

Perception of Promoting Activity in Romanian Supply Chain of Chemical Substances

A complex statistical analysis

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In the pharmaceutical production chain, the communication between pharmacies and medicine distributors are important. The aim of this research is to analyze—using complex statistical methods—the pharmacist's perception of promoting activity in relation with medicine distributors in Brasov and Mures. Our results have implications in marketing communication in the pharmaceutical sector in Romania being a first study that demonstrated the importance of pharmacists in their double role between the qualitative side, of satisfaction, and quantitative side, of sales.

Keywords: promotion, Romanian supply chain, medicine, statistical methods

The pharmaceutical industry is one of the most spectacular industries worldwide in terms of sales and marketing [1]. The marketing used by the Romanian medicine distributors in relationship with pharmacies has a lot of particularities [2] including the promotion activity and sensitivity to prices from the consumer [3] a large amount of money is spent for purchasing medicinal items [4]. Regarding this aspect, the last Cegedim [5] report signaling an increasing value of medicines distributed to Romanian patients in March 2018 with 11.8% compared with previous year, the Romanian pharmaceutical products sector is mentioning on an ascending trajectory [6].

In the pharmaceutical production chain, the relation and communication between pharmacies and medicine distributors are very important; the occasional errors in this process can lead to end customer dissatisfaction [7]. Therefore, it is important to study/analyze the pharmacist's perception of promoting activity and aspects related to promotion because the pharmacists make the link between medicine distributors and final consumers, respectively patients. In this study we take into considerations a few aspects, detailed in Table 1. In the literature review, we find only one study regarding these aspects but from the medicine brand point of view [8] and using the final consumers not pharmacists. Another study in Romania [1] highlights another important particularity: *Romanian companies are highly affected by defective upwards communication, which can generate wrong strategic approaches and ignorance in terms of market trends and competitors' strategies.*

For pharmaceutical companies is important the loyalty to consumers' needs [9], the final consumers' access to pharmaceutical product remains essential [9], in modern pharmaceutical companies the current practice is that medical research is correlated with marketing research in selecting product characteristics that best suit patient needs [10].

The *aim* of this research is to analyze – using complex statistical methods – the pharmacist's perception of promoting activity in relation with medicine distributors in two Romanian counties (Brasov and Mures). We mention that this paper is only a part from a complex research of the authors.

Experimental part

Materials and methods

For this study we use 198 questionnaire (with 14 items) completed by the pharmacists from Mures and Brasov counties, both from hospital and retail, from 1 May to 15 July 2018. We used SPSS v17.0 soft for the complex statistical analysis, respectively: *descriptive statistics* (mean, median, standard deviation, minim and maxim); *Pearson correlations* to analyze the direction and intensity of associations between variables; *Kolmogorov – Smirnov test* to analyze the normal distribution of the responses; *chi-square test* to test which variables differentiate according to the degree of satisfaction of pharmacists in relation with drugs distributors; *t Student test* to test the differences between means of items scores; *Mann – Whitney test* to test which of the items differentiate between the satisfied and unsatisfied pharmacist in relation with drugs distributors; *linear regression analysis* to find a model of satisfaction' degree of pharmacist according to variables of the study. The questions were accordance with the principles of pharmaceutical practice regulated in the Romanian Pharmaceutical Good Practice Rules [11]

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Results and discussions

To analyze the central tendency of the variables, we applied descriptive statistics, respectively the mean, the median, minim and maxim values, and standard deviation (Table 1). Data being qualitative, the results from Table 1 represent the values calculated based on codes of the response of each items in the study.

Table 1
DESCRIPTIVE STATISTICS FOR VARIABLES OF THE STUDY

Item din chestionar	N		Mean	Median	Std. Deviation	Minim	Maxim
	Valid	Missing					
C1. Are you satisfied by the collaboration of pharmacy with medicine distributors?	198	0	1.88	2.00	.468	1	3
C10. In your opinion, what are the most effective way to promote?	198	0	2.66	2.00	1.167	1	4
C11. Do you think it is advisable to call teams of medical representatives to promote medicine in pharmacies?	198	0	1.34	1.00	.517	1	3
C12. Who do you think affects consumers in purchasing a particular medicine?	198	0	1.28	1.00	.492	1	3
C13. What aspect do you consider is more important for medicine beneficiaries?	198	0	1.91	2.00	.805	1	4
C14. What do you consider to be the explanation for the continuous growth of the pharmaceutical market in Romania?	198	0	2.62	3.00	1.423	1	4

(Note: the responses for each items are: **C1**: 1-very satisfied, 1-satisfied, 3-unsatisfied, 4- very unsatisfied; **C10**:1-advertising, 2-scientific communication sand symposium, 3-exhibitions, 4- presentations of medicines to specialists; **C11**:1-yes, 2-relatively good, 3-no; **C12**: 1-family doctor/specialist doctor/primary doctor, 2-media promotions and other type of information, 3-family and friends; **C13**: 1- price need to be lowest, 2- the product arrives as quickly as possible, 3-advices from pharmacy staff, 4-the quality of serving; **C14**: 1-increased access of the population to medicines, 2-placing on the market of new high-priced medicines, 3- mergers and acquisitions made at international level, 4-increased number of illnesses).

According to the means from table 1, we can observe that for variable C1, the pharmacists are satisfied by their collaborations with medicine distributors; the most effective way to promote medicine (C10) is the products/medicines exhibitions; it is a relevant to use medical representatives team to promote medicine in pharmacies (C11); the patients are influenced by the family doctor/specialist doctor/primary doctor (C12); the most important aspect, for patients, is that medicine to arrive quickly as possible (C13); the pharmacists explanation for the continuous growth of Romanian market is the mergers and acquisitions made at international level (C14).

Because to the first item of questionnaire (C1) there were differences and also there were different opinions and appreciations to the other questions in the questionnaire, we applied the nonparametric statistic to deepen the interpretation of the data. Therefore, chi square test was applied with the null hypothesis: $H_0 = \text{There are no statistically significant differences depending on the degree of satisfaction of the pharmacies regarding the relation with medicine distributors, related to all the other aspects of the study.}$ The results are presented in Table 2 only for the items with p-value <0.05 . For the statistic value χ^2 calculated higher than χ^2 theoretically, H_0 is rejected, concluding that (the last column of Table 2) there are differences depending on the degree of satisfaction only referring to aspect describing by C13. Also, for variable C10, because the H_0 is accepted we can conclude that all the pharmacists from the sample consider that the most effective way to promote medicine is products/medicines exhibitions.

Table 2
RESULTS FOR CHI-SQUARE TEST

	χ^2 calculat	df	p-value	χ^2 teoretic	Concluzia
$H_0 = \text{There are no statistically significant differences depending on the degree of satisfaction of the pharmacies regarding the relation with medicine distributors, referring to:}$					
C10. In your opinion, what is the most effective way to promote?	11.571 ^a	6	.072	12.5916	H_0 se acceptă
C13. What aspect do you consider is more important for medicine beneficiaries?	42.350 ^a	6	.000	22.4577	H_0 se respinge

To test if there are statistically significant differences between the score averaged by the response of each item, mean of each answers the Student t test was applied, the results being shown in Table 3.

Table 3
RESULTS FOR T STUDENT TEST

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
C1.	56.526	197	.000	1.879	1.81	1.94
C10.	32.091	197	.000	2.662	2.50	2.83
C11.	36.568	197	.000	1.343	1.27	1.42
C12.	36.531	197	.000	1.278	1.21	1.35
C13.	33.475	197	.000	1.914	1.80	2.03
C14.	25.872	197	.000	2.616	2.42	2.82

Because for each item the p-value < 0.05 (statistically significant for 100% of sample), results that, the scores averaged are statistically significant for all 6 item of the study. To establish if there are correlations between the variables of the study and to analyze both the direction and intensity of these correlations, we applied *Pearson coefficients*. The results are presented in Table 4.

Table 4
RESULTS FOR PEARSON CORRELATIONS

		C10	C11	C12	C13	C14
C10	Pearson Correlation	1	-.092	-.242**	-.177*	.236**
	Sig. (2-tailed)		.195	.001	.013	.001
	N	198	198	198	198	198
C11	Pearson Correlation		1	.102	.120	-.220**
	Sig. (2-tailed)			.153	.092	.002
	N		198	198	198	198
C12	Pearson Correlation			1	.150*	-.260**
	Sig. (2-tailed)				.035	.000
	N			198	198	198
C13	Pearson Correlation				1	-.064
	Sig. (2-tailed)					.367
	N				198	198
C14	Pearson Correlation					1
	Sig. (2-tailed)					
	N					198

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

From the above data it can be noticed that there are positive (direct) correlations (marked with red in the table) and also negative (inverse) ones (marked with blue in the table), both statistically significant but of low intensity (Pearson coefficients $\leq 0,300$). To test if the answers of each item are normal distributed (Gauss curve) we applied the *Kolmogorov- Smirnov test*, the results being presented in Table 5. The results show that for all 6 items the distribution is normal.

Table 5
RESULTS FOR KOLMOGOROV- SMIRNOV TEST

	N	Normal Parameters ^{a,b}		Most Extreme Differences			Kolmogorov- Smirnov Z	Asymp. Sig. (2-tailed)
		Mean	Std. Deviation	Absolute	Positive	Negative		
C1	198	1.88	.468	.425	.342	-.425	5.987	.000
C10	198	2.66	1.167	.275	.275	-.268	3.873	.000
C11	198	1.34	.517	.424	.424	-.253	5.960	.000
C12	198	1.28	.492	.456	.456	-.286	6.419	.000
C13	198	1.91	.805	.225	.225	-.199	3.169	.000
C14	198	2.62	1.423	.319	.276	-.319	4.495	.000

a. Test distribution is Normal; b. Calculated from data

Because the distributions of answers are normal for the items and because exist significant correlations between variables (items) we applied *the linear regression model* to analyse and to find a model for depending variable *satisfaction degree of pharmacist - medicine distributors relationship* according to variables C10-C14. The results are presented in Tables 6-8.

Table 6
MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.236 ^a	.056	.031	.460

a. Predictors: (Constant), C10, C11, C12, C13, C14

According to data from Table 6 and Table 7 we can conclude that the model are significantly statistic (p-value of ANOVA is 0.049) but the model explain only 23.6% of total variance (R coefficient = 0.236) that it mean the model are available only for this percept of sample.

Table 7
ANOVA^b

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	2.406	5	.481	2.271	.049^a
	Residual	40.685	192	.212		
	Total	43.091	197			

a. Predictors: (Constant), C10, C11, C12, C13, C14

b. Dependent Variable: C1

Table 8
COEFFICIENTS^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.905	.194		9.820	.000
	C10	-.031	.030	-.078	-1.046	.297
	C11	.179	.065	.198	2.732	.007
	C12	-.056	.071	-.059	-.789	.431
	C13	-.078	.042	-.135	-1.867	.063
	C14	.014	.025	.044	.583	.560

a. Dependent Variable: C1

From data of Table 8 we can observe that only for two variables the contribution to the model are statistically significant, respectively for C11 and C13, respectively *the satisfaction degree of pharmacist in collaboration with medicine distributors are positively affected by the promotion activity made by medical representative teams* (C11) and *negatively* by the most important aspects for medicine beneficiaries, respectively *the medicine price to be lowest*. This last aspect demonstrates the sensitivity of Romanian patients to the price of the medicine from the pharmacist's point of view and directly experience with clients.

In order to test for which of the 5 items (C10-C14) the degree of satisfaction of the pharmacies in the study is different, we divided the 198 pharmacies into two groups (satisfied (152) and dissatisfied (11)) and applied the *Mann - Whitney test* for two different samples to test the significance of these differences. The results are presented in Table 9.

Table 9
RESULTS FOR MANN – WHITNEY TEST

	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
C10	747.500	12375.500	-.621	.534
C11	644.000	12272.000	-1.528	.126
C12	820.000	12448.000	-.141	.888
C13	765.000	831.000	-.500	.617
C14	736.000	12364.000	-.730	.465

a. Grouping Variable: C1

According to results presented in Table 9, it can observe that none of these five variables differentiate between the satisfied and unsatisfied pharmacists.

Conclusions

The statistically significant results of the research, even it was collected from only two Romanian counties (Brasov and Mures), can be inference at the national level.

Regarding the results from descriptive statistics for variable C14 (*the fusions and acquisitions from international level influenced the growth or Romanian medicine market*), our results confirm the last Cegedim report respectively that the top 10 medicine producers are dominated by the multinationals and international companies [5].

The our results of the *chi-square test* and the *linear regression model* (with only variables C11 and C13 significant statistically) confirm the international one, respectively that, for a better and effective service management in a pharmacy is need by *a sustain steady in supply* [4] and to upgrade the role of the modern pharmacies under a wide range of *cognitive pharmaceutical services* [12].

The present results highlights also another particularity of pharmacists' perception of promoting activity in Romanian supply chain: the international results [8] show that the final consumers are sensitive to the TV advertising and social responsibility *but* we find that – from the pharmacists point of view – the final consumers a sensitive to *the promotion made by the teams of medical representatives and they are influenced by their doctor* (family doctor/specialist doctor/primary doctors). Our results confirm also the causal relationship between operational managers of pharmacies and users [13].

In conclusion, it is important, for pharmacists to have a pharmaceutical care practice in accordance with patients' needs *but* also to have more efficient communication with them [12].

The present results may have implications in marketing communication in the pharmaceutical sector in Romania being a first study that demonstrated the importance of pharmacists in their double role (in fact they represent the interface between patients and medicine distributors) and those establishing a relation between the qualitative side, of satisfaction, and quantitative side, of sales [14].

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