

Knowledge and attitudes of Greek Physicians towards generic prescribing after the economic crisis

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Abstract

Purpose: The aim of the present study is to estimate the penetration of generics, detect factors that deter their prescribing, and suggest measures that could potentially increase their utilization in the Greek pharmaceutical market.

Methods: The study was conducted during 2011-2012. 215 questionnaires were completed by doctors of both private and public health sector, after a pilot study. Non-parametric chi-square testing and binary logistic regression were applied to assess the potential impact of doctors' demographic characteristics on their attitude towards generic substitution and INN (International Non-proprietary Name) prescription.

Results: 68.8% of doctors reported that they had prescribed generics. 56.1% of them had prescribed generics at a frequency of <20%. Working years, working sector, and medical specialty were significantly associated with generic prescribing. Doctors working at the prefecture of Chania (OR=1.2; CI= 1.025-1.429 and p value= 0.03), hospital physicians (OR=1.65, CI=1.028-3.046, p=0.04), and pulmonologists (OR=2.60, CI=1.034-4.164, p=0.01) had a higher probability of prescribing generics. Hospital physicians demonstrated greater probability of INN prescribing (OR=1.8, CI=0.034-2.836, p<0.001).

Conclusions: Our study inserts a new parameter regarding active substance prescribing, suggesting the need for further research on patients' and pharmacists' attitudes towards generic substitution.

Key words: generics, drug prescribing, active substance, pharmaceutical policy, Crete.

Introduction

Over the last ten years, public pharmaceutical expenditure in Greece was growing at a rapid rate. According to data published by the General Secretariat of Social Security, public pharmaceutical expenditure increased from €1.28 billion in 2000 to €5.09 billion in 2009, at an average annual rate of 17%. Public spending on pharmaceuticals accounts for approximately 80% of total pharmaceutical expenditure and for 24% of public health expenditure (average 2000-2006)². In 2006, public pharmaceutical expenditure (FEIR,2009) accounted for 28% of public health expenditure, the highest rate among EU-15 countries[1].

Since May 2010, the decrease of public pharmaceutical expenditure has become a national priority in the light of the economic adjustment program and the need to contain costs in the health sector. According to the targets set by the program, public pharmaceutical expenditure would have to amount to 1% of annual Gross Domestic Product (GDP) by the end of 2014[2]. To achieve these figures a number of specific measures aiming to decrease public spending on pharmaceuticals have been included in the program and are in the process of being implemented since 2010, including price reductions, volume control and generic substitution. In particular, the control of physicians' prescribing patterns and the increase of generic substitution has become an issue of major importance for pharmaceutical policy, in order to meet the program's specific targets. Based on these targets, at least 50% of the volume of medicines used by public hospitals and 60% of the overall volume of medicines sold by pharmacies should be gradually composed of generics. Physicians are required to prescribe the cheaper generic when available in the national market[3]. This way, it is expected that savings will be achieved at a larger scale and in a shorter timeframe[4].

The generic market is globally developed and fairly organized in many countries of the Organization for Economic Co-operation and Development (OECD,1998). In Denmark, Germany, U.S.A. and Great Britain generic medicine account for up to 50-60% of the total pharmaceutical market[5]. However, this is not the case for Greece, where the penetration of generics has remained considerably low, accounting for approximately 18% of the market in value and volume terms (nom,2012). The Greek regulatory framework has not supported the development of this market and doctors have not been provided with incentives for prescribing generics[6]. Greek physicians are cautious towards generic prescribing and this affects their overall prescribing patterns[7]. In Greece, generics are priced at 40% of the price of the originator prior to losing patent protection[8].

At the same time, the monitoring of physicians' prescribing behavior in the Greek health care system isn't as developed as in other European countries[9,10].

In this context, the purpose of this study was to capture physicians' prescribing patterns and perceptions towards generics in the health region of Crete, based on data collected from all hospitals. Main objectives of the study were to estimate generic penetration, detect the factors that influence generic prescribing and suggest measures and policies that could potentially increase generic utilization in the Greek pharmaceutical market.

Materials and methods

Study design

The study was conducted in the 7th Health District of Crete, during 2011-2012. The population of Crete is considered to be genetically homogeneous and is mainly rural. Data were collected via a questionnaire completed by private and public sector doctors of the four Prefectures of Crete. Five public hospitals participated in the study: the University Hospital of Heraklion, the Venizeleio-Pananeio General Hospital, the General Hospitals of Agios Nikolaos, the General Hospital of Rethymnon and the General Hospital of Chania "Agios Georgios". The majority of questionnaires were distributed via personal contact. A small number of questionnaires were sent via email. Permission to conduct the study was taken from the Management department of all Hospitals in Crete. Confidentiality and anonymity of the information collected was safeguarded as per the Helsinki Declaration of Human Rights. Ethics approval was not required, as this was an observational study and not an interventional one, and also due to our need to capture the generics prescribing practices and attitudes in doctors.

Questionnaire

The questionnaire was tested in a pilot study conducted on a sample of 50 doctors, 25 from the University Hospital of Heraklion and 25 from the private sector of the same Prefecture. Based on the outcomes of the pilot study, minor adjustments were made to make the questionnaire more operational and simple. The final questionnaire consisted of 14 questions and was divided in two parts. The first part included questions on the demographic characteristics of the study population, such as gender, age, prefecture, additional degrees, medical specialty, number of working years and medical tier. The second part included seven questions on the subjects' opinion on generic prescribing, their percentage of generic prescribing, the subjects' opinion and their recommendations regarding ways of increasing generic prescribing, as well as their attitude towards INN prescribing. It was estimated that a minimum of 210 questionnaires was required to achieve a power of 0.8, for a statistical significance level of 0.05.

Statistical analysis

221 questionnaires were collected. 6 were rejected on grounds of bias. The remaining 215 constituted the final sample of the study, at a response rate of 93.47%. Statistical analysis was carried out in SPSS 19. Basic descriptive statistics were calculated to observe the physician's profile. The Kolmogorov-Smirnov test of normal distribution was applied in order to choose the correct statistical tests (parametric or non-parametric). All variables presented non-normal distribution; consequently, non parametric chi-square test was chosen to detect the statistical significance and the variations of the variables. Finally, binary logistic regression (age and gender standardized) was applied to explore the potential impact of demographic characteristics on respondents' attitudes and prescribing patterns.

Results

Sample profile

Based on the study results, a high degree of high heterogeneity was observed in the sample's synthesis as well as the physicians' prescribing practices and attitudes towards generics (**Table 1**).

Table 1. Generic prescription percentage in relation to demographical characteristics

Demographic characteristics	Generic Prescription						p
	Yes		No		Total		
	N	%	N	%	N	%	
Gender							0.70
Male	92	62.2	44	65.7	136	63.3	
Female	56	37.8	23	34.3	79	36.7	
Age Group							0.38
<40 years	48	32.4	28	41.8	76	35.3	
41-55 years	69	26.6	17	25.4	86	40.0	
56-65 years	23	15.5	19	28.4	42	19.5	
>66 years	8	5.4	3	4.5	11	5.1	
Working Prefecture							0.32
Heraklion	44	29.7	24	35.8	68	31.6	
Lasithi	26	17.6	16	23.9	42	19.5	
Rethymnon	29	19.6	13	19.4	42	19.5	
Chania	49	33.1	14	20.9	63	29.3	
Additional degrees							0.05
Master	18	12.2	20	29.9	38	17.7	
PhD	21	14.2	10	14.9	31	14.4	
None	109	73.6	37	55.2	146	67.9	
Working sector							0.04
Hospital – Public	82	55.4	36	53.7	118	54.9	
Private	66	44.6	31	46.3	97	45.1	
Working years							0.04
<5 years	35	23.6	19	28.4	54	25.1	
6-10 years	25	16.9	11	16.4	36	16.7	
11-20 years	41	27.7	13	19.4	54	25.1	
21-30 years	34	23.0	16	23.9	50	23.3	
> 31 years	13	8.8	8	11.9	21	9.8	
Medical tier							0.06
Specialized	12	8.1	7	10.4	19	8.8	
Consultant	20	13.5	14	20.9	34	15.8	
Director	8	5.4	2	3.0	10	4.7	
Assistant	1	0.7	0	0.0	1	0.5	
None	107	72.3	44	65.7	151	70.2	

The majority of participating physicians were men (63.3%), aged 41-55 (40.0%) and <40 (35.3%). The prefecture of Heraklion had a higher participation rate (31.6%) followed by the prefecture of Chania (29.3%). Most of the physicians did not have an additional degree (67.9%) or a medical speciality (70.2%). Distribution between public (54.4%) and private (45.1%) physicians was almost equal. The medical specialties with the biggest representation in the sample were cardiology (11.6%), pathology (12.1%), orthopedics (9.3%), gynecology (9.3%) and pulmonology (8.4%)

Generic Prescribing

The majority of physicians (68.8%) responded positively to the question regarding generic prescribing (**Table 1**).

56.1% of physicians that prescribed generics did so at a frequency of less than 20%, 44.1% of them at a frequency of 20-50%, and 3.4% at a frequency higher than 80% (**Table 2**).

Table 2. Generic prescription

	Generic Prescription					
	Yes		No		Total	
	N	%	N	%	N	%
Prescription percentage						
<20 %	77	56.1	0	0.0	77	35.8
20-50 %	64	44.1	0	0.0	64	29.8
50-80 %	8	5.4	0	0.0	8	3.7
>80 %	5	3.4	0	0.0	5	2.3
Generic prescription increase						
Yes	99	66.9	9	13.4	108	50.2
No	49	33.1	58	86.6	107	49.8
Drastic substance prescription						
Yes	50	33.8	19	28.4	69	32.1
No	98	66.2	48	71.6	146	67.9

The medical specialties which presented the highest rates of generic prescribing were cardiologists (12.8%), orthopedics (10.8%), pathologists (10.1%), gynecologists (9.5%), pulmonologists (8.8%) and otolaryngologists (8.1%), while the pediatricians followed at 6.1% (**Table 3**).

Table 3. Probability of prescribing drastic substance (OR, 95% CI) according to demographic characteristics

Demographical characteristics	Probability of prescribing drastic substance		
	N (%)	OR (95% CI)	p
Gender			0.45
Male	43 (62.3)	1	
Female	26 (37.7)	0.83 (0.094-1.048)	0.45
Age Group			<0.001
<40 years	37 (53.6)	1	
41-55 years	22 (31.9)	1.02 (0.932-2.438)	0.34
56-65 years	10 (14.5)	1.5 (0.379-2.943)	0.002
>66 years	0 (0.0)	1.6 (1.028-2.382)	<0.001
Working Prefecture			0.56
Heraklion	24 (34.8)	1	
Lasithi	13 (18.8)	0.3 (0.035-1.843)	0.06
Rethymnon	12 (17.4)	0.5 (0.002-4.293)	0.87
Chania	20 (29.0)	1.03 (0.942-3.943)	0.65
Additional degrees			0.06
Master	46 (66.7)	1	
PhD	15 (21.7)	1.4 (0.039-2.943)	0.07
None	8 (11.6)	1.2 (1.003-3.002)	0.04
Working sector			<0.001
Hospital - Public	19 (27.5)	1	
Private	50 (72.5)	1.8 (0.034-2.836)	<0.001
Working years			0.005
<5 years	27 (39.1)	1	
6-10 years	10 (14.5)	1.3 (1.020-2.394)	0.03
11-20 years	10 (14.5)	2.6 (1.732-4.853)	0.04
21-30 years	18 (26.1)	3.1 (2.749-4.653)	0.002
> 31 years	4 (5.8)	4.3 (3.012-5.038)	0.003
Medical tier			0.07
Specialized	42 (60.9)	1	
Consultant	7 (10.1)	0.3 (0.004-1.958)	0.09
Director	14 (20.3)	1.6 (1.183-2.947)	0.04
Assistant	5 (7.2)	1.2 (0.492-3.242)	0.23
None	1 (1.4)	1.9 (0.025-4.834)	0.45
Physicians' specialty			0.04
Other	94 (55.2)	1	
Cardiologists	5 (7.2)	1.3 (1.004-2.026)	0.03
Orthopedics	10 (14.5)	2.1 (1.730-4.248)	0.02
Pathologists	7 (10.1)	1.4 (0.042-3.027)	0.03
Gynecologists	6 (8.7)	1.6 (1.024-3.274)	0.04
Pulmonologists	3 (4.3)	2.5 (1.347-4.028)	0.04
Generic Prescription			<0.001
No	19 (27.5)	1	
Yes	50 (72.5)	2.3 (1.843-3.934)	<0.001

Some demographic characterists, such as working years, working sector, additional degrees and medical specialty, were shown to be significantly associated with generic prescribing ($p=0.04$, $p=0.04$, $p=0.05$, $p=0.03$ respectively, **Table 1**, **Table 4**).

Table 4. Probability of prescribing generics (OR, 95% CI) according to demographic characteristics

Demographical characteristics	Probability of prescribing generics		p
	N (%)	OR (95% CI)	
Gender			0.70
Male	92 (62.2)	1	
Female	56 (37.8)	1.25 (0.456-2.893)	0.74
Age Group			0.38
<40 years	48 (32.4)	1	
41-55 years	69 (26.6)	1.2 (1.023-2.362)	0.04
56-65 years	23 (15.5)	1.4 (0.204-2.390)	0.42
>66 years	8 (5.4)	1.3 (0.923-1.899)	0.34
Working Prefecture			0.32
Heraklion	44 (29.7)	1	
Lasithi	26 (17.6)	0.61 (0.234-1.675)	0.30
Rethymnon	29 (19.6)	0.73 (0.342-2.274)	0.54
Chania	49 (33.1)	1.2 (1.025-1.429)	0.03
Additional degrees			0.05
Master	109 (73.6)	1	
PhD	18 (12.2)	0.98 (0.023-1.363)	0.07
None	21 (14.2)	0.23 (0.147-0.859)	0.04
Working sector			0.04
Hospital - Public	66 (44.6)	1	
Private	82 (55.4)	1.65 (1.028-3.046)	0.04
Working years			0.04
<5 years	35 (23.6)	1	
6-10 years	25 (16.9)	2.46 (1.294-4.834)	0.03
11-20 years	41 (27.7)	1.63 (1.320-2.537)	0.04
21-30 years	34 (23.0)	1.45 (1.285-1.673)	0.02
> 31 years	13 (8.8)	2.60 (0.649-4.932)	0.46
Medical tier			0.06
Specialized	107 (72.3)	1	
Consultant	12 (8.1)	0.24 (0.048-2.384)	0.06
Director	20 (13.5)	2.34 (1.630-4.023)	0.03
Assistant	8 (5.4)	3.34 (0.038-6.284)	0.76
None	1 (0.7)	6.54 (1.924-14.437)	0.86
Physicians' specialty			0.03
Other	71 (48.0)	1	
Cardiologists	19 (12.8)	1.87 (1.454-2.283)	0.03
Orthopedics	16 (10.8)	2.45 (2.023-2.843)	0.04
Pathologists	15 (10.1)	1.62 (1.453-1.923)	0.03
Gynecologists	14 (9.5)	1.49 (1.002-2.235)	0.03
Pulmonologists	13 (8.8)	2.60 (1.034-4.164)	0.01

In addition, specific demographic subgroups were associated with higher probabilities of generic prescribing (Table 4). In particular, physicians aged 41-55 years demonstrated higher probability of generic prescribing (OR=1.2, 95% CI=1.023-2.362, p=0.04). Likewise, physicians from the Prefecture of Chania were 1.2 times more likely to prescribe generics (OR=1.2, CI= 1.025-1.429, p=0.03). The sector in which the physician worked also had a significant impact on attitude. Hospital physicians displayed 1.65 times higher probability to prescribe a generic compared to private sector physicians (OR=1.65, CI=1.028-3.046, p=0.04). The probability of prescribing generics increased for physicians working for less than 5 years and for those working for over 31 working years. Furthermore, statistically significant differences were observed amongst medical specialties. Orthopedics and pulmonologists had a higher probability of prescribing generics (OR=2.45, CI= 2.023-2.843, p=0.04 and OR=2.60, CI=1.034-4.164, p=0.01 respectively) when compared to other specialties.

Physicians that didn't prescribe generics attributed their decision primarily to their preference for originators. Those physicians also questioned the safety of generics and mentioned patients' preferences and their belief that the cost of generics did not differ significantly to the originator's as reasons for not prescribing generics.

Regardless of actual practice, 50.2% of respondents were in favor of an increase in generic prescribing (Table 2). This percentage was higher among physicians that prescribed generics (66.9%). In addition, respondents

were asked about the appropriate ways of increasing generic prescribing. The majority agreed on the need to provide better information to physicians', followed by reduction in the price of generics compared to originators. A lower patient co-payment and economic incentives to physicians were considered less important.

INN prescribing

32.1% of the sample responded in favor of INN prescribing, whereas the majority (67.9%) was against it. Respondents believed that (a) physicians should be solely responsible for selecting patient medication (by brand name) and (b) generics may not have the same effects as originator on individual patients.. Other reasons mentioned were differences in generic products' safety and risks related to chronic patient treatment compliance after generic substitution for price and availability.

Similarly to overall generic prescribing, certain demographic subgroups were significantly associated with higher probability of INN prescribing (**Table 3**). In particular, hospital physicians demonstrated greater probability for INN prescribing (OR=1.8; CI=0.034-2.836, $p<0.001$) compared to private sector physicians. Years in employment had a statistically significant impact on attitude ($p=0.005$), as the probability of INN prescribing increased with years in employment. Likewise, the medical specialty presented statistically significant results. Pulmonologists had a higher probability of INN prescribing (OR=2.5, CI=1.347-4.028, $p=0.04$), together with orthopedics (OR= 2.1; CI=1.730-4.28, $p=0.02$). Generic prescribing practices also affected physicians' attitudes towards INN prescribing ($p<0.001$); physicians who prescribed generics were 2.3 times more likely to support INN prescribing (CI= 1.843-3.934, $p<0.001$).

Discussion

The results of the present study confirm the hypothesis that generic prescribing has increased in Crete, during the last years. Furthermore, results suggest a potential increase in generic prescribing, under certain conditions. These conditions are related to the physicians' greatest concern which lies in the safety and effectiveness of generic drugs. Lack of generic drugs' control as well as physicians' insufficient/limited awareness regarding generics consist additional sources of concern. Physicians' comments regarding patients' opinion on generics were of high interest. They stated that most of the patients are not aware of the term "generics" and don't want to "risk" receiving such a prescription. All physicians agreed that this group of patients usually consists of elderly people living in villages of Crete (located mainly on the mountains).

Our results are comparable to those of the study conducted by Tsiantou et al (2009) which showed that Greek physicians have a positive view on generics but they prefer to prescribe the original products[8]. Similarly to our findings, the above research, suggest that physicians' opinion the efficacy, effectiveness and safety of generics are identified as determining factors of their prescribing decision.

Of course physicians take into account the patients' socioeconomic status when prescribing medication, something that –in the middle of a serious financial crisis- can lead to increased prescription of generic medicines. Low rates of generic medicines prescription may be attributed to lack of information during medical school years. This fact combined with the aggressive promotion of original medicines, makes clear why most physicians have a hard time prescribing generic medicines.

Physicians' prescribing behaviour can also be influenced by pharmaceutical companies through a variety of incentives such as high-end education programs or even some cash payment for prescriptions, as it seems form a similar research[11].

In addition the above results according to another research from Cyprus, it shames that the 51.2% of Greek physicians consider that generic drugs are sufficient. Respectively, 54.9% of them share the opinion that generics are safe and 52.4% find them effective. However, only 25.2% of doctors prescribe generics on a regular basis. Cyprian physicians are of more positive attitude towards generics. They considered generics to be sufficient, safe and effective at 60.1%, 67.8% and 62.1% respectively. With regards to the prescription of active substance, 37.6% of Greek physicians (and 39.3% of Cyprians) believe that this could be applied in the future. It is obvious that differences exist between the two countries. In particular, Greek physicians tend to be more cautious and skeptical towards generics with regards to safety and effectiveness. What is more, in both countries the control procedures are doubted[7].

Moreover, recent research carried out in the USA, confirmed the findings of the present study, stating that 50% of physicians question the safety of generic drugs[12]. Specifically, 25% of the physicians declared that they wouldn't use generics, either for their family members' or their own treatment[10,13]. Similarly, there are various studies regarding issues of insufficient generics' control and limited physicians' awareness[9,11,14,15].

A study in Denmark shares the same results, supporting also that the drugs' price strongly influences the physicians' prescribing decision[16]. Cheaper drugs that are covered by social insurance are preferred.

In accordance with our study, reported that general practitioners (GPs) are concerned about the quality of generics, although, they believe that their prescribing results in considerable savings in prescribing costs, and therefore are able to accept generic prescribing under certain conditions[17]. A study from Finland confirmed

the physicians' concerns regarding the quality of generic medicines, although virtually everyone agrees that healthcare systems should boost generic medicine prescription in order for the pharmaceutical expenditure to decrease[18]. Moreover, the cost of branded drugs compared to that of generics is highlighted by the studies of Simmenroth-Nayda (2006) and Zaoul (2011)[19,20].

An additional issue, arising from a Spanish study (2003), is the training and information about generics, their use and their prescription in relation to physicians' age (young physicians demonstrate a higher level of generic prescribing), area of specialization (specialists in family and community medicine prescribe more generics than GPs) and the number of visits (day-physicians with high popularity are more likely to be in favor of generics)[21].

On the other hand, contrary to our study Alqhasham (2009) and Chua (2010), report that the majority of physicians support generic substitution, but the increase of the information in new doctors and patients too in west societies seems to increase generics prescribing[22,23].

Limitations and strengths

The present study took place in the island of Crete, in Greece and focused on the local conditions, highlighting the doctor's perceptions towards generic prescribing. It was carefully designed and included a big number of doctors both in the private and public sector, although there was not equal representation by all medical specialties. The study used a questionnaire as a capturing tool, which was tested in a pilot study and was subsequently reconstructed based on the observed weaknesses. Furthermore, it assesses for the first time, the implementation of active substance prescribing in Greece. Nevertheless, there are two important limitations that could be addressed in a new study. First of all, the results should be treated with caution with regards to their generalizability and their transferability since the study was conducted in Crete. Secondly, the study focuses only on doctors' perceptions and practices, not taking into account the patients' opinion.

Policy implications and proposed measures

In Greece there is a widespread belief or prejudice that generic drugs are of low therapeutic value in comparison to original drugs. Generic penetration in Greece is one of the lowest among the European Union countries[24,25]. Hence, the government, because of the need to contain pharmaceutical expenditure in a time of financial crisis, recently created a legal framework aiming at the support and establishment of generics prescribing[26]. It is essential to apply effective national policies as well as provide incentives, in order to promote generic drugs. National policies should actively comprise of both economic and social measures including the reduction of pharmaceutical expenditure in public hospitals and social insurance funds, but also a reduction in patients' participation rates. Those measures should aim at the elimination of bureaucracy as well as at the boosting of the competitiveness of the pharmaceutical sector. Although several measures regarding generics have already been voted in the national legislation, we suggest a few additional measures based on the findings of this study.

Reduction of the price of generics to 60%-80% of original drugs is recommended, with simultaneous reduction in patients' participation rates. It is essential to implement investments and promote the generic pharmaceutical industry. Reliable and extensive controls on safety and effectiveness of generic drugs should be implemented by the National Organization of Medicines. It is also essential to conduct reliable bioequivalence studies and minimize the time required for the entrance of generics' in the market. Addressing the misleading propaganda against generic drugs should be managed through continuous provision of information to both physicians' and patients. The above could be achieved via informative workshops and educational seminars. Concluding, it is important to outline that this study was carried out almost two months before the enforcement of the new legislation (with a code number: *Law No 4052/12; Government Gazette 41 A/1-3-2012*) regarding active substance prescribing. Although, the new law is active since March of 2012, doctors and patients have not yet been appropriately informed[27].

Conclusion

Based on the literature and the results of the present study, the need to develop the appropriate regulatory framework for generic prescribing and an organized generic drug industry is obvious. Generic prescribing is still at an early stage, in Greece. Nevertheless, this fact provides the opportunity of establishing measures and policies in order to expand the generics market in Greece, in an effort to contain public pharmaceutical expenditure.

In order to increase the prescription of generic medicines, it is necessary to implement a strategy that could increase the physicians', the patients' and the companies' knowledge levels, something that could lead to better attitude regarding generic medicines. Such strategies should be combined with an appropriate legislative framework that could put limits and guidelines regarding medicine prescription.

Concluding, it is worth mentioning that the present study inserts a new parameter regarding the attitudes towards active substance prescribing in the general hospitals of the island of Crete. At the same time it offers an incentive for further research regarding patients' and pharmacists' attitude towards generic drugs.

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