

The Relation between Iranian Medical Science Research in PubMed and Burden of Disease

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doi:10.5455/aim.2016.24.271-276

ACTA INFORM MED. 2016 AUG; 24(4):271-276

Received: APR 18, 2016 • Accepted: MAY 25, 2016

ABSTRACT

Introduction: Scientific productions have been accelerated in Iran in past decades but its association with health problems and disease burden is doubtful. The aim of this study is assessment of the relationship between scientific productions with disease burden in Iran in PubMed dataset during 2010 to 2014. **Method:** The study was performed with the library method. Data Gathered using Scientometrics indicators and direct observation. The current research includes all articles written by Iranian researchers during 2010 to 2014 which were published in PubMed-indexed journals. The search was performed using keywords included road accident, ischaemic heart diseases, major depression disorders and cerebral vascular diseases. **Results:** In total 910 articles had been published PubMed -indexed journals. Among them Substance-Related Disorders and Accidents, Traffic had the highest (263 records) and lowest (94 records) records respectively. There was not a direct correlation between Years of Life Lost, Years Lost due to Disability and mortality rate with scientific productions. **Conclusions:** our results showed Iranian scientific productions in PubMed data set are not related to disease burden however they are not related to high mortality diseases.

Key words: scientific production, PubMed, Cost of illness, Scientometric, Medical sciences, Iran

1. INTRODUCTION

Scientometrics is the science of measuring and analyzing science using qualitative, quantitative and computational approaches. Scientometrics with its various indices is a reliable method for evaluation of scientific development. Research into mental health disorders is urgently needed in developing countries because of the imbalance between the burden of mental disorders and the resources for managing them in these countries. Research focusing on mental health services is no less important than biological research, and may be more relevant to answering the mental health (1). The recognition and the evaluation of a country's research status are essential for the country's research planners and policymakers as well as researchers within that country. Nowadays, the study of the quantity of scientific output (especially research articles and papers) is one of the most important factors in research and generation of science. The Science Citation Index Expanded (SCIE) database is presented by the ISI scientific infor-

mation center, which is considered an important center in Scientometrics Studies (2).

Today, research is as one of the most important countries infrastructure development. The importance of scientific information and its undeniable role in sustainable development to the extent that many developed countries spend large amounts of their national resources to develop their study and research institutes. In addition, the increasing tendency of the public to scientific activities which are conducive to scientific information, the importance of scientific information in the development of countries (3). Universities as one of the main sources for producing scientific information, play an important role in the development of the society. So, it is necessary to monitor their research activities. One of the missions and activities of universities and research institutions to facilitate the spread of information and research process is based on the basic needs of society. Nowadays scientific productions are known as a criterion for sci-

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ence evaluation and a society has been considered more developed than is superior than other nations for its information aspects not economical are military power (4). Different studies about scientific production and its importance (5).

Scholarly journals are quite necessary for each society's scientific life, especially the medical society, because they represent the academic community's achievements to a large extent at regional, national and international levels. The present research (6).

Bazrafshan and Mostafavi in a scientometric analysis of 36-year knowledge generation in Pasteur Institute of Iran in ISI-SCIE database argued that the knowledge generation in this institute was increasing. Quantitative evaluation of scientific findings from research activities can help officials and planners to lower the cost, the use of financial and human resources, and socio-economic structure of the country benefit from the optimization (7).

It is difficult to deliver effective and high-quality care to patients without knowing their diagnoses; likewise, for health systems to be effective, it is necessary to understand the key challenges in efforts to improve population health and how these challenges are changing. Before the early 1990s, there was no comprehensive and internally consistent source of information on the global burden of diseases, injuries, and risk factors. To close this gap, the World Bank and the World Health Organization launched the Global Burden of Disease (GBD) Study in 1991 (8).

The most recent assessment of the global burden of disease is the 2010 study (GBD 2010), which provides results for 1990, 2005, and 2010. Several hundred investigators collaborated to report summary results for the world and 21 epidemiological regions in December 2012 (8).

The Global Burden of Disease Study 2010 (GBD 2010) is a collaborative project of nearly 500 researchers in 50 countries led by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington. It is the largest systematic scientific effort in history to quantify levels and trends of health loss due to diseases, injuries, and risk factors. GBD serves as a global public good to inform evidence-based policymaking and health systems design. In terms of the number of years of life lost (YLLs) due to premature death in Iran, ischaemic heart disease, road injury, and congenital anomalies were the highest ranking causes in 2010. Of the 25 most important causes of burden, as measured by disability-adjusted life years (DALYs), lower respiratory infections showed the largest decrease, falling by 65% from 1990 to 2010. The leading risk factor in Iran is dietary risks. The greatest reductions in all-cause mortality rate were experienced by females aged 1-4 years (61%). Males aged 80+ years saw the smallest decrease in mortality rate (8%). Overall, the three risk factors that account for the most disease burden in Iran are dietary risks, high blood pressure, and high body-mass index. The leading risk factors for children under 5 and adults aged 15-49 years were childhood underweight and dietary risks, respectively, in 2010. Understanding the relative performance of Iran against other comparator countries provides key

insight into public health successes and areas where Iran might be falling behind. The table identifies Iran's rank across 14 other comparator countries, selected and ordered by income per capita, for five metrics of interest, with 1 indicating the best rank and 15 indicating the worst rank. Age-standardized rates are used to make meaningful comparisons across time by adjusting for changes in population size and age structure. Life expectancy incorporates mortality, and health-adjusted life expectancy further incorporates years lived in less than ideal health. In 2010, Iran ranked 8th for age-standardized death rate and 9th for age-standardized YLD rate (9).

The burden of disease study, health and disease summary of the two indices are measured as follows for healthy life expectancy and disability-adjusted life years lost due to premature death and total years of life due to disability caused by diseases and to measure the damage.

The ultimate goal of the burden of disease, providing the most objective evidence needed for policy, planning and management of health programs, prioritizing strategies in the areas of population health research and development and allocation of human and financial resources and the development of organizational capacity to design, implement and evaluate interventions cost-effective prevention, treatment and rehabilitation.

In the first national burden of disease studies in Iran, has been shown to cause 21 respectively: transport accidents, natural disasters, ischaemic heart disease, major depressive disorder, addiction, falls, cerebrovascular diseases, low back pain, knee osteoarthritis, iron deficiency and other anemias, bipolar disorder, COPD plus core pulmonale, burns, exposure to mechanical forces, prematurity with normal birth weight, diabetes mellitus, calculus of kidney and ureter, upper respiratory tract infections, acne vulgaris, perinatal respiratory and cardiovascular, schizophrenia schizo-affective disorder.

Injuries, which account for 10% of global mortality, are often ignored as a major cause of death and may require innovative strategies to reduce their burden. However, according to a report from Iran in 2003, among disease groups, injuries has the highest burden of disease (DALY) which includes 28%

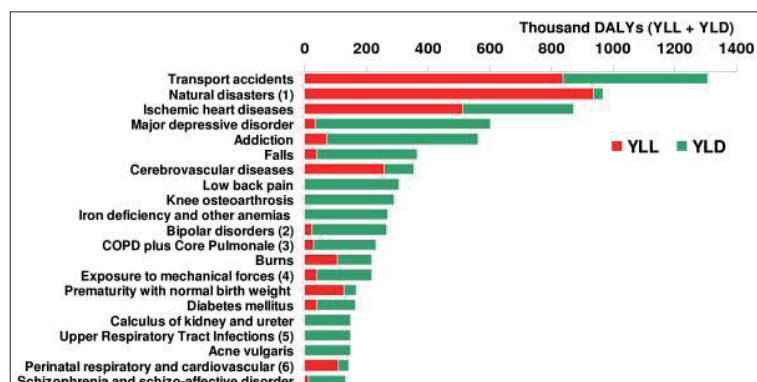


Figure 1. Top 21 disease and injury causes of ICD-10 with the highest burden, all ages and both sexes, Iran 2003. (1) Natural disasters: Exposure to forces of nature (including the Bam earthquake of 26 December 2003); (2) Bipolar disorders I, II, and cyclothymia; (3) COPD: Chronic Obstructive Pulmonary Disease; (4) Exposure to mechanical forces of the nature; (5) Upper Respiratory Infections and otitis media; (6) Respiratory and cardiovascular disorders specific to the perinatal period. Note: The rationale for presenting the 21 highest burden of disease and injury causes in this figure is that if the Bam earthquake is omitted – since such a huge disaster is not to be repeated every year – still the 20 highest burden disease and injury causes are presented.

of DALY - 36.5% in male and 18% in female patients; and the first cause of years of life lost because of premature mortality (YLL) (Figure 1) (10).

Heravi Karimooi, Aein, Ahmadi, Tootoonchi (2006) has done a research: "Are Nursing Students' Thesis Topics in Accordance with Burden of Diseases as Disability Adjusted Life Years in Iran?" concluded that Research is the basis of nursing and should be in accordance with society's health needs. 373 researches registered in the lists of school libraries or university web sites as master degree theses in nursing during 2000-2005, were investigated. The proportion of theses' topics and the etiology of burden of diseases, including intentional and unintentional accidents, sensory disorders, congenital anomalies, gastrointestinal and dental diseases, respiratory diseases, nutritional deficiencies and endocrine disorders was less than optimum. In contrast, the proportion of theses' topics on cardiovascular, genitourinary, dermatology and musculoskeletal diseases, diabetes mellitus, neoplasms and maternal and antenatal problems was more than the related DALYs. In addition it was optimum for neuropsychological disorders. Most theses' topics were in accordance with this health index (11).

Reports about scientometrics research productions in the field of medical sciences, shows a significant growth in research productions in the recent years. It is expected, this accelerated trend of scientific productions in the field of medical science, to solve health problems and therapeutics and reduce the burden of disease in the country. Therefore, in this study we aimed to analyze the relationship between scientific productions in the recent 5 years in medical fields has achieved the first 5 items burden of diseases in Iran. The aim of this study was to investigate the relationship of the productions in the medical science in the PubMed database between 2010 and 2014 with the burden of disease in Iran. Traffic accidents, natural disasters, ischaemic heart disease, major depression, addiction, fall, cerebrovascular diseases, back pain, osteoarthritis, anemia, bipolar disorder, COPD (chronic obstructive pulmonary disease, and pulmonary heart), burns, caused by mechanical forces (animate and inanimate mechanical forces face), preterm birth with normal weight, diabetes, kidney stones and urinary tract, upper respiratory tract infection, acne vulgaris, heart and breathing, schizophrenia.

2. MATERIALS AND METHODS

The study was performed with the library method. Data gathered using Scientometrics indicators and direct observation. Based on national burden of disease in Iran, Traffic accidents, Ischaemic heart disease, Major Depressive Disorder, Addiction and Cerebrovascular diseases as the disease has a high disease burden were considered. To improve the validity of searching, library science experts and clinicians were used. Table 1 shows the key search terms for topics studied in this research in a way that previously described

In order to derive the most accurate keyword for topics of study (Traffic accidents, Ischaemic heart disease, Major Depressive Disorder, Addiction, Cerebrovascular diseases) in the PubMed database based on MeSH were searched and compared and assessed with retrieved records and the most appropriate and most relevant special record were selected. In order to extract specific topics based on special data obtained

from Mesh in PubMed, fields affiliation (Iran), publication date (2010-2014) and Traffic accidents, Ischaemic heart disease, Major Depressive Disorder, Addiction, Cerebrovascular diseases were obtained from MeSH were searched and all the scientific productions of the subject area and the number of records retrieved by the search field of Affiliation and Year as the total Iranian scientific productions were considered. For data analysis of SPSS software and correlation coefficient was used.

Diseases under study	Selected key words for searching
Traffic accidents	Accidents, Traffic
Ischaemic heart disease	Coronary Artery Disease
Major Depressive Disorder	Depression
Addiction	Substance-Related Disorders
Cerebrovascular diseases	Cerebrovascular Disorders

Table 1. The key words selected topics in the MeSH Database

3. RESULTS

Percent of scientific productions of the disease in PubMed of total production in this database during the years 2010-2014 has shown in (Table 2). The subject of addiction in the years 2014-2010 allocated to the highest percentage and traffic accidents allocated to the lowest percentage. The number of articles published in PubMed database with YLL indicator related to disease by using the correlation coefficient ($r = -0.992$, $p = 0.008$) (Figure 2). YLL index was inversely related to diseases associated with scientific production. Figure

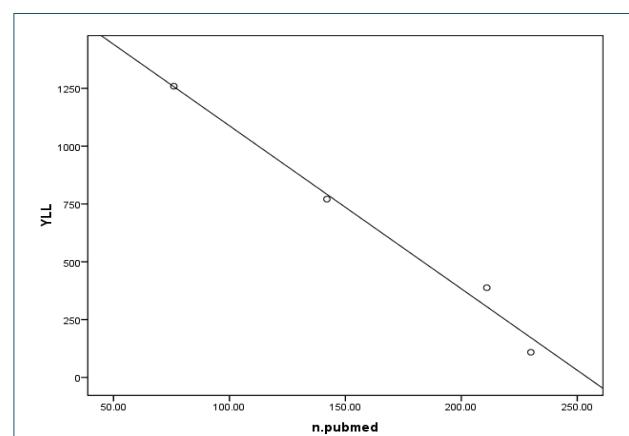


Figure 2. The number of articles published in PubMed database with YLL indicator related to disease by using the correlation coefficient ($r = -0.992$, $p = 0.008$)

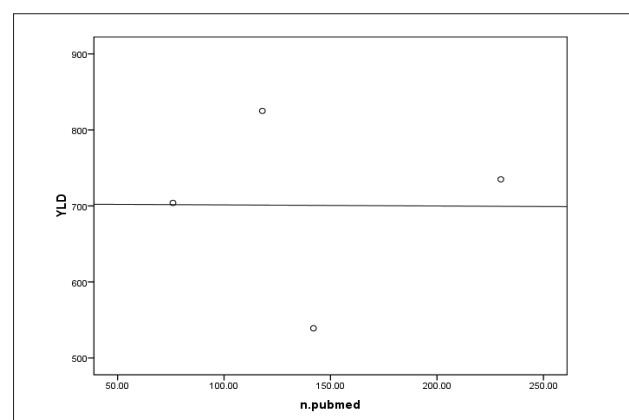


Figure 3. The number of articles published in PubMed database YLD index related to disease by using the correlation coefficient ($r = -0.008$, $p = 0.992$)

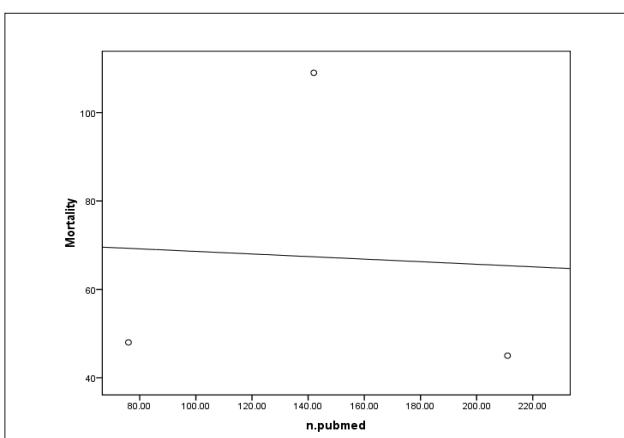


Figure 4. The number of articles published in PubMed database with mortality indicator related to disease by using correlation coefficient ($r = -0.054$, $p = 0.965$)

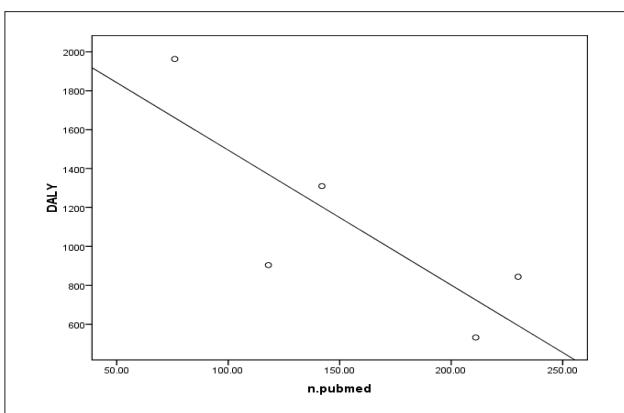


Figure 5. The number of articles published in PubMed database DALY indicator related to disease by using the correlation coefficient ($r = -0.809$, $p = 0.097$)

3 is showing the number of articles published in PubMed database YLD index related to disease by using the correlation coefficient ($r = -0.008$, $p = 0.992$). That in this case there was no need correlation (Figure 4). Is showing the number of articles published in PubMed database with mortality indicator related to disease by using correlation coefficient ($r = -0.054$, $p = 0.965$) which there is no correlation between the products ratio and mortality index (Figure 5). The number of articles published in PubMed database DALY indicator related to disease by using the correlation coefficient ($r = -0.809$, $p = 0.097$) which the index life years lost due to premature death and disability from diseases or injuries due to the production of the database there was no significant correlation. In fact, indicate that the DALY index and production in this database there is an inverse relationship and the diseases that have a higher DALY where there is less scientific production and a negative slope.

Diseases under study	The number of scientific production in PubMed database	Percent of Iran's total Scientific Publications in PubMed database
Traffic accidents	94	0.23
Ischaemic heart disease	163	0.43
Major Depressive Disorder	144	0.36
Addiction	263	0.72
Cerebrovascular diseases	246	0.64

Table 2. Percent of scientific productions of the disease in PubMed of total production in this database during the years 2010-2014

4. DISCUSSION

The number of scientific production in the field of addiction during 2010 and 2014 in the PubMed database to be allocated highest during in the above period. Of 32482 total scientific publications in the PubMed database, addiction with 0.72 % has the highest statistics among the scientific productions of Iran. Statistical data also show that, there is no significant correlation between the numbers of published scientific production in the PubMed database with an index of deaths related to the disease.

Heravi Karimooi, Aein, Ahmadi , Tootoonchi (2006) has done a research:" Are Nursing Students' Thesis Topics in Accordance with Burden of Diseases as Disability Adjusted Life Years in Iran?" concluded that Research is the basis of nursing and should be in accordance with society's health needs. 373 researches registered in the lists of school libraries or university web sites as master degree theses in nursing during 2000-2005, were investigated. The proportion of theses' topics and the etiology of burden of diseases, including intentional and unintentional accidents, sensory disorders, congenital anomalies, gastrointestinal and dental diseases, respiratory diseases, nutritional deficiencies and endocrine disorders was less than optimum. In contrast, the proportion of theses' topics on cardiovascular, genitourinary, dermatology and musculoskeletal diseases, diabetes mellitus, neoplasms and maternal and antenatal problems was more than the related DALYs. In addition it was optimum for neuropsychological disorders. Most theses' topics were in accordance with this health index (11).

Also in a research which has done by Lascurain-Sánchez, García-Zorita, Martín-Moreno, Suárez-Balseiro, and Sanz-Casado, entitled:" Impact of health science research on the Spanish health system, based on bibliometric and healthcare indicators". The present study aimed to determine the possible impact of medical research on the Spanish health system. To this end, an analysis was conducted of Spanish researchers' scientific production, measured in terms of the publications cited in MEDLINE, along with a series of economic, demographic and socio-sanitary data such as the R&D resources allocated to medical science, the actual population during the period studied mortality, morbidity and drug spending. The results showed increases in all the variables studied, identified the area which most intensely researched and defined the relationship between this information and the chief causes of mortality, morbidity and drug spending (12).

Global and regional projections of mortality and burden of disease by cause for the years 2000, 2010, and 2030 were published by Murray and Lopez in 1996 as part of the Global Burden of Disease project. These projections, which are based on 1990 data, continue to be widely quoted, although they are substantially outdated; in particular, they substantially underestimated the spread of HIV/AIDS. The division figures of our country is somewhat different from the World Health Organization (13). The general estimate is that the country is more advanced and higher-income, non-communicable diseases form the dominant cause of mortality and burden of disease form (14).

In addition to training our field of research should be in line with the burden of disease. However, in the comparative study, Aein, Heravi, Ahmadi and Tootoonchi in a research

entitled: "Baccalaureate Nursing Curriculum: Its Adjustment with Burden of Diseases as Disability Adjusted Life Years in Iran" to determine whether nursing curriculum conform to the burden of diseases as Disability Adjusted Life Years in Iran in 2003. They concluded that the proportion of credit hours in nursing curriculum assigned to psychiatric, cardiovascular, respiratory, gastrointestinal and sensory disorders as well as intentional and non-intentional accidents, nutritional deficiencies, and congenital anomalies was less than the proportion of burden of diseases as Disability Adjusted Life Years related to these diseases. This proportion was more than optimum level concerning infectious diseases, maternal and antenatal problems, endocrine, genitourinary and dermatological diseases, and at an optimum level for musculoskeletal disorders and malignant neoplasms (15).

In a research which Gross, Anderson and Powe (1999) entitled: The Relation between Funding by the National Institutes of Health and the Burden of Disease, The Institute of Medicine has proposed that the amount of disease-specific research funding provided by the National Institutes of Health (NIH) be systematically and consistently compared with the burden of disease for society. They performed a cross-sectional study comparing estimates of disease-specific funding in 1996 with data on six measures of the burden of disease. The measures were total mortality, years of life lost, and number of hospital days in 1994 and incidence, prevalence, and disability-adjusted life-years (one disability-adjusted life-year is defined as the loss of one year of healthy life to disease) in 1990. With the use of these measures as explanatory variables in a regression analysis, predicted funding was calculated and compared with actual funding (16).

There was no relation between the amount of NIH funding and the incidence, prevalence, or number of hospital days attributed to each condition or disease ($P=0.82$, $P=0.23$, and $P=0.21$, respectively). The numbers of deaths ($r=0.40$, $P=0.03$) and years of life lost ($r=0.42$, $P=0.02$) were weakly associated with funding, whereas the number of disability-adjusted life-years was strongly predictive of funding ($r=0.62$, $P<0.001$). When the latter three measures were used to predict expected funding, the conclusions about the appropriateness of funding for some diseases varied according to the measure used. However, the acquired immunodeficiency syndrome, breast cancer, diabetes mellitus, and dementia all received relatively generous funding, regardless of which measure was used as the basis for calculating support. Research on chronic obstructive pulmonary disease, perinatal conditions, and peptic ulcer was relatively underfunded. The amount of NIH funding for research on a disease is associated with the burden of the disease; however, different measures of the burden of disease may yield different conclusions about the appropriateness of disease-specific funding levels (16).

Groneberg-Kloft, Klingelhoefer, Zitnik and Scutaru (2013) have done: Traffic medicine-related research: a scientometric analysis. The aim of this study was to analyze quantity, evolution and geographic distribution of traffic medicine-related research. This multi-sectorial field covers both transport and health care sectors. A scientometric approach in combination with visualizing density equalizing mapping was used to analyze published data related to the field of traffic medicine between 1900 and 2008 within the "Web of

Science" (WoS) database. In total, 5,193 traffic medicine-associated items were produced between 1900 and 2008. The United States was found to have the highest research activity with a production of $n=2,330$ published items, followed by Germany ($n=298$) and Canada ($n=219$). Cooperation analyses resulted in a peak of published multilateral cooperation in the year of 2003. The country with the highest multilateral activity was the USA. The average number of cited references per publication varied heavily over the last 20 years with a maximum of 27.67 in 1995 and a minimum of 15.08 in 1998. Also, a further in-depth analysis was performed with a focus solely on public health aspects which revealed similar trends (17-27).

Amin Esmaeli and Sardarpour Gudarzi in an article entitled: Bibliometric Analysis of Research on Mood Disorders in Iran with the aim of Bibliometric Analysis of Research on Mood Disorders in Iran, concluded that from a total of 973 articles meeting the inclusion criteria, 78.4%, 7.8%, and 4% of the articles were dedicated to depressive disorders, bipolar disorders, and suicide respectively. The majority of the studies (i.e. 53%) were on the epidemiology, Methodologies of researches were descriptive, descriptive/analytic and analytic in 32.8%, 39.5%, and 28% of the articles, respectively. While 32.8% of studies were cross-sectional. Others such as cohort, hypothetical, systematic review, and economic studies, each constituted less than 1% of the studies. Nearly two-thirds of the articles were published in Iranian journals. There's a growing trend in the publications of articles on mood disorder studies. Nevertheless, considering the prevalence of these disorders, the whole scientific output is still insignificant in some areas(18).

The results showed that scientific productions which published by Iranian researchers which indexed in PubMed. In line with the highest burden of disease in the population level in Iran is not as well as to diseases that have a high mortality rate.

- Conflict of interest: none declared.
- This article was extracted from MA degree of Information management of Ms Zahra Foroughi who graduated from Islamic Azad University, North Branch, Tehran, Iran.

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