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Turkey's "Genuine" Contribution to Medicine in the Current Century: Major Recent Decline

ORIGINAL INVESTIGATION

Altan Onat

ABSTRACT

Objective: To identify publications from Turkey with highest "genuine" contributions to the field of medicine in the past 15 years and evaluate the performance trend.

Materials and Methods: Based on the data from Web of Science, publications originating from the institutions in Turkey that were received by June 2016 with ≥85 citations were identified, after excluding papers having more than a minor share by international authors.

Results: In total, 231 medicine-related papers were published, each receiving ≥85 citations. The articles were of a citation level of top global 8-10% papers. Five-sixths of the articles were published until 2006, wherein a mean of 32 papers were generated annually. Thereafter, the number of papers declined drastically since 2010, compared with the similar performance that was anticipated. It is estimated that only a global share of 1 per mille has been generated in Turkey. Internal medicine, led by cardiology, rheumatology, endocrinology, and neurosciences were better represented than the overall average. Health issues encountered more widely than those in other populations formed frequent topics of contribution. Medical faculties of Harran University, the ancient universities of three major cities, and the Military Medical Academy were front-runners. Only 36 medical faculties and 14 public and private hospitals served as sources.

Conclusion: The serious decline in Turkey's contribution to the field of medicine in the past 7-10 years is deeply concerning. The general atmosphere surrounding the scientific institutions raises minimal hope for rebuilding a milieu favorable to promote research in the near future.

Keywords: Contribution to medicine, history of medicine, medical research in Turkey

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Department of Cardiology, İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul, Turkey

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Correspondence
Altan Onat,
Department of Cardiology, İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul, Turkey
Phone: +90 212 351 6217
e.mail:
alt_onat@yahoo.com.tr

INTRODUCTION

Economic development and welfare are closely connected to health-the vital aspect of life. The promotion of health and prevention and management of disease depend on the development in medical knowledge. Therefore, closely tracking the contributions to the field of medicine is indispensible for any community or nation. The total number of publications, number of papers in exceptionally high-impact periodicals, or the total number of citations to an article has been used among others as indicators of scientific contributions. Citations are a proxy for improved impact in science (1). Given the high heterogeneity in the quality of a scientific paper and the factors associated with the overall number of citations received, it is generally considered that highly cited papers, designated by the Web of Knowledge as the top 1% of all articles in a field receiving the highest cites, reflect the contribution better (2). As a corollary, a criterion of 10% of papers with highest citations has been utilized in the Leiden ranking of world universities (3).

The proportion of publications with international collaboration, notably clinical trials, meta-analyzes, guidelines, or scientific statements that receive high number of citations is on a rise. Participating individually with a minor role in such papers distorts the overall picture of citations attributable to an institution or country. This issue was investigated recently for Turkey, Of the 394 articles or reviews receiving top citations within a decade, the papers designated as "genuine" formed only 30% and attained slightly less than one-quarter of the citations, while the overwhelming proportion of the impact belonged to the internationally "collaborative" papers (4).

Research attaining citations above a relatively high threshold generated in the institutions of a country, particularly for those not among leading positions in science, is the most appropriate to evaluate with regard to progress in medical science (5). For such a task, threshold in the number of "genuine"

publications needs to be selected to yield in the order of 200 papers. To both encompass such a number and to allow comparison with a 3-year prior evaluation, a cut of 85 citations is now selected for inclusion of a paper (6). The present article aims to investigate the contribution to the field of medicine of scientific research conducted in Turkey in the first 15 years of the current century. The annual output of such papers, distribution across medical institutions and fields, and scientists were evaluated herein, and the individual publication references are provided.

MATERIALS and METHODS

Citation data were retrieved from Thomson Reuters Web of Science Core Collection, using "Turkey" as the address. Meeting proceedings and the recently introduced "Emerging Journals" were included for deriving citations. A total of 358,931 publications in the field of science and technology since the beginning of 2001 were identified. Of which, when sorted to those receiving citations, 2602 articles (0.72%) had acquired ≥85 cites. Papers related to fields other than medicine were excluded after individual screening. Further, those articles that met the criterion of not having more than a minor international share, specifically indicated by having the first three authors affiliated to a Turkish university or hospital, were sorted.

In papers coauthored from multiple institutions, the first author and his/her institution were credited and listed. For authors who produced highly cited papers in two different institutions, citations received were assigned to the two institutions. The term "highly cited" used herein does not overlap with and is of a lower quality than the designation used by Web of Science.

The data reported from Web of Science in the current study pertain to those available by mid-June 2016. These Web of Science data are known to exclude intrinsically eligible citations to references incorrectly or inadequately provided and to periodicals not covered by Web of Science. These excluded citations may be estimated to form a share of approximately 5% of the Web of Science citations.

RESULTS

In total, 231 medical papers that received ≥85 citations and produced in the institutions of Turkey since 2001 were identified. The aggregate number of citations received was 31.300. The source information to these articles is presented in Table 1.

Overall comparison with the previous evaluation

Based on the previous work, 121 papers with a publication date (median end 1996) prior to 2001 were excluded. In addition, 148 of 150 papers published since 2001 were included in the present assessment. These articles increased the rate of received citations by a mean 39%, which corresponds to a mean annual increase of 11%. Eighty-one papers meeting the present criteria were included in our list.

The 231 included articles herein had a median (interquartile range) publication date of August 2004 (August 2002; July 2006), representing 9.9-13.8 years of exposure until the index date.

Major fields in medicine

Table 2 lists the publications and citations categorized into the medical fields. The share of cites was 43% for internal medicine and 18% for neurosciences; these are considered to represent above-average performance when compared with the mean share. Surgery and basic sciences attained near-average shares, each of 20%. With a production of eight papers alone, pediatrics displayed a clear below-average performance.

Among internal medical sciences, cardiology, rheumatology, and endocrine and metabolism with 16-12 papers, infectious diseases and gastroenterology with eight and seven papers, respectively, ranked in the forefront. Neurology and psychiatry (each with 19 articles) were remarkably successful. Biochemistry led basic sciences with 17 papers, receiving a notable 3965 citations. Urology displayed best performance among surgical sciences.

Sources were restricted to 51 institutions

Only 36 medical faculties, Gülhane Military Academy (GATA), and 14 public and private hospitals generated the herein papers studied (Table 3). Harran University is specifically acknowledged, considering the high quality biochemical research of Özcan Erel. Closely following were the medical faculties of the universities of Hacettepe, Istanbul (Cerrahpaşa and Istanbul faculties), Ankara, and GATA, with 13-24 publications. Runners-up were the Erciyes, Ege, and Inönü Universities' medical faculties and Ankara Nümune Hospital. Researchers working in hospitals outside the medical faculties had a respectable share of 9% of total citations.

DISCUSSION

Compared to our previous report, the present evaluation discloses major differences regarding three aspects (5). Nearly one-half of the published papers dating from prior to 2001 were excluded; the current threshold was higher than the previous by 13 points. Eighty papers have been successfully included in the recent list, and 150 papers previously included have managed to increase their citations by 30% in barely over 3 years. A total of 231 papers originating from Turkey and one-half of them published since mid-2004 have each successfully received 85-748 (median 112) cites. Data of Essential Science Indicators show that in the 15-year period included in this study, 3.20 million papers were published in clinical medicine. Of these nearly 288,000 papers were estimated to be in the citation bracket of the herein studied articles. Therefore, Turkey's contribution to global medicine in this period is an estimated 0.8 per mille. Both such a low performance and a declining trend are seriously unsatisfactory using any measure.

Moreover, data of Essential Science Indicators show that the total citations in clinical medicine have increased by

Table 1. Data on authors, medical fields, and references for 231 publications with ≥85 "genuine" citations contributing to medicine since 2001 (31.300 cites by mid-June 2016)

Number of cites	Authors	Field	Area	Journal	Year and reference
748	Erel Ö	Biochem.	Antioxid. capacity	Clin Biochem	2005; 38: 1103-11
682	Erel Ö	Biochem.	Antioxid. capacity	Clin Biochem	2004; 37: 277-85
631	Erel Ö	Biochem.	Antioxid. capacity	Clin Biochem	2004; 37: 112-9
390	Ergönül Ö	Infections	C-C hemorrhagic fever	Lancet Inf Dis	2006; 6: 203-14
383	Keskin M, Kurtoğlu S, Kendirci M_&	Pediatrics	Insulin resistance	Pediatrics	2005; 115: E500-3
344	Bilici M, Efe H, Köroğlu MA &	Psychiatry	Depression	J Affect Disord	2001; 64: 43-51
328	Emre M	Neurology	Dementia	Lancet Neurol	2003; 2: 229-37 R
300	Tunca M, Akar S, Onen F &	Intern med.	Fam. Medit. fever	Medicine	2005; 84: 1-11
297	Kural-Seyahi E, Fresko İ, Seyahi N &	Rheumat.	Behçet's dis. mortality	Medicine	2003; 82: 60-76
257	Öğüş AC, Yoldaş B, Özdemir T&	Pneumol.	Gene in tuberculosis	Eur Respirat J	2004; 23: 219-23
250	Özben T	Biochem.	Oxidative stress	J Pharmaceut Sci	2007; 96: 2181-96 R
247	Coşkun Ö, Kanter M, Korkmaz A&	Infections	Antioxid. quercetin	Pharmacol Res	2005: 51: 117-123
237	Ateş K, Nergizoğlu G, Keven K&	Nephrol.	Peritoneal dialysis	Kidney Int	2001; 60: 767-76
236	Arıcan Ö, Aral M, Şaşmaz S &	Dermatol	Psoriasis: TNF-α	Mediators Inflamm	2005;14: 273-9
228	Altınbaş M, Coşkun HI, Er O &	Oncology	Low-mol-wt heparin	J Thromb Haemost	2004; 2: 1266-71
223	Satman İ, Yılmaz T, Şengül A &	Metabol.	Diabetes epidemiology	Diabetes Care	2002; 25: 1551-6
218	Onat A, Ceyhan K, Başar Ö &	Cardiology	Metabolic syndrome	Atherosclerosis	2002; 165: 285-92
206	Can A & Karahüseyinoğlu S	Hist & Biol	Chord stem cell	Stem Cells	2007; 25: 2886-95 R
199	Gönül AS, Akdeniz F, Taneli F&	Psychiatry	Depressive patient	Eur Arch Psyc Cl Nsci	2005; 255: 381-6
191	Kalay N, Başar E, Özdoğru İ &	Cardiology	Cm'pathy: carvedilol	J Am Coll Cardiol	2006; 48: 2258-62
190	Tuğlu C, Kara SH, Çalıyurt O &	Psychiatry	Depression: TNF-α	Psychopharmacol	2003;170: 429-33
190	Ökten A, Kalyoncu M, Yarış N	Pediatrics	Adrenal hyperplasia	Early Hum Develop	2002; 70: 47-50
188	Kanpolat Y, Savaş A. Bakar A &	Neurosurg	N. trigeminus rhizotomy	Neurosurg	2001; 48: 524- PP
186	Tuğal-Tutkun İ,Önal S, A-Yaycıoğ M&	Rheumat.	Behçet's uveitis	Am J Ophthalmol	2004; 138: 373-80
184	Onat A	Cardiology	Cardiovasc.disease	Atherosclerosis	2001; 156: 1-10 R

Table 1. Data on authors, medical fields, and references for 231 publications with ≥85 "genuine" citations contributing to medicine since 2001 (31.300 cites by mid-June 2016) (Continued)

182	Özcan ME, Güleç M, Özerol E &	Psychiatry	Oxidative stress	Int Clin Psychopharm	2004; 19: 89-95
181	Direskeneli H	Rheumat.	Behçet's disease	Ann Rheumat Dis	2001; 60: 996-1002
178	Akyol Ö, Herken H, Uz E &	Biochem.	Schizophrenia	Prog Neurops'phar	2002; 26: 995-1005 R
176	Şentürk M, Özcan PE, Talu GK&	Anesthes	Analgjesia techniques	Anesthesiol	2002; 94: 11-5
172	Uygun A, Kadayıfçı A, Işık AT &	Gastroent.	Fatty liver, metformin	Alim Pharma Ther	2004; 19: 537-44
169	Tarçın Ö, Yavuz DG, Özben B	Metabol	Endothel funct. Vit D	J Clin Endocrin Metab	2009; 94: 4023-30
169	Tahaoğlu K, Torun T, Sevim T &	Thor. surg.	Resistant tbc.	N Engl J Med	2001; 345: 170-4
168	Kasapoğlu M, Özben T	Biochem.	Free radical theory	Exp Gerontol	2001; 36: 209-20 PP
168	Göker H, Haznedaroğlu IC, ErçetinS &	Hematol	Ankaferd & hemostasis	J Int Mrd Res	2008; 36: 163-70
168	Everekliogluc C	Ophthalm.	Behçet's dis. management	Survey Ophthalmol	2005; 50: 297-350 R
167	Kuloğlu M, Üstündağ B, Atmaca M &	Biochem.	Schizophren. & oxidation	Cell Bioche Funct	2002; 20: 171-5
165	Tarkun İ, Arslan BC, CantürkZ &	Endocrin	Polycyst.ovar. syndr.	J Clin Endocr Met	2004; 89: 5592-6
164	Ergenoğlu T, Demiralp T, Bayraktaro Z&	Neurology	Visual detection	Cognit Brain Res	2004; 20: 376-83
163	Kanbay M, Özkara A, Selçoki Y &	Nephrol.	Hyperuricemia treatment	Int Urol Nephrol	2007; 39: 1227-33
162	Çimen M, Burak Y	Biochem.	Free radicals	Clin Chim Acta	2008; 390: 1-11
160	Malas MA, Doğan Ş, Evcil EH&	Anatomy	Fetus: hand developm.	Early Hum Develop	2006; 82: 469-75
160	Ersöz G, Tekesin O, Özütemiz AO &	Gastroent.	Biliary tract stone	Gastroint Endosc	2003; 57: 156-9
159	Tefekli A, Karadağ MA,	Urology	Nephrolithotomy	Eur Urol	2008; 53: 184-90
159	Yemişçi M, Gürsoy-Özdemir Y, Vural A&	Neurology	Oxidat. stress-reflow	Nature Med	2009; 15: 1031-U82
158	Yılmaz E, Özen S, Balcı B, &	Med. biol.	FMF genetics	Eur J Hum Genet	2001; 9: 553-5
157	Herken H, Uz E, Ozyurt H &	Psychiatry	Schizophrenia	Mol Psychiat	2001: 6: 66-73
155	Göktaş S, Yılmaz Mİ, ÇağlarK&	Urology	Adiponectin in cancer	Urology	2005; 65: 1168-72
154	İnal ME, Kanbak G, Sunal S	Geriatrics	OxsOxidation in elderly	Clin Chim Acta	2001; 305: 75-80
153	Nazıroğlu M	Biophysics	TRPM2 channel activat.	Neurochem Res	2007; 32: 1990-2001
151	Sennaroğlu L, Saatçi İ	Ear-Nose-T	Cochlea malformation	Laryngoscope	2002; 112: 2230-41

Table 1. Data on authors, medical fields, and references for 231 publications with ≥85 "genuine" citations contributing to medicine since 2001 (31.300 cites by mid-June 2016) (Continued)

150	Önen F	Intern med.	Fam. Medit. fever	Rheumatol Int	2006; 26: 489-96 R
149	Tuğal-Tutkun I, Mudun A, Urgancıoğ M&	Rheumat.	Behçet's uveitis	Arthr Rheumatism	2005; 52: 2478-84
147	Karahüseyinoğ S, Çınar Ö, Kılıç E &	Hist & Biol	Chord stem cell	Stem Cells	2007; 25: 319-31
147	Melikoğlu M, Fresko İ, Mat C &	Rheumat.	Behçet: etanecerpt	J Rheumatol	2005; 32: 98-105
147	Onat A, Şurdum-AvcıG, Barlan MM&	Cardiology	Visceral adiposity	Int J Obes	2004; 28: 1018-25
145	Zoroğlu SS, Tüzün U, Sar V &	Psychiatry	Suicidal attempt: students	Psych Clin Neurosci	2003; 57: 119-26
145	Aydın A, Orhan H, Sayal A &	Pharma-Tox.	Diabetes & oxidation	Clin Biochem	2001; 34: 65-70
143	Ertekin C, Aydoğdu İ	Neurology	Swallowing: physiology	Clin Neyrophysiol	2003; 114: 2226-44
142	Gürsoy-Özdemir Y, Can A, Dalkara T	Neurology	Focal cerebral ischemia	Stroke	2004; 35: 1449-53
142	Eren M, Görgülü Ş, Uslu N &	Cardiology	Aort stiffn.; LV diast funct	Heart	2004; 90: 37-43
142	Yurdakul S, Mat C, Tüzün Y &	Rheumat.	Behçet: colchicine	Arthr Rheumatism	2001; 44: 2886-92
141	Harma M, Harma M, Erel Ö	Gynecol	Ox-stress & hydatif. mole	Swiss Med Weekly	2003; 133: 41-2
140	Gürsoy S, Erdal E, Herken H &	Rheumat.	Fibromialgia syndrome	Rheumatol Int	2003; 23: 104-7
139	Çoban E, Özdoğan M, Yazıcıoğlu G&	Intern med.	Obesity & platelets	Int J Clin Pract	2005; 59: 981-2
139	Bulakbaşı N, Kocaoğlu M, Örs F&	Radiology	Proton MR spectroscopy	Am J Neuroradiol	2003;24: 225-33
138	Siva A, Kantarcı OH, Saip S &	Neurology	Behçet nörol.musabiyet	J Neurol	2001; 248: 95-103
137	Herken H, Gürel A, Selek S &	Psychiatry	Depression-antidepr.drugs	Arch Med Res	2007; 38: 247-52
137	Bora E, Vahip S, Gönül AS &	Psychiatry	Mental defects	Acta Psych Scand	2005; 112: 110-6
135	Ilhan A, Gürel A, Armutçu F &	Neurology	Oxidative stress	Clin Chim Acta	2004; 340: 153-62
133	Aksoy S, Harputluo H, Kılıçkap S&	Oncology	Lymphoma	Leukem Lymphoma	2007; 48: 1307-12
132	Everekliogl C, Er H, Türköz Y&	Ophthalm.	Behçet's disease	Mediators Inflamm	2002;11: 87-93
132	Gul A	Rheumat.	Behçet's disease	Clin Exp Rheumat	2001; 19: S6-S12 R
132	Saatçi I, Çekirge HS, Öztürk MA&	Radiology	Carotid art aneurysm	Am J Neuroradiol	2004; 25: 1742-9
132	Günal Aİ, Duman S, Özkahya M &	Nephrol.	Peritoneal dialysis	Am J Kidney Dis	2001; 37: 588-93
131	Azizlerli G, Köse AA, Sarıca R &	Dermatol	Behçet d. prevalence	Int J Dermatol	2003; 42: 803-6

Table 1. Data on authors, medical fields, and references for 231 publications with ≥85 "genuine" citations contributing to medicine since 2001 (31.300 cites by mid-June 2016) (Continued)

131	Özata M, Mergen M, Öktenli C &	Metabol	Obesity & oxid. stress	Clin Biochem	2002; 35: 627-31
131	Alpsoy E, Durusoy C, Yılmaz E &	Dermatol	Behçet: interferon-α	Arch Dermatol	2002; 138: 457-71
129	Güler N, Kırerleri E, Öneş Ü &	Allergy	Leptin and asthma	J Allerg Cl Immunol	2004; 114: 254-9
129	Fenkçi V, Fenkçi S, Yılmazer M&	Gynecol.	Polyc.ovar s. CV risk	Fertil Steril	2003; 80: 123-7
129	Demircan N, Safran BG, Soylu M&	Ophthalm.	Diabetic retinopathy	Eye	2006; 20: 1366-9
128	Nazıroğlu M	Biophysics	Role of selenium.epilepsy	Neurochem Res	2009; 34: 2181-94
128	Yıldız BO, Yaralı H, Oğuz H &	Metabol.	Polycyst.ovar. syndr.	J Clin Endocr Metab	2003; 88: 2031-6
128	Tursen U, Gürler A, Boyvat A	Dermatol.	Sex; Behçet's disease	Int J Dermatol	2003; 42: 346-51
128	Fıçıcıoğ C, Kutlu T, Bağlam E&	Gynecol.	Ovarian reserve	Fertil Steril	2006; 85: 592-6
127	Yılmaz Mİ, Sağlam M, Çağlar K&	Nephrol.	Oxid. stress & ADMA	Am J Kidney Dis	2006; 47: 42-50
126	Söğüt S, Zoroğlu SS, Özyurt H &	Biochem.	Autism pathophysiol.	Clin Chim Acta	2003; 331: 111-7
125	Taysi S, Polat F, Gül M &	Rheumat.	Rheum. arthritis antioxid.	Rheumatol Int	2002; 21: 200-4
125	Bora E, Eryavuz A, Kayahan B &	Psychiatry	Schizophrenia: social	Psych Res	2006; 145: 95-103
125	Tanrıverdi F,Şenyürek H, Ünlühizarcı K&	Endocrin	Hypopituitarism	J Clin Endocr Metab	2006; 91: 2105-11
125	Tuzcu M, Baydaş G (Fırat)	Physiology	Melatonin - memory	Eur J Pharmacol	2006; 537: 106-10
125	Doğru T, Sönmez A, Taşçı İ &	Metabol	Prediabetes: visfatin	Diabet Res Clin Pr	2007; 76: 24-9
125	Sabuncu T, Vural H, Harma M &	Biochem.	Polyc.ovar s. CV risk	Clin Biochem	2001; 34: 407-13
124	Öner AF, Bay A, Arslan Ş &	Pediatrics	Asian flu	N Engl J Med	2006; 355: 2179-85
124	Vardar-Ünlü G, Candan F, Sökmen A &	Microbiol	Antimicrobial activity	J Agr Food Chem	2003; 51: 63-7
123	Ateş O, Hakgüder G, Olguner M&	Ped. surg	Laparo. appendecto.	J Ped Surg	2007; 42: 1071-4
123	Onat A, Uyarel H, Hergenç G &	Cardiology	MetS: uric acid	Am J Hypertens	2006; 19: 1055-62
122	Doğu O, Sevim S, Çamdeviren H&	Neurology	Essential tremor	Neurology	2003; 61: 1804-6
121	Yazıcı H, Fresko I, Yurdakul S &	Rheumat.	Behçet's disease	Nature Cl Pr Rheum	2007; 3: 148-55
121	Saatçi I, Yavuz K, Özer C& HT	Radiology	Emboliz.-cranial aneurysm	Am J Neuroradiol	2009; 33: 1436-46

Table 1. Data on authors, medical fields, and references for 231 publications with ≥85 "genuine" citations contributing to medicine since 2001 (31.300 cites by mid-June 2016) (Continued)

120	Polat P, Kantarcı M, Alper F& (Ata)	Radiology	Hydatid cyst	Radiographics	2003; 23: 475-94
120	Kösecik M, Erel Ö, Sevinç E &	Ped. card.	Passive smoking	Int J Cardiol	2005; 100: 61-4
120	Sungur M, Güven M	Intern med.	Insekticide poisoning	Critical Care	2001; 5: 211-5
119	Erermiş S, Çetin N, Tamar M &	Psychiatry	Obesity & psyche	Pediatr Int	2004; 46: 296-301
119	Sezgin AT, Sığırcı A, Barutçu İ &	Cardiology	Slow coronary flow	Coron Art Dis	2003; 14: 155-61
119	Kıyıcı M, Gülten M, Gürel S &	Gastroent	Nonalcoh. steatohepatitis	Canad J Gastroent	2003; 17: 713-8
118	Irmak MK, Fadıloğlu E, Güleç M &	Biochem.	Cell. tel. & oxidation	Cell Biochem Funct	2002; 20: 279-83
117	Alanay A, Acaroğlu E, Yazıcı M &	Orthopedics	Thoracolumb. fractures	Spine	2001; 26: 213-7
117	İşeri PK, Altınas O, Tokay T &	Neurology	Alzheimer dis.-retina	J Neuroophthalmol	2006; 26: 18-24
117	Ergönül O, Çelikbaş A, Dokuzgöz B&	Infections	Crimean-Congo fever	Clin Infectious Dis	2004; 39: 284-7
116	Yilmaz E, Batislam E, Başar MM	Urology	Ureteral calculus	J Urol	2005: 173: 2010-2
116	Koçak M, Çalışkan E, Şimşir C &	Gynecol.	PcOvS: metformin	Fertil Steril	2002: 77: 101-6
115	Çayan S, Akbay E, Bozlu M &	Urology	Sexual dysfunction	Urol Internat	2004; 72: 52-7
114	Ünal-Çevik İ, Kılınç M, Can A &	Neurology	Cerebral ischemia	Stroke	2004; 35: 2189-94
112	Atmaca M, Kuloğlu M, Tezcan E &	Psychiatry	Drug, leptin, trigyceride	J Clin Psychiat	2003; 64: 598-604
112	Timurkaynak F,Can F, Azap OK&	Microbiol	Antimicrobial-resist.strains	Int J Antimicrob Agents	2006; 27: 224-8
112	Akman MA, Erden HF, Tosun SB &	Gynecol.	Ovarian stimulation	Hum Reproduct	2001; 16: 858-70
112	Gültekin F, Delibaş N, Yaşar S&	Biochem.	Eritrosit oxid. damage	Arch Toxicol	2001; 75: 88-96
112	Gök H, Ergin S, Yavuzer G	Phys. Med	Knee arthrosis	Acta Orthop Scand	2002; 73: 647-52
111	Kısacık B, Tufan A, Kalyoncu U&	Rheumato	Mean platelet vol. RA	Joint Bone Spine	2008; 75: 291-4
111	Hekimsoy Z, Payzın B, Örnek T &	Endocrin	Mean platelet vol. Diabet.	J Diabet Complic.	2004; 18: 173-6
111	Özaslan C, Kuru B	Gen surg.	Breast Ca lymphedema	Am J Surg	2004; 187: 69-72
110	Yaralı H, Yıldırır A, Aybar F &	Gynecol	CV risk in polycyst. OS	Ferti Steril	2001; 76: 511-6
110	Kumral A, Özer E, Yılmaz O &	Pediatrics	Erythropoietin in rats	Biol Neonate	2003; 83: 224-8

Table 1. Data on authors, medical fields, and references for 231 publications with ≥85 "genuine" citations contributing to medicine since 2001 (31.300 cites by mid-June 2016) (Continued)

109	Müftüoğlu M, Elibol B, Dalmızrak O &	Biochem.	Parkin mutasyonu	Movement Disord	2004; 19: 544-8
109	Çelik T, İyisoy A, KursaklıoğH&	Cardiology	Nebivolol & metoprolol	J Hypertens	2006; 24: 591-6
109	Arslan H, Azap GK, Ergönül O&	Infection	Ciprofloxacin resistance	J Antimicr Chemother	2006; 56: 914-8
109	Turan A, Karamanlıoğ B, Memiş D&	Anesthes	Gabapentin: effect	Anesthesiol	2004; 100: 935-8
109	Şar V, Akyüz G, Kundakçı T &	Psychiatry	Conversion disease	Am J Psychiat	2004; 161: 2271-6
108	Büyükokuroğ M, Gülçin İ, Oktay M &	Pharmaco	Antioxid. Dantrolene Na	Pharmacol Res	2001; 44: 491-4
108	Sevim S, Doğu O, Çamdeviren H &	Neurology	Unusual RLS	Neurology	2003; 61: 1562-9
108	Yılmaz GR, Buzgan T, Irmak H &	Infection	Crimean-Congo fever	Int J Infect Dis	2008; 13: 380-6
108	Aktaş E, Küçüksezer UC, Bilgiç S 6	Immunol	CD107a- cytotoxia	Cell Immunol	2009; 254: 149-54
108	Kumral A, Uysal N, Tuğyan K&	Neurology	Brain ischemia	Behav Brain Res	2004; 153: 77-86
107	Tamer L, Çalıkoğlu M, Ateş NA&	Biochem	Genetics in asthma	Respirology	2004; 9: 493-8
107	Ateş Ö, Çaylı S, Altınöz E &	Neurosurg	Resveratrol- brain injury	Mol Cell Biochem	2007; 294: 137-44
107	Yeşilova Z, Zaman H, Öktenli C &	Gastroent	Oxidat. Fatty liver diseas	Am J Gastroent	2005; 100: 850-5
106	Yılmaz Y, Dolar E, Ulukaya E&	Gastroent	Cytokeratin. Fatty liver dis.	World J Gastroent	2007; 13: 837-44
106	Başterzi AD,Aydemir C, Kısa C &	Psyciatry	SSRI Rx depression.IL-6r	Hum Psychopharmac	2005; 20: 473-6
106	Akkuş E, Kadıoğlu A, Esen A &	Urology	Erectile dysfunction	Eur Urol	2002; 41: 289-304
106	Aldemir M, Özen S, Kara IH &	Gen Surg	Delirium- intensive care	Critic Care	2001; 5: 265-70
105	Eroğlu S, Sade LE, Yıldırır A &	Cardiology	Epicardial fat- CAD	Nutr Met CV Dis	2009; 19: 211-7
105	Deniz G, Erten G, Küçüksezer UC&	Immunol	NK cells- T cell response	J Immunol	2008; 180: 850-7
105	Özcan EE, Güneri S, Akdeniz B&	Cardiolog	Radiocontrast nephropathy	Am Heart J	2007; 154: 539-44
104	Karnak İ, Şenocak ME, Çiftçi AO &	Ped. surg.	Myofibroblastic tumor	J Pediat Surg	2001; 36: 908-12
104	Anıl-Yağcıoğlu AE, AkdedeBBK,Turgut TI&	Psychiatry	Schizophren: risperidon	J Clin Psychiat	2005; 66: 63-72
104	Sivaslıoğ AA, Ünlübilgin E, Dölen I&	Gynecol	Mesh for cystocoele	Int Urogynecol J	2008; 19: 467-71

Table 1. Data on authors, medical fields, and references for 231 publications with ≥85 "genuine" citations contributing to medicine since 2001 (31.300 cites by mid-June 2016) (Continued)

104	Zoroğlu SS, Armutçu F, Özen S &	Psychiatry	Oxidat. stress- autism	Eur Arch Psych Cl N's	2004; 254: 143-7
103	Kadıoğlu A, Tefekli A, Erol B &	Urology	Peyronie disease	J Urol	2002; 168: 1075-9
102	Aydemir Ç,Yalçın ES, Aksaray S&	Psychiatry	Depress. & neutrophils	Prog Npsych Biol Psych	2006; 30: 1256-60
102	Aydemir O, Deveci A, Taneli F	Psychiatry	Depression treatm.	Prog Neuropsychopha	2005; 29: 261-5
102	Güvener M, Paşaoğlu İ, Demircin M	CV Surg	Bypass & diabetes	Endocrine J	2002; 49: 531-7
101	Irmak MK, Koltuksuz U, Kutlu NO &	Biochem.	Exper. rat kidney	Urol Res	2001; 29: 190-3
101	Bahçeciler NN, Işık U, Barlan IB&	Ped pulm.	Asthma & rhinitis	Ped Pulmonol	2001; 32: 49-55
101	Aras D, Tüfekçioğ O, Ergun K&	Cardiology	Ventric. noncompaction	J Cardiac Fail	2006; 12: 726-33
101	Özden C, Özdal ÖL, Uryancıoğ G&	Urology	MetS- prostate growth	Eur Urol	2007; 51: 199-206
101	Çallı C, Kitiş O, Yünten N &	Radiology	MR- cerebral tumors	Eur J Radiol	2006; 58: 394-403
101	Karatekin G, Kaya A, Salihoğlu O &	Pediatrics	Vit D deficien. newborns	Eur J Clin Nutr	2009; 63: 473-7
100	Kara İ, Sazcı A, Ergül E &	Neurology	Migraine genetics	Mol Brain Res	2003; 111: 84-90
100	Siva A, Altıntaş A, Saip S	Neurology	Behçet ve sinir sistemi	Curr Opin Neurol	2004; 17: 347-57
100	Ünal-Çevik İ, Kılınç M, Gürsoy-Özd. Y&	Neurology	Cerebral ischemia	Brain Res	2004; 1015: 169-74
99	Gür A, Saraç AJ, Çevik R &	Gen surg.	Laser: chronic neck pain	Lasers Surg Med	2004; 35: 229-35
99	Şavlı H, Karadenizli A, Kolaylı F&	Microbiol	Pseudomon. aerug. gene	J Med Microbiol	2003; 52: 403-8
99	Yıldız O, Doğanay M, Aygen B &	Intern med.	Sepsis: steroid Rx	Critical Care	2002; 6: 251-8
98	Divrik RT, Yıldırım U, Zorlu F	Urology	Bladder tumor	J Urol	2006; 175: 1641-4
98	Elpek GO, Gelen T, Aksoy NH &	Pathology	Esophagus Ca.	J Clin Pathol	2001; 54: 940-4
98	Sungurtekin H, Sungurtekin U, Balcı C&	Nutrition	Nutrition-Abdom.surgery	J Am Coll Nutr	2004; 23: 227-32
97	Horasanlı K, Sılay MS, Altay B &	Urology	Laser-Prostate resection	Urology	2008; 71: 247-51
97	Kılıçkap S, Abalı H, Çelik İ &	Oncology	Bevacizumab	J Clin Oncol	2003; 21: 3542-2 L
97	Küçükdeveci AA, Yavuzer G, Elhan AH&.	Phys Med	Funct. indepnd. measure	Clin Rehabilit	2001; 15: 311-9
97	Yerdel MA, Akın EB, Dölalan S &	Gen surg.	Hernia repair- drug	Ann Surg	2001; 233: 26-33

Table 1. Data on authors, medical fields, and references for 231 publications with ≥85 "genuine" citations contributing to medicine since 2001 (31.300 cites by mid-June 2016) (Continued)

96	Akkoç Y, Karatepe A, Akar S &	Phys Med	Ankylos spondylit activity	Rheumatol Int	2005; 280-4
96	Ok E, Aşçı G Toz H &	Nephrolog	Mortal hemodiafiltration	Nephr Dial Tr'plant	2013; 28: 192-202
96	Doğanay S, Evereklioglu C, Er H &	Ophthalm.	Diabetic retinopathy	Eye	2002;16: 163-70
96	Köroğlu A, Demirbilek S, Teksan H&	Anesthesio	Dexmedetomidine effects	Br J Anaesthesia	2005; 821-4
95	Levendoğ F, Ogün CO, Özerbil O&	Orthoped	Gabapentin for spin. pain	Spine	2004; 29: 743-51
95	Özkurt Z, Kiki H, Erol S &	Microbiol	Crimean-Congo fever	J Infect	2006; 52: 207-15
95	Elmalı N, Baysal O, Harma A &	Orthoped	Resveratrl - arthritis	Inflammation	2007; 30: 1-8
95	Soysal S, Soysal ME, Özer S &	Gynecol.	Endometriosis	Hum Reproduct	2004; 19: 160-7
95	Onat A, Uyarel H, Hergenç G &	Cardiology	Male abdom. obesity	Atherosclerosis	2007; 191: 182-90
95	Özbalkan Z, Bağışlar S, Kiraz S&	Rheumat.	Scleroderma	Arthr Rheumatism	2005; 52: 1564-70
94	Çokuğraş H, Akçakaya N, Seçkin İ &	Pneumol.	Bronch. biopsy in asthma	Thorax	2001; 56: 25-9
94	Sağlam K, Aydur E, Yılmaz Mİ&	Intern med	Prostate Ca: leptin	J Urol	2003; 169: 1308-11
94	Atmaca M, Kuloğlu M, Tezcan E &	Psychiatry	Obsess. compulsive	Int Clin Psychopha	2002; 17: 115-9
94	Günen H, Hacıevliyagil SS, Koşar F&	Pneumol	Survival. COPD pts	Eur Resp J	2005; 26: 234-41
94	Sırmalı M, Türüt H, Topçu S &	Thor surg	Traumatic rib fractures	Eur J Cardiothor Surg	2003; 24: 133-8
94	Genç Ş, Köroğlu TF, Genç K	Neurology	Nerv. syst. erythropoietin	Brain Res	2004; 1000: 19-31
94	Erdoğan D, Güllü H, Yıldırım E &	Cardiology	Low bilirubin; carotid IMT	Atherosclerosis	2006; 184: 431-7
94	Korkmaz C, Özdoğan H, Kasapçopur O &	Rheumato	FMF: acute phase resp.	Ann Rheum Dis	2002; 61: 79-81
93	Sayek İ, Onat D	Gen surg.	Liver hydatid cyst	World J Surg	2001; 25: 21-7
93	Günal AI, Özalp G, Yoldaş TK	Nephrolog	Gabapentin therapy	Nephr Dial Tr'plant	2004; 19: 3137-9
93	Erden-İnal M, Sunal ED, Kanbak G	Biochem	Age relation- redox system	Cell Biochem Funct	2002; 20: 61-6
93	Pata C, Erdal ME, Derici E &	Gastroent.	Irritable bowel syndr.	Am J Gastroenter	2002; 87: 1780-4
92	Tavil Y, Şen N, Yazıcı HU &	Cardiolog	Platelet vol. MetS.CAD	Thrombos Res	2007; 120: 245-50
92	Erkan F, Gül A, Tasalı E	Pneumol.	Behçet's lung	Thorax	2001; 56: 572-8
92	Ergönül O, Tunçbilek S, Baykam N &	Infection	Crim-Congo: IL-6,TNFα	J Infect Dis	2006; 193: 941-4

Table 1. Data on authors, medical fields, and references for 231 publications with ≥85 "genuine" citations contributing to medicine since 2001 (31.300 cites by mid-June 2016) (Continued)

92	Hoşoğlu S, Geyik MF, Balık I &	Infection	Tbc meningitis	Int J Tbc Lung Dis	2002; 6: 64-70
91	Saatçi I, Geyik S, Yavuz K &	Radiology	Outcome tbc. meningitis	J Neurosurg	2011; 115: 78-88
91	Cörüt A, Şenyiğit A, Uğur SA &	Mol Biol Gen	Alveolar microlithiasis	Am J Hum Genet	2006; 79: 650-6
91	Özaydın M, Varol E, Aslan SM&	Cardiology	Atrial fib. & statin	Am J Cardiol	2006; 97; 1490-3
90	Kaya D, Gürsoy-Özdemir Y, Yemişçi M&	Neurology	VEGF- focal ischemia	J Cerebr Bl Flow Met	2005; 25: 1111-8
90	Akdemir A, Türkçapar MG, Örsel SD&	Psychiatry	Depression rating scale	Compreh Psychiat	2001; 42: 161-5
90	Okutan H, Ozçelik N, Yilmaz HR et al.	CV Surg	Caffeic acid & . lipid peroxide	Clin Biochem	2005; 38: 191-196
90	Meral İ, Mert H, Mert N &	Physiol	Brain oxid stress-cell phone	Brain Res	2007; 1169: 120-4
89	Tatlı M, Satıcı P, Kanpolat Y &	Neurosurg	Surgery trigem. neuralgia	Acta Neurochir	2008; 150: 243-55
89	Siva A	Neurology	Nervous syst. vasculitis	J Neurol	2001; 248: 451-68
89	Erem C, Ersöz HO, Kartı SS &	Endocr Met	Fibrinolysis hyperthyroif	J Endocr Invest	2002; 25: 345-50
89	Mergen M, Mergen H, Özata M&	Metabol	Morbid obesity gene	J Clin Endocr Metab	2001; 86: 3448-51
89	Yıldız BO, Haznedaroğ IC, Kirazlı S&	Endocr Met	Fibrinolyt cap- PCOS	J Clin Endocr Met	2002; 87: 3871-5
89	Tali ET	Radiology	Spinal infections	Eur J Radiol	2004; 50: 120-33
89	Toprak NU, Yağcı A, Güllüoğ BM&	Microbiol	Endotoxin-colorectal Ca	Clin Microb Infect	2006; 12: 782-6
88	Sarı İ, Okan T, Akar S &	Rheumato	Ankylos spondylitis	Rheumatol	2006; 45: 283-6
88	Yazici S, Yazici M, Erer B &	PhysM-Card	Platelet indices rheumatoid arthr.	Platelets	2010; 21: 122-125
88	Tüzün EH, Eker L, Aytar A &	Phys Med	Osteoarthritis index	Osteoarthr Cartilage	2005; 13: 28-33
88	Kaptanoğlu E, Solaroğlu I, Okutan O&	Neurosurg	Neuroprotection	Neurosurg Rev	2004; 27: 113-20
88	Paydaş S, Zorludemir S, Ergin M&	Oncology	Granulocytic sarcoma	Leukem Lymphom	2006; 47: 2527-41
88	Demirkılıç U, Kuralay E, Yenicesu M &	CV Surg	Postop renal failure	J Cardiac Surg	2004; 19: 17-20
88	Ergönül O, Çelikbaş A, Baykam N &	Infection	Crim-Congo: risk factors	Clin Microb Infect	2006; 12: 551-4
88	Haklar G, Sayın-Özveri E, Yüksel M&	Biochem	React. oxygen species	Cancer Letters	2001; 165: 219-24
86	Küpeli B, İrkilata L, Gürocak S&	Urology	Tamsulosin- ureteral stone	Urol	2004; 64: 1111-5
86	Can A, Semiz O, Çınar O &	Hist & Embr	Oocytes in meiosis	Mol Hum Reproduct	2005; 11: 389-96

Table 1. Data on authors, medical fields, and references for 231 publications with ≥85 "genuine" citations contributing to medicine since 2001 (31.300 cites by mid-June 2016) (Continued)

Number of cites	Authors	Field	Area	Journal	Year and reference
86	Yeşildağ A, Kutluhan S, Şengül N&	Radiology	Carpal tunnel syndrome	Clin Radiol	2004; 59: 910-5
86	Köroğlu A, Teksan H, Sağır Z&	Anesthesi	Dexmedetomidine effect	Anesthes Analges	2006; 103: 63-7
85	Kanter M, Coşkun Ö, Budancamanak M	Hist & Embr	BNigella sativa L	World J Gastroent	2005; 11: 6884-8
85	Bilge AK, Ozben B, Demircan S &	Cardiology	Depression & defibrillat.	PACE	2006; 29: 619-26
85	Emre M	Neurology	Parkinson: mental disorder	Movement Disord	2003; 18: S63-S71
85	Duedu S, Akar AR, Arat M &	CV surg	Thrombangiitis obliterans	J Vasc Surg	2006; 44.732-9
85	Yıldırım B, Sabır N, Kaleli B &	Gynecol	Abd.fat nonobese PCOS	Fertil Steril	2003; 79: 1358-64
85	Eskiçorapçı SY, Baydar DE, Akbal C &	Urology	Prostate biopsy	Eur Urol	2004; 45: 444-8
85	Gökçel A, Gümürdülü Y, Karaköse H &	Endocrin	Sibutramin in obesity	Diab Obes Metab	2002; 4: 49-55
85	Bölükbaş C, Bölükbaş FF, Horoz M&	Gastroent	Oxid.stress in hepatitis B	BMC Infect Dis	2005; 5: #95
85	Eifan AO, Keleş S, Bahçeciler NN&	Pediatr	Anaphylaxis-immunother.	Allergy	2007; 62: 567-8
31,300	231* 135.5				

& denotes et al.

1.34-fold, from 220,000 to 294,000, within a 6-year period from 2007 to 2013. This corresponds to an annual rise in global citations by 5.0%. Papers listed in the previous analysis and continued in the current list have received a mean annual increase of 8.9% in citations and thus have fared well when compared at an international level (6). The median publication date of end-2003 must be considered, relatively old.

The majority of best research originates from established faculties

Barely over one-half of the highly cited medical publications were derived from only seven medical faculties and GATA, supporting the opinion that the distribution of medical research is highly concentrated in Turkey. Interestingly, Harran University (due to its biochemical research) is among those topping this list, along with the medical faculties of established universities in three big cities and Erciyes University. Furthermore, İnönü, Dokuz Eylül, Süleyman Demirel, Akdeniz, Mersin, and Marmara Universities' medical faculties produced notable contributions and surpassed certain more ancient faculties, such as Gazi, Çukurova, and Uludağ Universities. Other than the 40-year old 19 Mayıs University, medical faculties of the following universities that are although ≥20 years old, have failed to meet the criteria stipulated in this study for a single publication: Sakarya, Adnan Menderes, Çanakkale, Balıkesir, Abant Izzet Baysal, Karaelmas Zonguldak, Mustafa Kemal, Muğla, Gaziosmanpaşa. Yeditepe, Kadir Has, and Istanbul Bilim. Ankara Nümune Hospital led by far the Health Ministry hospitals and merits tribute. Interestingly, Koşuyolu Res. & Ed. Hospital, which is among the all-time leading institutions in cardiovascular medicine research, failed to represent in this evaluation (7).

Compared with the previous analysis including publications from 1971 onwards (wherein the legendary Muzaffer Aksoy, Şeref İnceman, and Hasan Yazıcı stood out), the fields that fared worse recently were hematology, rheumatology, nuclear medicine, plastic surgery, and ophthalmology (6). The fields that have performed better recently were cardiology, endocrinology and metabolism, infection, physical medicine, histology, urology, and anesthesiology.

Leading scientists

Table 4 lists 21 primary authors who, with a total of 51 papers, have generated more than one highly cited paper and attained 27% of the total citations in this study. The biochemist Özcan Erel, cardiologist Altan Onat, infection specialist

Table 2. Relative performance in five major medical fields and 39 branches

Field	Publications	Cites	%	Field	Publications	Cites	%
Internal medicine 23,2	91	11892	38	**Basic sciences**	45	7241	
Cardiology	16	2045		Biochemistry	17	3965	
Rheumatology	14	1673		Radiology	8	879	
Endocrine and metabolism	12	1529		Nutrition	1	98	
Infection	8	1243		Microbiology	5	519	
Gastrohepatology	7	842		Pharmacology	2	253	
Nephrology	6	848		Anatomy and Histology	5	684	
Internal medicine	6	902		Med. boil and genetics	2	249	
Physical medicine	5	437		Physiology	2	215	
Pneumology	4	537		Pathology	1	98	
Oncology	4	546		Biophysics	2	281	
Dermatology	4	626		**Surgical sciences**	45	5387	17.3
Immunology	2	213		Gynecology	9	1020	
Hematology	1	168		General surgery	5	506	
Geriatrics	1	154		Urology	11	1221	
Allergy	1	129		Ophthalmology	4	860	
Neurosciences	42	5566	17,8	Cardiovascular surgery	4	365	
Neurology	19	2436		Thoracic surgery	2	263	
Psychiatry	19	2658		Pediatric surgery	2	227	
Neurosurgery	4	472		Anesthesiology	4	467	
Pediatrics	8	1214	4	Orthopedics	3*	307	
				Ear-nose-throat	1	151	
				Total	231	31300	100

*Total number of global articles in orthopedics are reported to be 14300/year; these three articles are estimated to form a global share of 1.55 per mill, that is, slightly above the average of all medical fields

Ömer Ergönül, neurologists Murat Emre and Aksel Siva, radiologist Işıl Saatçi, ophthalmologist İlknur Tuğal-Tutkun have each accumulated over 300 citations in multiple worthy publications. Beyond them, nephrologist Ercan Ok has managed to be listed herein with an exceptionally high-cited investigation published as late as 2013. The pediatrician M. Keskin, pneumologist A. C. Öğüş, psychiyatrist M. Bilici, and rheumatologist Emire Kural-Seyahi have attained over 250 cites each through a single publication.

The highly cited papers referred to in this study, which represent 1 of every 600 overall medical papers generated in Turkey in the period, received over one-tenth of overall citations in the field of medicine.

Clear decline in performance in the past decade

Given that an average of 32 highly-cited articles were published during 2001-2006 and that according to Essential Science Indicators, top papers or citations received reduce by 50% in approximately 4.8 years, we may estimate that at the same level of performance, 6-7 articles should have been published annually by the Turkish medical scientists in 2010-2015. However, only a total of three articles or less than one-tenth of the anticipated (Figure 1) has achieved the figure.

There is minimal hope of reversing this dismaying trend in the near future, in view of the approach of the authorities unwilling to promote scientific research and tending to suppress free expression of scientific findings. Providing new incentives to improve the science policy are not expected. This situation further increases the risk of serious brain drain to the Western countries in the near future. The huge success of Aziz Sancar, a student of the Istanbul U. Medical Faculty in 1965-'67 when I was in the teaching staff , through his long-standing work in the USA leading to the

Table 3. Highly cited articles and citations generated by 51 institutions

	Cites	Items		Cites	Items
Hacettepe U	2922	24,5	Sütçü İmam U	236	1
Harran U	2532	7	Uludağ U	225	2
IU Istanbul MF+ DETAM	2499	18	Çukurova U	217	2
IU Cerrahpaşa MF	1954	13,5	İzmir Tepecik Atatürk Res. H	209	2
Ankara U	1731	13,5	Etfal H, Istanbul	198	2
GATA	1728	13	Ist. Süreyyapaşa H.	169	1
Erciyes U	1347	7	Fatih U	163	1
Ege U	1269	10	Haseki Ed. H	159	1
İnönü U	1236	11	Siyami Ersek Sug. Ctr.	142	1
Ankara Nümune H.	1087	8	Kocatepe U	129	1
Dokuz Eylul U	1078	8	Zeynep Kamil H	128	1
Akdeniz U	1043	6	Cumhuriyet U	124	1
S Demirel U	914	8	SSK Ankara (Ana-Çocuk)	116	1
Mersin U	826	7	Kırıkkale U	116	1
Marmara U	713	6	German H, Istanbul	112	1
Gaziantep U	683	5	Ankara Res. H	111	1
Fırat U	630	5	Etlik Educ. H	104	1
Karadeniz T U	623	3	Celal Bayar U	102	1
Başkent U	619	6	T Yüksek İhtisas H	101	1
Atatürk U	448	4	Selçuk U	95	1
Pamukkale U	386	4	Atatürk Educ. H, Ankara	94	1
Trakya U	384	3	Boğaziçi U	91	1
Kocaeli U	381	3	Yüzüncü Yıl U	90	1
Dicle U	297	3	SSK Ankara H	90	1
Osmangazi U	294	2,5	Düzce U	88	1
Gazi U	267	3	Total	31300	231

Table 4. Turkish scientists (21) contributing to medicine with multiple highly cited papers

Cites	Papers	Scientist	Period	Cites	Papers	Scientist	Period
2061	3	Özcan Erel	'04-'05	281	2	Mustafa Nazıroğlu	'07-'09
763	5	Altan Onat	'01-'07	262	2	Emre Bora	'05-'06
687	4	Önder Ergönül	'04-'06	249	2	S. S. Zoroğlu	'03-'04
413	2	Murat Emre	2003	230	2	Oğuz Ateş	2007
344	3	Işıl Saatçi	'04-'11	225	2	A. I. Günal	'01-'04
335	2	İlknur Tuğal-Tutkun	'04-'05	219	2	M. Kemal Irmak	'01-'02
327	3	Aksel Siva	'01-'04	218	2	Abdullah Kumral	'03-'04
316	3	Bülent O. Yıldız	'02-'03	214	2	Işın Ünal-Çevik	2004
300	2	Cem Evereklioğlu	'02-'05	206	2	Murat Atmaca	'02-'03
294	2	Hasan Herken	'01-'07	182	2	A Köroğlu	'05-'06
292	2	Alp Can	'05-'07	8416	Total		

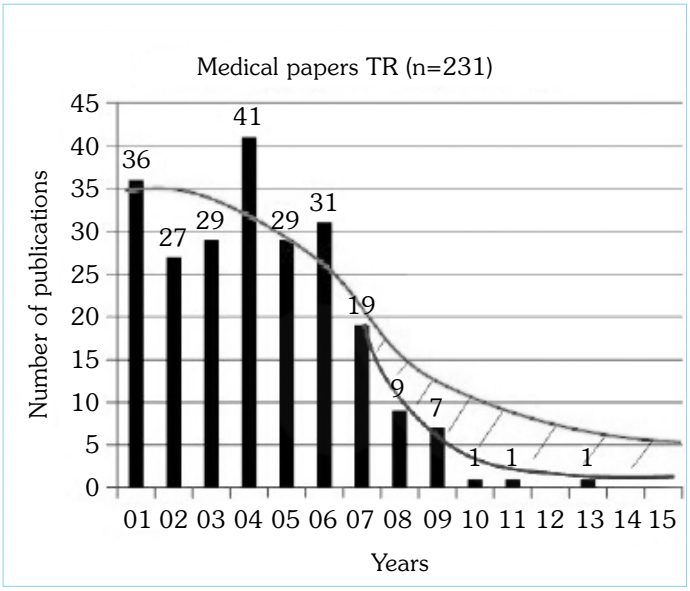

Figure 1. Temporal distribution of 231 medical papers receiving ≥85 cites and originating from Turkey's institutions over the past 15 years
It is evident from the curve indicating the anticipated similar output and the actual number of papers that the performance until year 2006 is curtailed until 2009 and more severely since 2010

sharing of Nobel Prize in Chemistry in the past year, is no consolation for us regarding the prospect of forthcoming scientific performance.

CONCLUSION

In summary, only 231 articles have been generated in the past 15 years in Turkey, which had a potential to contribute to medicine; one-half of these were dated prior to mid-2004. The annual output of 30-35 papers in the first 6 years of this century appears to have drastically declined to <10 papers in recent years, and regrettably, supports my estimate 3 years ago. The Turkish medical faculties that incorporate nearly 40,000 academic personnel and a teaching staff of approximately 16,000 are as much responsible for this poor performance compared as the authorities' approach to scientific activities.

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