-0.009
X children	0.52	.0258	3.654	<0.01	0.2547	1.246
* variables with initial X are of the type “dummy” (0; 1)						

Table 5: Results of socio-demographic variables for doctors

Probit patients						
Socio-demographic variables	Coef.	Std.Err.	z	P > z	[95% Conf.	Interval]
intercept	2.3564	.6473526		<0.001		
age	-0.49	.263	-1.34	<0.01	-1.240	-0.09
X sex	0.25	.0198	3.24	<0.001	0.04	0.92
education	0.654	.492	2.24	<0.085	0.0341	1.234
X marital status	0.023	.6983	2..44	<0.02	0.001	1.462
East Asia	0.0876	.0932	1.46	<0.01	0.032	1.34
West Asia	-0.087	.74536	-1.65	<0.053	-1.25	-0.07651
South Asia	-0.034	.84632	-2.34	<0.031	-1.34	-0.004
X children	0.46	.01245	4.620	<0.001	0.14	1.356
* variables with initial X are of the type “dummy” (0; 1)						

Table 6: Results of socio-demographic variables for patients

Probit doctors						
Disease	Coef.	Std.Err.	z	P > z	[95% Conf.	Interval]
Intercept	1.85463	.56345		<0.001		
minordiseasewithfavourpro	0.21	.1213	3.3	<0.002	0.0734	1.03
moderdiseasewithfavourpro	0.29	.0193	1.13	<0.021	0.0234	0.863
moderdiseasewithmoderapro	0.41	.7496	2.776	<0.2124	0.032	1.14
severdiseasewithfavourpro	0.40	.89970	3.454	<0.007	0.001	1.0023
severrdiseasewithmoderapro	0.21	.687388	1.230	<0.081	0.0185	1.024
severdiseasewithinauspicio	-0.9	.98	-1.469	<0.001	-1.01	-0.001

Table 7: Results in presence of diseases for doctors

Probit patients						
Disease	Coef.	Std.Err.	z	P > z	[95% Conf.	Interval]
Intercept	.19673452	.8653456	1,3			
minordiseasewithfavourpro	0.32	.3001325	2.32	<0.243	0.08	1.23
moderdiseasewithfavourpro	0.9	.84078438	3.23	<0.001	0.234	1.131
moderdiseasewithmoderapro	0.346	.7342	4.53	<0.003	0.122	0.565
severdiseasewithfavourpro	0.0665	.69341	6.32	<0.001	0.005	0.972
severrdiseasewithmoderapro	0.87	.008	-2.45	<0.05	0.352	1.12
severdiseasewithinauspicio	-0.813	.01287	2.87	<0.02	-1.143	-0.3

Table 8: Results in presence of diseases for doctors

In particular, the estimates obtained using the logit model, from a technical and statistical point of view, are similar to those obtained with the ordinal probit model, whether for the sign of the parameters estimated and for the order of importance of the attributes constructed from these parameters. The characteristics of the answers given by the respondents, however, make the Logit model more suitable for this investigation. The comparison between the estimates showed that the variables that have the greatest impact in the choosing to use Fb in Health are linked to the disease factor,

Comparing, then, the change in the variables that most affect the use of Fb, it can be seen that the presence of diseases among people constitutes a primary condition in comparison with the other variables, since it focuses attention on the need of the individual to change their Knowledge and beliefs. The necessity dictated by the presence of diseases has a motivational drive to change, so strong as to lead to changes in the decision-making processes in order to achieve the objective, the healing.

5. Discussion and Conclusions

Starting from these observations, conducted at national level, we analyzed which is the impact (positive or negative) that exists between Health activity and the use of Fb. The key questions to which we have tried to answer are:

Which are the variables that most influence the perception that the individual has of the use of FB in health care?

- Have socio-economic aspects a specific impact on communicative behavior?
- Did the process used to change behavior include communicative activities, such as goal setting, decision making, planning for specific behaviors, and self-evaluating physical, emotional, and cognitive responses associated with behavior change?

The presence of more or less severe diseases affects the perception of the benefits that may result from the use of a new communication tool (Fb)?

The current study has examined socio-demographic and health-related variables that can influence the perception of the use of Fb in Healthcare. The results of this study offer new and important implications for health communication in this digital age: the potential use of Fb in Health and on health behavior through social media is necessary.

For those who are suffering from diseases in general and severe diseases in particular, Fb is almost a panacea. The perception of the severity of the disease and the need to have a constant comparison with doctors and other patients lead individuals to consider Fb as an advantage and to change their communicative behavior.

On the one hand, this result highlights the enormous advantages that the Health Organizations would have if they used social communication, on the other hand, it requires further investigation. For example, if we extend the analysis sample we could observe the phenomenon on a larger scale, although it should be always considered that this kind of research can suffer from the inability to totally observe the analyzed phenomenon.

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