

ORIGINAL RESEARCH

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General characteristics of top 100 selling drugs: Turkish pharmaceutical market between 2003 and 2016

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Abstract

There have been many developments that affected the Turkish pharmaceutical market following the Health Transformation Program (2003) and Social Security Reform (2006). The objective of this study was to investigate effects of the developments in Turkish drug market between 2003 and 2006 on the general properties of top selling drugs. Sales figures of all pharmaceuticals between 2003-2016 were obtained from IMS-Health Turkey database. The top 100 pharmaceuticals with the highest sales for each year were included in the study. Pharmaceuticals classified according to their general characteristics (locally manufactured/imported/locally manufactured and imported, brand name/generic, biotech or blood products, ATC groupings). There were 2.593 brands of pharmaceuticals in 2003 and 4.461 in 2016. During the 14 years, total sales of pharmaceutical came up to 21.052.440.931 TRY from 5.487.899.850 TRY. Total sales of the top 100 pharmaceuticals in 2003 approximately was 2.1 billion TRY, and exceeded 6.9 billion TRY in 2016. In this top selling group, dominance of imported and brand name drugs has increased over the years. The total value of biotechnological pharmaceuticals in the top 100 pharmaceutical group increased from 100 million TRY in 2003 to 2.5 billion TRY in 2016. Biotechnological pharmaceuticals are all brand name drugs and imported. Pharmaceuticals in this group have been dominated by antibiotics between 2003-2011, and by oncology drugs for the following years. The result of our study demonstrated the importance of creating new molecules for the long-term, and producing pharmaceuticals with higher value added and more advanced technology in Turkey.

Keywords: Health policy, biotechnological drugs, Turkish pharmaceutical market

Introduction

Pharmaceutical industry is rapidly growing every year. The size of global pharmaceutical industry has exceeded 1 trillion dollars in recent years. Global size of this industry is estimated to reach approximately 1.4 trillion dollars by 2019 [1]. In comparison, Turkey is among the first 20 countries in terms of the size of drug industry, and is one of the developing countries in the market [2]. According to data from the Information Medical Statistics-Health-Turkey (IMS-Health), size of the drug market in Turkey was 5.5 billion TRY in 2003, by increasing 3.8 fold it became 21 billion TRY in 2016 [3-5]. This figure does not include the profits of wholesalers and pharmacies.

With the Health Transformation Program which was launched in 2003 and Social Security Reform in 2006, many developments that affected the drug market and facilitated access to medication have been introduced. The most significant developments include the introduction of benchmark price in drug pricing in 2004

shifting to the Family Practice System in pilot areas in 2005, and nationwide in 2010, foundation of the Social Security Institution (SSI) and establishment of the Payment Commission within the body of SSI in 2007. Ceiling prices for each certificated / licenced drug, wholesaler acquisition price, wholesale price, pharmacy price, and retail price are all determined by the Turkish Medicines and Medical Devices Agency (TMMDA). The benchmark drug prices are determined by taking the cheapest wholesaler's acquisition price in France, Italy, Spain, Portugal, Greece and the countries where the drug is manufactured or imported as reference. When public sector prices of the drugs are determined, public enterprise discounts are taken in to account in the SSI reimbursement process based on the prices determined by TMMDA. With the change of the benchmark pricing system in 2009 and 2011, drug prices were dropped, and additional public enterprise discounts were realized.

Previous reports prepared by TMMDA have shown that top selling drugs are predominantly imported and brand name drugs. A significant increase in the dominance of biotechnological medicines within the top selling group has also been shown in recent years. These reports have indicated the necessity of increasing the current manufacturing capacity and encouraging the research and development (R&D) and production of high-tech drugs [3-5].

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The objective of this study was to investigate effects of the developments in Turkish pharmaceutical market between 2003 and 2016 on the general properties of top selling drugs in Turkey. By investigating the data from 2003 and the following years, we aimed to determine the current situation and make inferences for future projections.

Material and Methods

Total retail sales and sales to the hospital figures between 2003 and 2016 were obtained using IMS-Health Turkey database. All forms of the drugs were included in the calculations. The drugs were listed from the highest to the lowest in sales for each year. The top 100 selling drugs for each year were included in the study.

The drugs that are included in the study were classified according to the general properties (locally manufactured/imported/locally manufactured and imported; brand name/generic; biotechnological or blood products, the Anatomical Therapeutic Chemical (ATC) Classification System). Annual total sales for the above-mentioned subgroups were calculated. Whether the drugs would be classified as locally manufactured/imported/locally manufactured and imported; brand name/generic; biotechnological or blood products was evaluated according to the definitions specified in the TMMDA regulations. Locally manufactured or imported status of the drugs was checked from database of the agency for each year separately. When calculating the sales of the brands with both locally manufactured and imported forms, sales of the manufactured forms were added to the total sales of locally manufactured drugs, while sales of the important forms were added to the total sales of imported drugs.

Sales figures (in Turkish liras) of the drugs included in the study were obtained from database of the IMS-Health Turkey Retail&Hospital Combine National+Molecule. This database has

both the data for wholesales to pharmacies and to hospitals via tenders. Although the processes of supplying drugs via these two systems are different, the data sets of both groups were used in order to form an opinion about the entire Turkish drug market. However, data regarding the drugs that are imported via the Turkish Pharmacists' Association (TPA) were not included in the study. The calculations, tables, and charts were made in the Microsoft Excel .

The products that cannot be considered as drug derivatives at ATC-2 level in the V05, V06, and V07 groups (herbal tea, non-medical formula etc.), diagnostic tests in the T02 and T03 groups, and dialysis and irrigations solutions in K05 and K06 groups were excluded from the study.

Study Limitations

Since we aim to assess the entire market, the database used includes both pharmacy and hospital data. Processes of supplying drugs via these two systems are different. These data include drug sales from wholesalers to pharmacies and hospitals. The drugs imported via TPA are not within the scope of this study.

Results

Turkish drug market between 2003 and 2016

Total number of drug brands in the market has increased over the years. There was a total of 2,593 drugs in 2003, this figure reached to 4,461 in 2016 by an increase of 72.04%. Total drug sales have also increased over the years. While the total drug sales were 5,487,899,850 TRY in 2003, this amount reached to 21,052,440,931 TRY in 2016 by an increase of 2.8 folds. Drug sales showed a steady pattern with similar figures between 2009 and 2014. However, the sales showed a dramatic increase in 2015 and 2016 (Figure 1).

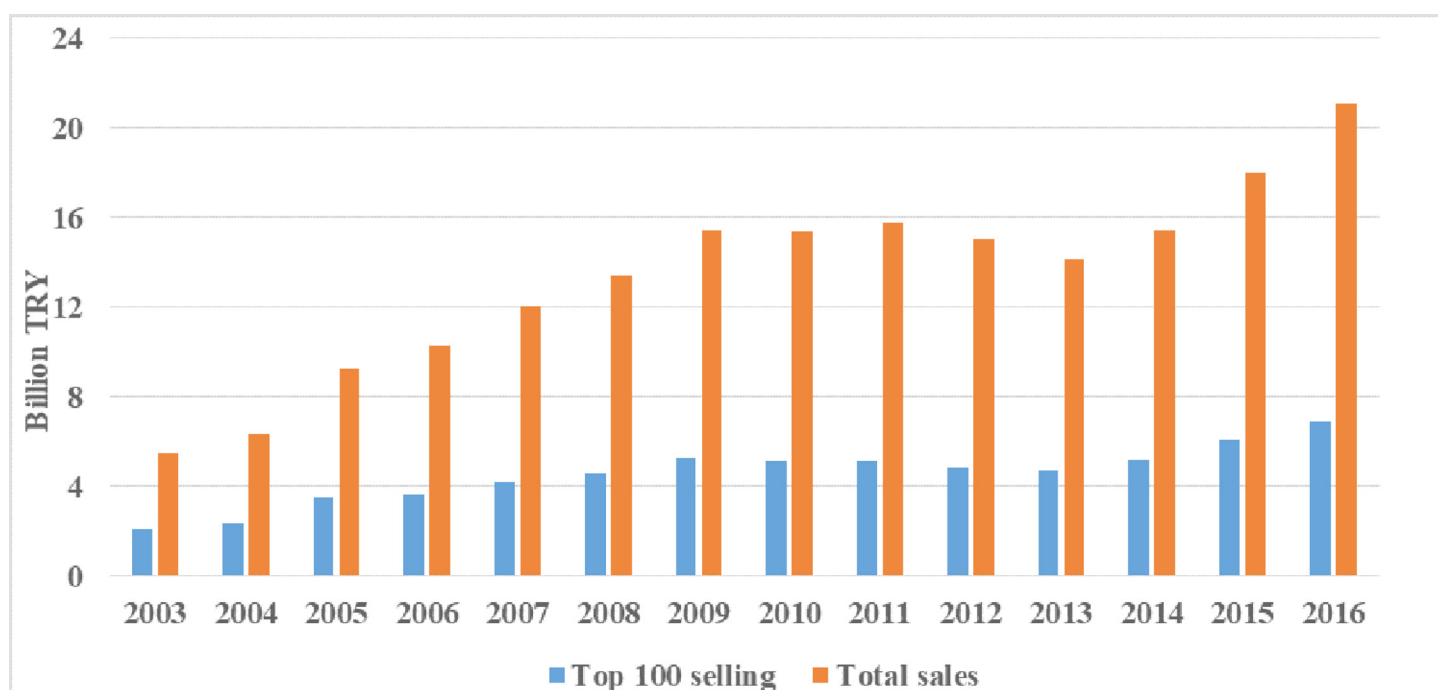


Figure 1. Turkish drug market between 2003 and 2016

General characteristics of the top 100 drugs

Distribution of the top 100 selling drugs according to their general characteristics are given in Table 1. As shown in the table, brand name drugs were dominant throughout the years, while the number of imported drugs increased over time and became dominant as of 2013. While there were 4 biotechnological drugs among the top

100 in 2003, the numbers of these medicines regularly increased over time, and reached to 27 in 2016. Although there were no blood products among the top 100 in 2003, there were 7 blood products in the list by 2016.

Table 2, shows the numbers of the top 100 drugs by their ATC group.

Table 1. Distribution of the top 100 selling drugs by their general characteristics on an annual base

Year	Locally Manufactured	Imported	Manufactured & Imported	Brand name	Generic	20 years and older drugs	Biotech	Blood Product
2003	57	30	13	65	35	43	4	0
2004	50	34	16	67	33	40	4	0
2005	43	41	16	67	33	35	8	0
2006	34	54	12	73	27	36	12	0
2007	29	62	9	77	23	22	15	1
2008	33	60	7	72	28	24	16	1
2009	35	60	5	73	27	28	17	1
2010	35	60	5	72	28	26	18	1
2011	35	60	5	69	31	34	14	2
2012	33	62	5	73	27	31	18	4
2013	19	75	6	87	13	24	22	8
2014	22	73	5	85	15	26	22	7
2015	21	75	4	85	15	23	26	6
2016	23	71	6	84	16	25	27	7

Table 2. Distribution of the top 100 drugs according to ATC groups on an annual base

Year	A	B	C	D	G	H	J	L	M	N	R	S	V
2003	9	4	16	0	3	2	30	3	11	15	6	0	1
2004	11	4	16	0	5	1	30	3	11	13	6	0	0
2005	9	5	16	0	5	0	31	6	10	12	7	0	0
2006	8	5	116	0	5	1	23	9	12	13	8	0	0
2007	9	55	17	0	5	1	19	12	8	14	10	0	0
2008	15	5	17	0	3	1	19	13	6	12	9	0	0
2009	13	5	17	0	2	2	19	13	7	10	10	1	1
2010	13	5	13	0	3	1	19	16	6	11	11	1	1
2011	12	4	10	1	5	1	21	13	10	10	11	1	1
2012	14	6	10	2	6	1	17	16	9	6	10	2	1
2013	13	10	10	1	4	2	14	16	5	12	10	2	1
2014	13	11	8	1	4	2	12	19	6	11	10	2	1
2015	14	12	6	2	5	2	11	21	6	10	7	3	1
2016	16	13	3	1	6	1	12	18	6	9	7	5	3

ATC I groups: Group A (Digestive System and Metabolism), Group B (Blood & Blood-Forming Organs), Group C (Cardiovascular System), Group D (Dermatologic Drugs), Group G (Genito Urinary System and Sex Hormones), Group H (Systemic Hormonal Preparations), Group J (Systemically Used Anti-infective), Group L (Antineoplastic and Immunomodulator Agents), Group M (Musculoskeletal System), Group N (Nervous System), Group R (Respiratory System), Group S (Sensory Organs), Group V (Drugs Used for Different Purposes).

Total sales of the top 100 drugs between 2003 and 2016 according to their general characteristics

Total sales for each category of the top 100 selling drugs by their general characteristics are shown in the tables (Figures 1-5).

Overall sales of the top 100 selling drugs was about 2.1 billion TRY in 2003, while this figure reached to 6.9 billion TRY in 2016. Market share of the top 100 drugs in Turkish drug market ranged between 30% and 39% during the 14 years studied.

While total sales of the locally manufactured drugs was about 1.3

billion TRY in 2003, it was approximately 1 billion TRY in 2016. This figure ranged over 1.5 billion TRY between 2008 and 2012 and fell down below 1 billion TRY from 2013 onwards. Sales of the imported drugs was about 770 million TRY in 2003, and it exceeded 5 billion TRY from 2015 onwards (Figure 2).

J01M drugs completely disappeared from the top selling list from 2012 onwards. Groups J01C (Beta-Lactam Antibiotics [Penicillin]) and J01D (Other Beta-Lactam Antibacterial) drugs had sustained their dominance at varying ranges during the studied years.

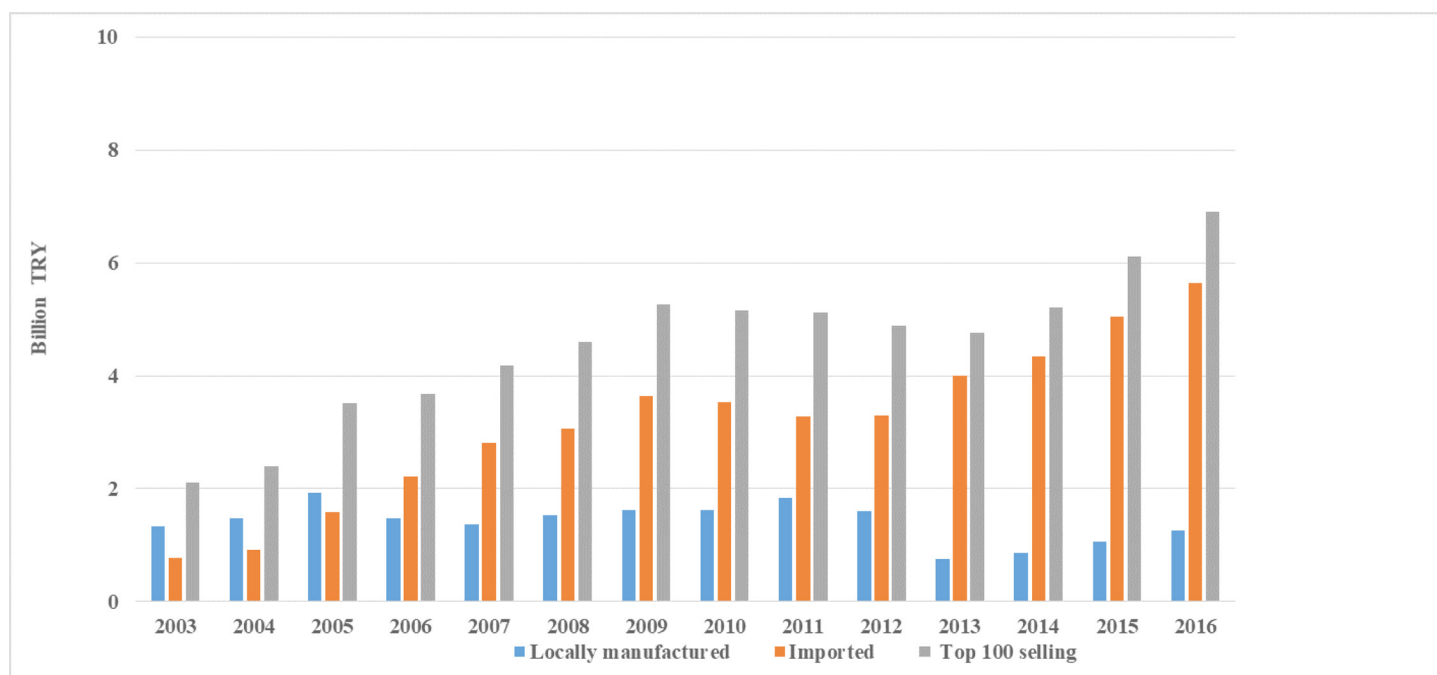


Figure 2. Total Sales of the Imported and Locally Manufactured Drugs which are in the Top 100 Selling Drugs List in Turkish Drug Market

Sales of the brand name drugs was about 1.5 billion TRY in 2003, while this figure approached to 6 billion TRY in 2016. This figure showed an increase each year until 2010, and ranged from 3.6 to 3.8 billion TRY between 2010 and 2012. It began to rise again in the last 4 years. Sales of the generic drugs in the top selling 100 drugs

was under 1 billion TRY in 2003, while it showed an increase until 2011 and exceeded 1.4 billion TRY. It decreased between 2012 and 2014 and fell down to 570 million TRY. Sales of the generic drugs increased in 2015 and 2016 compared to previous years and was 940 million TRY in 2016 (Figure 3).

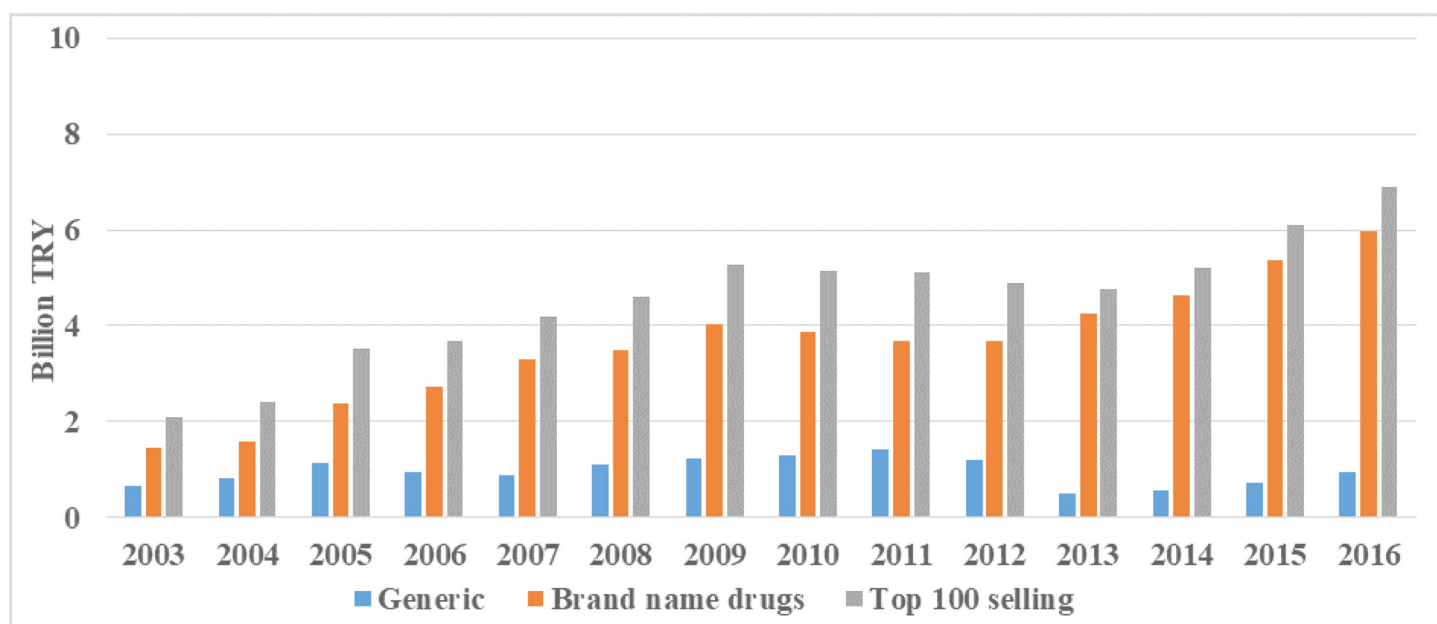


Figure 3. Total Sales of the Generic and Brand name drugs which are in the Top 100 Selling Drugs List in Turkish Drug Market

Sales of the biotechnological drugs in the top 100 drugs was under 100 million TRY in 2003, it exceeded 2.5 billion TRY in 2016. This figure regularly increased over years. The sales showed an exceptional decrease in 2011 compared to the previous year. Although there were no blood products among the top 100 selling drugs in 2003, sales of the seven blood products in this group exceeded 500 million TRY in 2016 (Figure 4).

Total sales of the top 100 selling drugs based on their ATC-I groups is seen in Figure 5. Group J (Antiinfectives for systemic use) drugs had the highest-sales between 2003 and 2011, while Group L (Antineoplastic and Immunomodulator Agents) drugs had showed an increase over the years and became one of the top selling drugsgroup from 2012 onwards. Sales of Group A (Digestive System and Metabolism) drugs regularly increased over the years

and exceeded 1 billion TRY as of 2015. J06B (Immunoglobulins) group drugs first appeared in the top selling list in 2010, and their sales showed an increase from 2010 onwards. Whereas sales of Group J01M (Quinolones) drugs decreased between 2007 and 2011, and J01M drugs completely disappeared from the top selling

list from 2012 onwards. Groups J01C (Beta-Lactam Antibiotics [Penicillin]) and J01D (Other Beta-Lactam Antibacterial) drugs had sustained their dominance at varying ranges during the studied years.

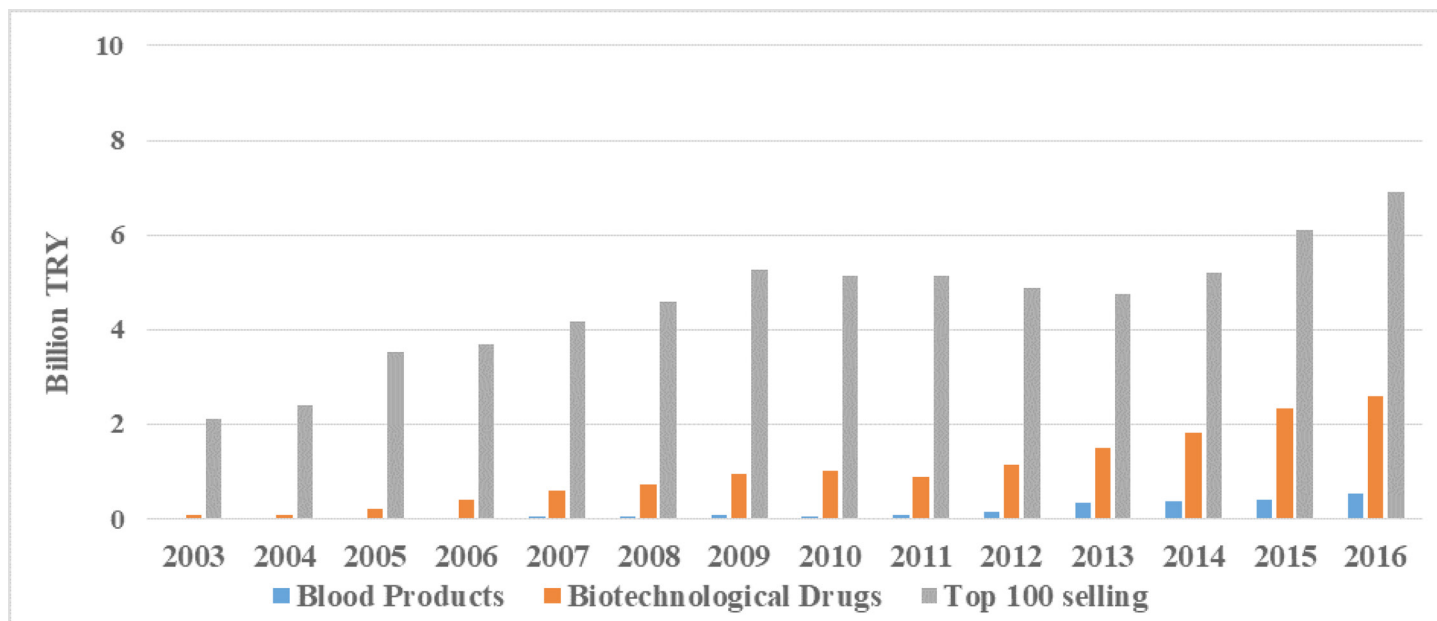


Figure 4. Total sales of the Blood Products and Biotechnological Drugs which are in the Top 100 Selling Drugs List in Turkish Drug Market

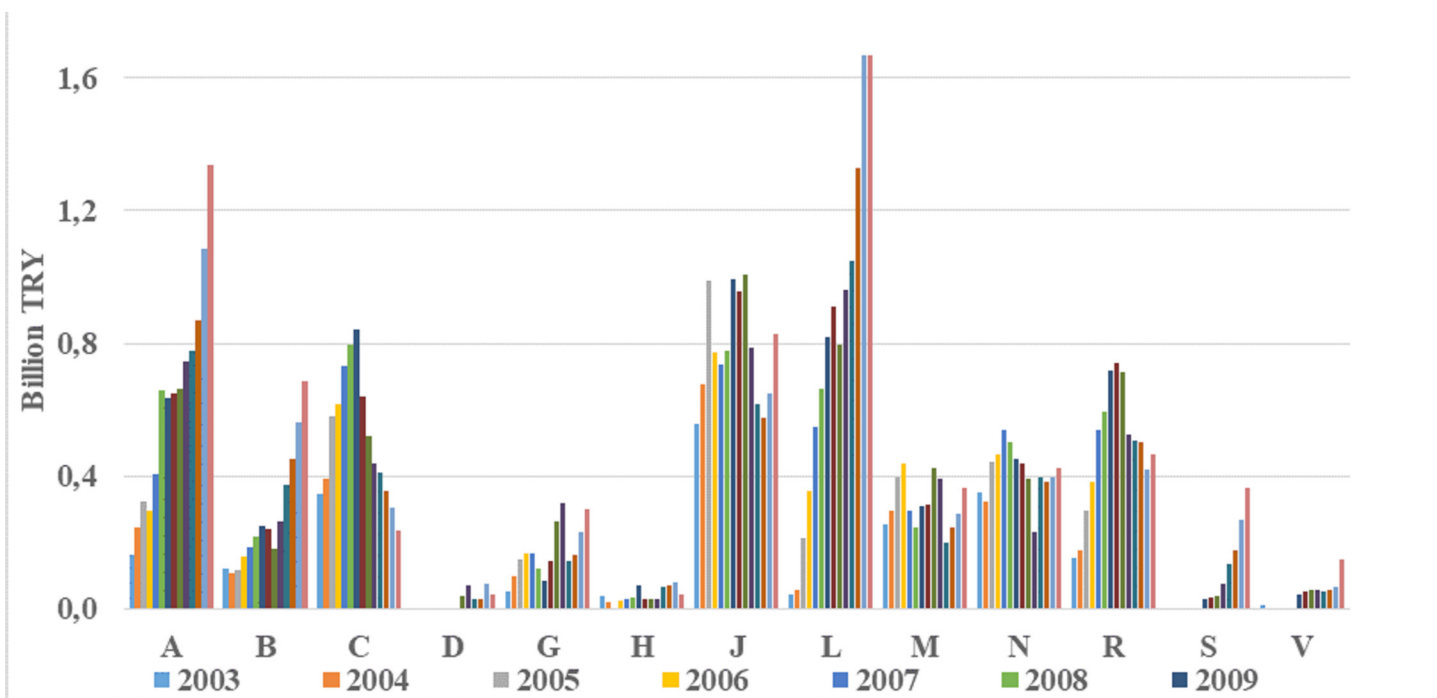


Figure 5. Distribution of the Top 100 selling drugs by Their ATC Groups

Discussion

Pharmaceutical industry is one of the largest in the world. Value of the global pharmaceutical market was 390.2 billion dollars in 2001, while it exceeded 1.057 trillion dollars from 2014 onwards. When we compare Turkish pharmaceutical industry to the global market, Turkey is one of the developing markets and ranked 17th

in 2014 in terms of the market size [1-2]. Total sales in Turkish pharmaceutical market has doubled from 2004 to 2010. This development was proportional to the global market [3-5]. Sales in Turkish pharmaceutical market was about 5.5 billion TRY in 2003, while it exceeded 21 billion TRY in 2016. There were about 2,500 drug brands in the market in 2003, while this figure approached to 4,500 in 2016. Total sales of the top selling 100 drugs subject to

this study was 2.1 billion TRY in 2003, and it exceeded 6.9 billion TRY in 2016. We found that market share of these 100 drugs ranged from 30% to 39% over years.

Studies investigating locally manufactured and imported drug markets have found that sales figures for both group are close, however the distribution in terms of volume (based on number of boxes sold) was in favour of imported drugs between 2008 and 2013. The difference between sales of the locally manufactured and imported drug has increased in favour of imported drugs starting from 2013. According to the IMS Health Turkey data, the sales (in TRY) of locally manufactured drugs was about 44% of total drug sales in 2016, however when we look at the volume based figures in number of boxes sold approximately 80% of the drugs sold were locally manufactured [3-6]. We can explain this with the low unit prices of the locally manufactured drugs.

“Structural Transformation in Health Industries Program” is one of the 25 programs designed within the scope of the 10th Development Plan. This program has intended to increase the domestic production capacity in the midterm. One of the program goals has been to meet 60% of the domestic drug needs with the domestic production in terms of total sales [7]. Considering the current status and the targets, there is a need to increase production capacity through investment in high-tech drugs, and providing production methods at global standards. In our study, we demonstrated that the predominance of imported drugs within the top selling drugs.

Biotechnological drugs take up a considerable portion of the drugs subject to this study. While 4 of the top 100 selling drugs were biotechnological drugs in 2003, this figure reached to 27 in 2016. All of these biotechnological drugs were imported, and made up almost 40% of the top selling 100 drugs in 2016. Biotechnological drug market is gradually growing all over the world. Global biotechnological drug market generated 290 billion dollars in sales in 2014, and its market share was about 23%. This amount is estimated to reach 445 billion dollars with a market share reaching up to 26% [8].

Spending on biotechnology and drug research are one of the top in the list of R&D expenditures worldwide with a share of 19.3%. As it is specified in previous reports published by TMMDA, R&D and promotion of an entrepreneurial ecosystem in our country are of paramount importance. Drug industry should increase its production capacity through investment in high-tech drugs. Policies for collaboration of government, university, and industry should be pertinaciously implemented in this field [3-5]. Biopharmaceutical research companies are engaged in development of many products and vaccination using biological processes. There is a wide spectrum of the products such as monoclonal antibodies, vaccinations, recombinant proteins, cell therapies, and gene therapies. Assessing by disease category, biotechnological products are more intensely used in cancer, infectious diseases, autoimmune diseases, and cardiovascular diseases. Evaluating by product category, monoclonal antibodies and vaccinations are at the top of the list followed by the production of hormones / proteins [9]. 13 of the drugs out of 27 biotechnological drugs that were among the top 100 selling drugs in 2016 were antineoplastic and immunomodulatory agents, 6 were recombinant insulin, and 2 were recombinant coagulation factor. TMMDA is in the process of

conducting a detailed study about the top selling biotechnological products, and the results of this study will be shared in the future publications. Similarly, share of the blood products among top selling drugs is increasing. While there was no blood product among the top 100 drugs in 2003, 8 blood products were in the list in 2013, 7 in 2014, 6 in 2015, and 7 in 2016. Total sales of these blood products reached to 533 million TRY in 2016 (share within the top 100 drugs were 7.7%) which was the highest amount in the studied period.

Market share of the generic drugs which is important for sustainability varies from country to country. It has been stated that the market share of prescription of generic drugs was 49% in 2000, while it reached to 86% in the USA in 2013 [10]. In a report published in 2009, prescription of generic drugs was stated as 52% in France, 71% in UAE, 24 in Japan, and 51% in Turkey [11]. In addition, in a study conducted in 10 different European countries, generic drugs have been shown to cause reduction in the prices of drugs in proportion to their dominance in the market. According to the results of this study, a more significant reduction in prices is shown in the countries with a higher generic drugs market share compared to the countries with the lower market share [12].

In our study, there is a dominance of brand name drugs in the top 100 selling drugs. Although there were about 70 brand name drugs in the top 100 selling drugs list between 2006 and 2012, there were 85 drugs in this group in 2014 and 2015, and 84 in 2016. Brand name drugs made up of about 75% of total sales of the top 100 selling drugs, this rate approached to 90% within the last 4 years.

Looking at the ATC groups of the studied drugs; we found that Group L which involves Antineoplastic and Immunomodulator Agents had showed an increases over the years and become dominant in the top selling group after 2012. Market share of these drugs is estimated to increase rapidly in the following years. In the previous years, Group J (Systemically Used Anti-infective) were the leading group, and they continue to maintain high sales within the last two years.

Evaluating the subgroups according to the ATC classification, there was a striking finding that Quinolones disappeared from the top selling list as of 2012. In particular, the decrease of sales of quinolones had occurred because of the limitations that have been brought with the Health Implementation Communiqué (HIC) and rational use of medicines. With HIC changes which was enforced at 10/03/2011, it is stipulated that oral forms of antibiotics that are in Group J01M and have the highest budgetary effect should be only used in outpatient pneumonia cases. If it is necessary to use J01M in other outpatients cases, result of the culture and Antimicrobial Sensitivity Tests which shows the susceptibility of microorganism has to be stated in the prescription. These data highlight once again the importance of promoting the rational use of medicines, development of new guidelines for diagnosis and treatment and use of the current guidelines.

Conclusion

In this study, we showed that sales in the overall Turkish drug market and total sales of the top 100 selling drugs has increased over the years. Particularly, market share of the brand name drugs and biotechnological drugs in the market has been increasing

gradually. We think that budgetary pressure due to drugs could be reduced by making rational use of medicines widespread and promoting the use of appropriate guidelines for diagnosis and treatment. This study once again demonstrated the importance of implementing plans for developing new drug molecules and producing higher value added and higher technology drugs in Turkey in the long run.

Competing interests

The authors declare that they have no competing interest.

Financial Disclosure

The financial support for this study was provided by the investigators themselves.

References

1. Reh, G., 2016 Global Life Sciences Outlook–Moving forward with cautious optimism. Report by the Deloitte Touche Tohmatsu Limited [https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/gx-lshc-2016-life-sciences-outlook.pdf], date of access : 08.08.2018
2. Rickwood S, Kleinrock M, Núñez-Gaviria M. Report by the IMS Institute for Healthcare Informatics, The Global Use of Medicines: Outlook Through 2017. [http://www.quotidianosanita.it/allegati/allegato1501906.pdf], Date of access: 08.08.2018
3. T.C. Sağlık Bakanlığı, Kamu Müdahalelerinin 2008-2013 Dönemindeki Değer Bazında İlk 100 İlaç Üzerine Etkilerinin Analizi, Sağlık Teknolojisi Değerlendirme Raporu-I. Türkiye İlaç ve Tıbbi Cihaz Kurumu, Ağustos, Ankara, 2014. [https://titck.gov.tr/Dosyalar/Ilaç/SaglikTeknolojileriDegerlendirme/STDRaporu1.pdf], date of access: 08.08.2018
4. T.C. Sağlık Bakanlığı, 2014 Yılında Değer Bazında En Yüksek Satış Tutarına Sahip İlk 100 İlacın Değerlendirilmesi Ve 2012-2013 Yılları İle Karşılaştırılması, Sağlık Teknolojisi Değerlendirme Raporu-II. Yayın No:1038, Ankara, Ağustos 2016. [https://titck.gov.tr/Dosyalar/Ilaç/SaglikTeknolojileriDegerlendirme/STDRaporu2.pdf], date of access: 15.08.2018
5. T.C. Sağlık Bakanlığı, Türkiye İlaç Pazarındaki Değer Bazında Yüksek Satışa Sahip İlaçların Farmakoekonomik Açısından Değerlendirilmesi: 2006-2015 Dönemi, Sağlık Teknolojisi Değerlendirme Raporu-IV, Yayın No:1058, Ankara, Aralık 2016. [https://titck.gov.tr/Dosyalar/Ilaç/SaglikTeknolojileriDegerlendirme/STDRaporu4.pdf], date of access: 15.08.2018
6. T.C. Sağlık Bakanlığı, Türkiye İlaç Pazarı Gözlem Raporu -1, Satış Hacmi ve Satış Değeri Açısından İlk 20 İlacın Pazardaki Durumu, Türkiye İlaç ve Tıbbi Cihaz Kurumu, 2014, Ankara. [https://www.titck.gov.tr/PortalAdmin/Uploads/UnitPageAttachment/XswrEocV.pdf], date of access: 15.08.2018
7. T.C Kalkınma Bakanlığı, 10. Kalkınma Planı, Ankara, 2013 [http://www.resmigazete.gov.tr/eskiler/2013/07/20130706M1-1-1.doc], date of access: 15.08.2018
8. Deloitte, Life Sciences and Health Care Industry Group Analysis of Industry Report: Group Biotechnology, IBISWorld, USA, 2015. [https://www2.deloitte.com/content/dam/Deloitte/es/Documents/sanidad/Deloitte_ES_Sanidad_Global-Life-Sciences-Outlook-2014.pdf] erişim tarihi: 15.08.2018
9. Vural EH. Overview of Bioeconomics in Turkey and in the World. Sağlık ve İnsan. 2013;17:16-7.
10. PhRMA, Pharmaceutical Research and Manufacturers of America, 2014 Biopharmaceutical Research Industry Profile, Washington, DC, 2015. [http://www.phrma.org/sites/default/files/pdf/2014_PhRMA_PROFILE.pdf], date of access: 15.08.2018
11. Sheppard, A. Generic Medicines: Essential contributors to the long-term health of society. Sector Sustainability Challenges In Europe- IMS Health, UK, 2014. [https://www.hup.hr/EasyEdit/UserFiles/Granske_udruga/HUP-UPL/IMS.pdf], date of access: 15.08.2018
12. Dylst P, Simoens S. Does the market share of generic medicines influence the price level? A European analysis. Pharmacoeconomics. 2011;29:875-82..