INQUIRY: The Journal of Health Care Organization, Provision, and Financing
Volume 53: 1–8

DOI: 10.1177/0046958016637791
inq.sagepub.com

The Impact of Information on Doctors' Attitudes Toward Generic Drugs

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Abstract

The objective of this study is to assess the impact of information on doctors' attitudes and perceptions toward generics. A cross-sectional survey based on a specially designed 21-item questionnaire was conducted. The survey involved doctors of different specialties working in a public hospital in Greece. The analysis includes descriptive and inferential statistics, reliability and validity tests, as well as structural equation modeling to evaluate the causal model. Statistical analysis was accomplished by using SPSS 20 and Amos 20. A total of 134 questionnaires out of 162 were received, providing a response rate of 82.71%. A number of significant associations were found between information and perceptions about generic medicines with demographic characteristics. It seems that the provision of quality information on generic drugs influences doctors' attitudes and prescription practices toward generic drugs. This is not a static process but a rather dynamic issue involving information provision policies for strengthening the proper doctors' attitudes toward generic drugs.

Keywords

drugs, generics, information, medical doctors, survey, Greece

Introduction

Generic medicine policies are rather important for any health care system mainly due to the expenditures associated with pharmaceutical products.[1] Although the aforementioned statement is rather evident, not all health care professionals may share the same attitudes across EU countries.[2] This may be a result of the distinct drugs financing models, distinct national pharmaceutical reformation policies as well as divergent health care management practices among the different countries.[3] An integration of central and southern European pharmaceutical products markets is the "Holy Grail" for National Healthcare Systems (NHS) within the European Union.[4] Due to the global economic crisis of 2008, the Greek governments have implemented programs to reduce medication expenses through generics utilization.[5] These efforts aimed to influence doctors' attitudes and perceptions toward generics. This article is studying the impact of the current level of information about generics on doctors' attitudes toward generics. The survey involved all medical doctors registered at Kavala's General Public Hospital as well as in the primary health care units of this region in Greece. Out of the 162 registered medical doctors asked to participate in this survey, 134 agreed, completed, and returned the 21-item questionnaire, with a response rate of around 83.7%. Prior to the survey, the hospital scientific committee reviewed and accepted the research protocol. The impact of information on medical doctors' beliefs toward generic drugs may provide a pathway for strengthening national policies and programs for generics' utilization.

Theoretical Framework and Hypothesis

An important goal for the Greek NHS is to achieve a reduction of pharmaceutical expenses. Overall, generic drugs increase the competition among pharmaceutical companies and reduce the cost of treatment without jeopardizing quality and safety characteristics.[6] The deep economic crisis in Greece in conjunction with the requirements set by the international institutions made the promotion of generic drugs against original drugs a priority.[7] The physicians' perceptions on generic drugs in the era of austerity in Greece have been recently studied by Labiris et al.[8] In Greece, brand-generic drug substitution has been extensively promoted by issuing

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Received 28 December 2015; revised February 9 2016; revised manuscript accepted 9 February 2016

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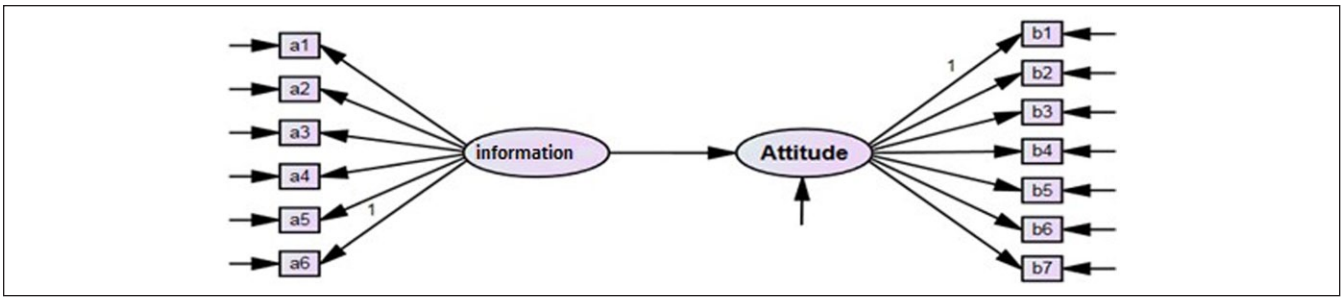

Figure 1. Research model.

warnings and developing national control mechanisms.[9] These include measures for better administrative control through the national e-prescription system that was introduced in 2010 in Greece as well as the inclusion of generics in the e-procurement system for the containment of unnecessary pharmaceutical expenditure. These measures focused on promoting regulations and rules, as well as diminishing misconceptions about generics' efficiency.[10] However, at the same time, the general population has a difficulty accepting specific generic pharmaceutical products, whereas there appears to be a widespread myth among doctors and patients that branded products are better in terms of quality and safety than generic forms.[11]

This article aims to evaluate the significance of the role of information in doctors' attitudes toward generics. For example, informed doctors provide their patients with written instructions that encourage them to purchase and use generic medicines. However, many doctors without access to the scholar medical information still have a negative attitude toward generic drugs and they are not convinced of the bioequivalence between prototype and generic drugs. The research model developed and presented in Figure 1 is based on the studies by Chua et al[1] as well as Gevorgyan,[12] which involve assessments of both doctors' information on and their attitudes toward generic medicines. Therefore, the following hypothesis is tested:

> **Hypothesis 1:** Doctors' information on generic medicines positively affects doctors' attitude toward generic medicines.

Research Design

Material and Methods

The questionnaire used in our survey was informed by the work of Chua et al[11] adopted for Greece and comprised three sections: (1) doctors' demographics, (2) information about generics, and (3) attitudes toward generic medicines. The questionnaire was initially cross-translated, and qualitatively pilot tested for validity by a group of experts from academia and professionals with research experience. In its final form, the questionnaire together with our research protocol was submitted to the hospital's scientific committee for review and acceptance. A 5-point Likert scale was used for scale measurement. In our sampling plan, all 162 medical doctors of Kavala's hospital were included and a total of 134 responses were received within the first month of 2015, indicating a response rate of 83.7%. After data screening, SPSS 20 was used for the descriptive statistics as well as the exploratory factor analysis, whereas structural equation modeling (SEM)[13] was developed by Amos 20. Construct validity was assessed through principal component factor analysis whereas construct reliability was assessed using Cronbach's alpha values.[14]

Results

Table 1 provides the survey demographics. The responses and significant differences in population subgroups are provided in Table 2. Group differences were assessed using Mann-Whitney and Kruskal-Wallis tests, wherever applicable. The results exhibit that although the majority of the respondents (55.2%) correctly stated that generic drugs are bioequivalent to branded drugs, a quite high percentage of 39.6% were neutral. Furthermore, only the 17.9% of the respondents assumed that a generic medicine must be in the same dose as the brand name medicine and 25.4% had no doubt about it, but still 54.5% of the doctors were neutral. Therefore, the results are indicative of physicians' misinformation about generic drugs in relation to the issues raised in our survey. Differences have been noted for the statement, "Generic medicines should contain the same dose as the brand name medicines" in regard to doctor's place of work ($U = 451.500$, $z = -2.019$, $P = .44$), with the doctors in the hospital being better informed than the doctors working in primary health care centers. Also, differences have been identified for the statement, "Generic medicines are less effective compared to brand name medicines" in gender ($U = 1823.00$, $z = -2.097$, $P = .036$), years of practice ($U = 6.982$, $z = 2$, $P = .030$), and work position ($U = 1804.500$, $z = -2.183$, $P = .029$) subgroups. In fact, male doctors, specialists, and doctors with more than 10 years of practice

Table 1. Respondents' Demographic Characteristics.

	Frequency (persons)	Frequency (%)	Cumulative %
Gender			
Male	66	49.3	49.3
Female	68	50.7	100
Age			
24-30	31	23.1	23.1
31-40	48	35.8	59
41-50	29	21.6	80.6
51-64	26	19.4	100.0
Years in practice			
1-5	63	47.0	47.0
6-10	23	17.2	64.2
>10	48	35.8	100
Position			
Specialist	65	48.5	48.5
Non-specialist	69	51.5	100
Responsibility position			
Senior	26	20.1	20.1
Non-senior	117	79.9	100
Place of work			
Public hospital	123	91.8	91.8
Health care centers	11	8.2	100

experience expressed a stronger disagreement to the given statement than females. Similar results are reported in another study[15] stating for instance that female physicians have more negative perceptions toward generic medicines than male doctors.

Moreover, men were more positive than women about generics toward the statement, "Generic drugs produce more side effects compared with brand name drugs" ($U = 1819.00$, $z = -2.055$, $P = .04$). Also, men expressed more positive beliefs on generic medicines than the women toward the statement, "Brand name drugs are required to meet higher safety standards than generics" ($U = 1664.500$, $z = -2.818$, $P = .05$).

In Table 2, survey results for the participants' attitudes toward generics are presented: 76.9% of the respondents were in favor of issuing guidelines on brand substitution for the prescribers and the pharmacists; 83.6% felt that patients should be appropriately provided with trusted information on generic drugs; 59.0% indicated that drug advertising campaigns had a positive impact, and 54.5% reported that they need more information on the safety and efficacy of generics. Finally, 57.5% stated that patients' socio-economic factors affected the choice of medicines, whereas 84.3% stated that they are influenced by the reliability of manufacturers for prescribing generics. In conclusion, there appears to be a lack of adequate information about generics among doctors. The study revealed that there were significant differences among doctors in different age groups for the statement, "I think patient should be given enough information about generic medicines to make sure they really understand about the medicines they take" ($U = 7.501$, $z = 3$, $P = .058$); the response expressed by the junior doctors, aged 24 to 30 years, under their specialty was more positive than older doctors. That is perhaps because young doctors usually spend more time with patients, to inform them about their condition and options. Finally, there are significant differences among doctors in different age groups ($U = 8.386$, $z = 3$, $P = .039$), and years of practice ($U = 6.495$, $z = 2$, $P = .039$) for the statement, "Patient's socio-economic factor will affect my choice of medicines." The respondents aged between 24 and 30 years as well as doctors who had less years of practice, from 1 to 5 years, expressed a stronger agreement with the above statement when compared with older doctors with more experience.

Measurement Analysis and Hypothesis Testing

Two-step approach methodology was adopted based on the suggestions of Hair et al[16] and Anderson and Gerbing.[12] For the first stage of analysis, explanatory factor analysis was conducted on the data set to examine the construct validity and the unidimensionality of each independent variable. Only Kaiser-Meyer-Olkin (KMO) values greater than 0.7 and factor loadings values greater than 0.6 were accepted and that is a rigorous cut-point. After the deletion of one item (b7) from the second construct as shown in Table 3, the KMO statistics were 0.876 and 0.917 at a significance level of .001 for the 2 independent variables under test. The test of sphericity was also highly significant (χ^2 457.14 and 596.20 with 10 degrees of freedom [*df*], at $P < .001$). Therefore, it was concluded that a factor analysis of the scale items would be appropriate. Factor loadings ranged from 0.770 to 0.958, a very satisfactory outcome. Therefore, the results indicate that the scales used to measure the independent variables were unidimensional and represented a single concept. Next, confirmatory factor analysis was performed. Item reliability was tested by squared factor loadings (SFLs), whereas contract reliability was assessed through Cronbach coefficient, composite reliability, and average variance extracted (AVE). As Table 3 shows, all used items had SFLs greater than the .50 recommended value. In addition, all the questionnaire scales exhibited Cronbach coefficientsand AVE estimates above the recommended levels of 0.7 and 0.50, respectively. Therefore, these values ensure that each construct is psychometrically sound.[17]

The next step of the analysis was to evaluate the goodness of fit of the structural model. Six common model-fit measures were used to assess the model's overall goodness of fit: the ratio of chi-square values to degrees of freedom, the comparative fit index (CFI), the normalized fit index (NFI), the root mean square residual (RMR), the root mean square error of approximation (RMSEA), and the goodness-of-fit index

Table 2. Survey Results.

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Gender[a]	Age[b]	Years of practice[b]	Position[a]	Responsibility[a]	Place of work[a]
Doctors' information on generic medicines											
A generic medicine is bioequivalent to brand name medicines	16	58	51	9	0	.109	.989	.819	.732	.207	.223
A generic medicine must be in the same dosage form (eg, tablet, capsule) as the brand name medicine	26	44	53	7	4	.201	.637	.250	.095	.235	.774
A generic medicine must contain the same dose as the brand name medicines	34	24	73	1	2	.779	.894	.657	.877	.225	**.044**
Generic medicines are less effective compared with brand name medicines (r)	1	12	29	77	15	**.036**	.437	**.030**	**.029**	.073	.924
Generic medicines produce more side effects compared with brand name medicines (r)	0	15	36	68	15	**.040**	.789	.440	.606	.308	.857
Brand name medicines are required to meet higher safety standards than generic medicines (r)	1	15	35	70	13	**.005**	.921	.601	.759	.899	.891
Doctors' attitudes and perceptions toward generics											
I believe we need a standard guideline for both Doctors and pharmacists on the brand substitution process	34	69	20	10	1	.954	.102	.348	.640	.345	.064
I think the patient should be given enough information about generic medicines to make sure they really understand about the medicines they take	34	78	4	17	1	.699	**.058**	.622	.994	.374	.960
I believe advertisement by the drug companies will influence my future prescribing pattern	13	66	44	11	0	.604	.458	.384	.623	.373	.839
I need more information on the issues pertaining to the safety and efficacy of generic medicines	36	73	19	6	0	.817	.608	.394	.650	.966	.379
Patient's socio-economic factor will affect my choice of medicines	32	77	15	9	1	.832	**.039**	**.039**	.089	.461	.824
Credibility of the manufactures/suppliers is my concern when prescribing medicines	31	82	12	8	1	.900	.661	.755	.949	.733	.672
Pharmaceutical companies' product bonuses will influence my choice of medicines	17	39	40	36	2	.481	.993	.377	.826	.477	.896

Note. $P < .05$ is considered significant. Bold values indicate statistical significance. r = reversed item.
[a]Mann-Whitney test was used.
[b]Kruskal-Wallis test was used.

Table 3. Explanatory Factor Analysis Results and Confirmatory Factor Analysis Results.

		Explanatory factor analysis						Confirmatory factor analysis				
Factor	Items	Comp. matrix	Mean	SD	KMO	Bartlett test	Total variance explained	Loadings	Squared factor loadings	Cronbach's α	Composite reliability	Variance extracted
Doctors' information of generic medicines	a1	0.779	3.60	0.785	0.876	457.14	66.288%	0.73	0.54	0.898	0.90	0.60
	a2	0.782	3.60	0.958				0.74	0.55			
	a3	0.877	3.65	0.920				0.86	0.74			
	a4	0.841	3.69	0.816				0.80	0.63			
	a5	0.826	3.62	0.830				0.78	0.61			
	a6	0.775	3.59	0.843				0.71	0.51			
Doctors' attitude toward generic medicines	b1	0.876	3.93	0.877	0.917	596.20	73.75%	0.85	0.73	0.928	0.91	0.63
	b2	0.924	3.95	0.928				0.92	0.85			
	b3	0.775	3.60	0.776				0.73	0.53			
	b4	0.850	4.04	0.770				0.81	0.65			
	b5	0.854	3.97	0.831				0.82	0.67			
	b6	0.867	4.00	0.795				0.84	0.70			

Note. KMO = Kaiser-Meyer-Olkin.

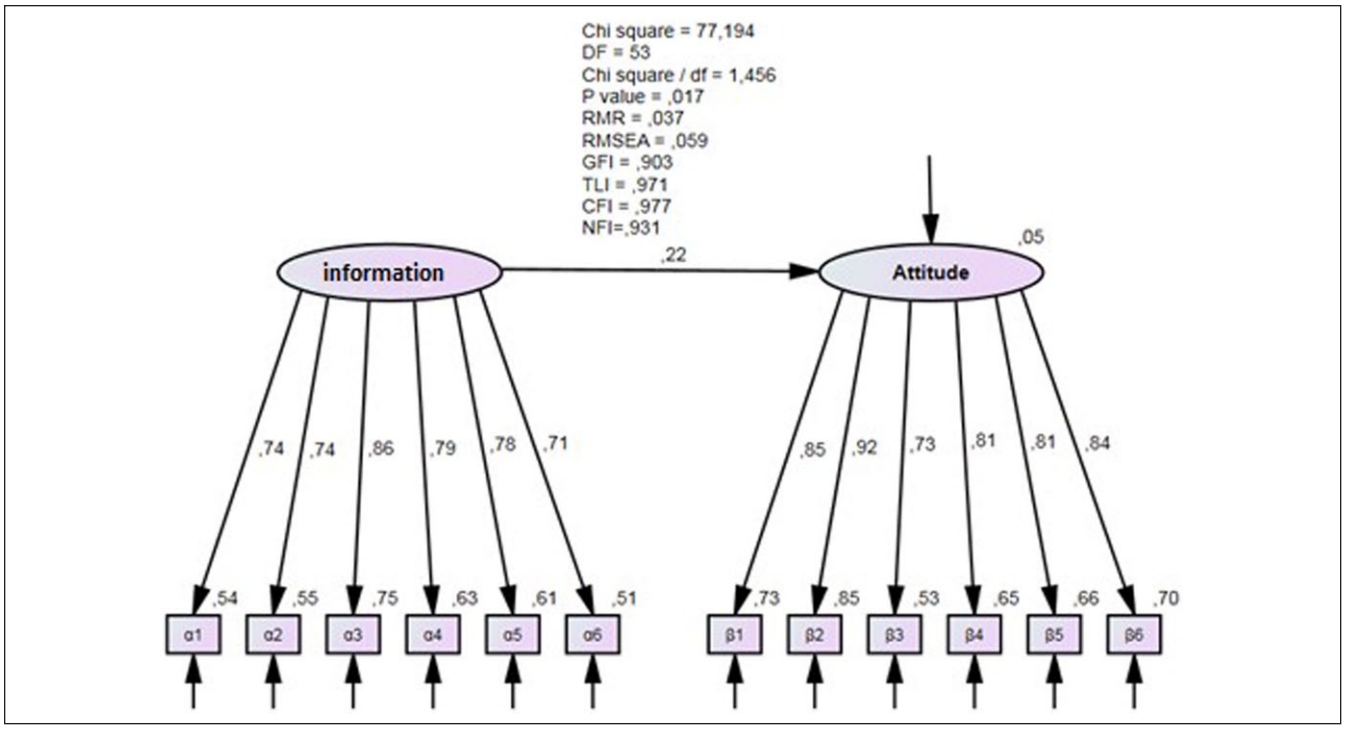

Figure 2. Confirmatory factor analysis of the model.
Note. df = degrees of freedom; RMR = root mean square residual; RMSEA = root mean square error of approximation; GFI = goodness-of-fit index; CFI = comparative fit index; NFI = normalized fit index; TLI = Tucker-Lewis index.

(GFI). Generally, good fits are obtained when the CFI and GFI are equal to or greater than 0.90, RMR is equal to or less than 0.05, and the RMSEA is equal to or less than 0.06

Figure 2 presents the measurement and structure model for the goodness-of-fit tests of the hypothetical model. As shown, the adopted fit indices exceed the recommended threshold levels: $\chi^2/df < 3$; GFI, NFI, and CFI > 0.90; and RMR < 0.05, indicating that the research model fits the data well. Findings according to path coefficients and their statistical significance in Figure 2 show that the proposed hypothesis is supported. More analytically, the results show that doctors' information about generic medicines has a statistically significant positive influence on doctors' attitude toward generic medicine.

Discussion

Our results suggest that the myth that brand name drugs are "better" than their generic equivalents is still present.[18] Perhaps, this explains why the use of generics in Greece is still among the lowest in the European countries. These misconceptions could be altered in order cost–containment programs to succeed.[19] Our results by large do not differ to the ones reported in other similar studies: For example, it is reported that Malaysian doctors' information and knowledge about generics do not diminish misconceptions.[20] Sheppard[18] also states that doctors consider generics being less secure than branded drugs, whereas in another study[21] in Denmark, it is reported that physicians are displeased with the drug substitution process and 58.2% claimed that patients have to be educated and better informed on safety and efficacy of generics, so as to be certain about their high quality. In our study as in others, it was reported that the patient's socioeconomic status was a pivotal issue in doctors' choice of drugs.[22] In France, as it is also reported here, the socioeconomic characteristics of patients were the basic reason in doctors' willingness to prescribe generics.[23] It is noticed that successful advertising campaigns launched by pharmaceutical companies are thought by medical doctors to have a positive impact on perceptions toward generics. According to these results, it seems that more should be done in terms of informing all interested parties.

Physicians provide information to patients about generics' safety, efficacy, and cost. Indeed, if consumers refuse generic's substitution, they have to pay the price difference between the generic and the more expensive prototype drug.[24] Therefore, the establishment of a comprehensive awareness program to improve information about generic products is necessary. In Australia, for example, National Prescribing Service Limited is an independent organization that plays a major role in informing consumers, as well as health care professionals, about generic medicines. Nevertheless, patients often refuse to change their medicines, especially if they are older patients with low level of

education or mothers with concerns about their children's care. Patients suffering from chronic and serious diseases are also reluctant to use generics due to lack of trust in generics' therapeutic efficacy. Without proper justification, lower prices are thought to be an evidence for poor quality products.[25] Information about previous positive experiences as well as the factor of cost saving have an improving impact on patients' decision to accept generic drugs therapies.[26] Information provision and awareness interventions are important for generic medicine acceptance. National Organization for Medicines, Food and Drug Administration, drug representatives, and pharmacists are resources of information about generics.[27]

Medical doctors have the responsibility to decide whether or not the brand name drug substitution is suggested. Generics are promoted in EU countries by specific policies that are mainly grounded on cost containment, market regulation, and encouragement of efficient use of resources. The reliability of manufacturers is one of the major factors reported by the survey participants. The governments could promote generics by assuring quality/safety and by issuing guidelines on prototype drug substitution.[28] However, pharmacists can substitute original medicines with their therapeutic equivalent generic form, unless prohibited by the doctor or if patients raise objections.[29] Some physicians mainly in the private health care sector do not support generic substitution due to the lack of incentives and fear of reputation loss. This is also reported in studies disputing bioequivalence of generic medicines.[30] These misconceptions should be altered by the central health care authorities in order cost–containment programs to succeed.[19] In Greece, policy makers should maintain their financial and nonfinancial incentives to substitute branded drugs.[31] Kontodimopoulos et al[32] have reported substitution of prototype drugs by generics at a rate of about 26% by 2012, observing the favorable effects of the corresponding reform initiatives in reducing the pharmaceutical expenditures. Furthermore, the procurement procedures of the Health Procurement Committee (EPY) for pharmaceuticals and medical devices in Greece after 2010 allowed request management at a national level, organizing calls for tender and developing a Price List Observatory for price comparisons, greater transparency, and cost control.[33]

Study Limitations

This is one of the first studies in Greece conducted to systematically evaluate the relation of doctors' level of information with their attitudes toward generic drugs. As in every research pursuit there are inherent limitations and the results provided should be generalized with caution. Being a pilot study, this survey includes the responses of medical doctors from a specific public hospital in Greece. Further studies of this nature could be useful for unraveling the role of information in shaping the appropriate doctors' attitudes toward extensive generics adoption and thus reducing unnecessary public spending without improving clinical outcomes.

Conclusions

The findings of the present study indicate that information plays a significant role toward generic medicines. Information provision alters misconceptions about the safety and efficacy of generics and increase doctors' and patients' confidence in adhering to generic substitution policies. Health authorities in Greece must further establish generic promotional laws and information policies toward the health care professionals, and hold public campaigns in media about the generics' quality, to build confidence among doctors, pharmacists, and consumers. Data analysis has shown that there is a significant positive association between information and generic prescription practices. Information-seeking skills would allow doctors to continually retrieve information about pharmaceutical products and research and hence be able to assess drugs more effectively. Furthermore, in a future research more situational (eg, access to scholarly databases, medical specialty, type of hospital) and personal variables (eg, computer and information literacy skills, knowledge of foreign language) could be included, to further explain the role of information in doctors' perceptions and preferences toward generics.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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