

# State of Clinical Neuroscience Research in Saudi Arabia: Where Do We Rank in the World?

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## State of Clinical Neuroscience Research in Saudi Arabia

### Introduction

#### Assessment of Scientific Productivity

- **Citation Indices** compare contribution to a specialty by:  
Journals  
Researchers  
Countries
- **Worldwide Ranking** is popular for:  
Universities  
Medical Specialty Research
- **Medical Research in KSA**  
College of Medicine, King Saud University, Riyadh 1969  
King Faisal Specialist Hospital and RC, Riyadh 1975  
Saudi Medical Journal 1979
- **KSA Research Performance**  
Where do we stand in the world?

## State of Clinical Neuroscience Research in Saudi Arabia

### Introduction

#### SCImago Journal & Country Rank (SCR)

[www.scimagojr.com](http://www.scimagojr.com)

- Developed from data from Scopus (1996-2014)
- Provides lists of “Worldwide Ranking” in:  
**Subject Areas: 27 (Medicine)**  
**Subject Categories: 48 (Clinical Neurology)** (No Neurosurgery)

Based on **6 productivity indices:**

1. Total documents
2. Total citations
3. *h*-index
4. Citable documents
5. Citations per document
6. Self-citations

## State of Clinical Neuroscience Research in Saudi Arabia

### Introduction

SCImago Journal & Country Rank (SCR)

### Journal Search

Subject Category and Country

### “Clinical Neurology”

- 335 Neuroscience Journals
- 31 Neurosurgery journals
- 15 Middle Eastern Journals
- 2 KSA Journals: Neurosciences (Riyadh)  
Pan Arab Journal of Neurosurgery

**SCR**

**Clinical Neurology= Clinical Neuroscience**

## State of Clinical Neuroscience Research in Saudi Arabia

### Objectives

- Evaluate Clinical Neuroscience (CNS) research in KSA over the last two decades by determining its position amongst the top 50 countries in the world
- Examine the country-specific characteristics that may influence a country's position amongst the top 50 in the world in CNS research
- Compare the performance of CNS research with other medical specialties in KSA

## State of Clinical Neuroscience Research in Saudi Arabia

### Methods

#### The Search

SCR web site searched in August 2015 using:

- ❖ Subject Area: **“Medicine”**
- ❖ Subject Category: **“Clinical Neurology”**
- ❖ Year: **“1996-2014”**
- ❖ Region: **“All”**

## State of Clinical Neuroscience Research in Saudi Arabia

### Methods

#### Top 50 World Ranking in Clinical Neuroscience

- Three Top 50 World Ranking Lists based on:
  - 1) Total documents
  - 2) Total citations
  - 3) *h*-index
- **“Adjusted” Top 50 World Ranking List**  
calculated using mean values of the three rankings\*\*

\*\* Pearson's correlation coefficient (*R*) strongly positive between:  
Total documents and Total citations ( $R= 0.9469$ )  
Total documents and *h*-index ( $R=0.9215$ )  
Total citations and *h*-index ( $R= 0.9908$ )

## State of Clinical Neuroscience Research in Saudi Arabia

### Methods

#### Data Collected for Each Country

- Total documents
- Total citations
- *h*-index
- Population to nearest million (worldometer web site 2014)
- GDP/capita to nearest \$1000 (IMF database 2014)
- Percentage of GDP spent on Research and Development (R &D) (World Bank web site 2012)
- Number of CNS journals (SCR web site 2014)
- Number of universities in the world top 500 (Shanghai ranking web site 2014)



## State of Clinical Neuroscience Research in Saudi Arabia

### Methods

#### Characteristics of Countries Ranked 1-25 versus 26-50 in CNS Research

Country-Specific Characteristic	Variables ( $\leq$ vs. $>$ Median)
• Population in millions	$\leq 23.5$ vs. $> 23.5$
• GDP/capita in \$ 1000	$\leq \$31.5$ vs. $> \$31.5$
• Percentage GDP on R & D	$\leq 1.4\%$ vs. $> 1.4\%$
• Number of CNS journals in SCR	$\leq 1$ vs. $> 1$
• Number of universities in top 500	$\leq 3$ vs. $> 3$

## State of Clinical Neuroscience Research in Saudi Arabia

### Methods

#### Relative Specialization Index (RSI)

RSI measures whether a **country's share in world's publication in a specialty** is relatively higher or lower than its **overall share in world's total publication**

#### RSI Calculation

Thematic Specialization Index (TSI)=

$$\frac{\text{Total CNS Documents in KSA} \div \text{Total KSA Documents}}{\text{Total CNS Documents in World} \div \text{Total World Documents}}$$

$$\text{RSI} = \frac{\text{TSI} - 1}{\text{TSI} + 1}$$

RSI 0 = world average

RSI < 0 = below world average

RSI > 0 = above world average

## State of Clinical Neuroscience Research in Saudi Arabia

### Results

#### KSA CNS Research

**KSA Rank** (adjusted based on 3 indices)  
**40th in the world**  
**4th in Middle East**

	Total Documents	Total Citations	<i>h</i> -index
<b>KSA</b>	<b>1,189</b>	<b>8,820</b>	<b>40</b>
Top 50 Range (Median)	462 - 174,187 (3687)	2904 - 4,406,449 (46,447)	23 - 410 (86)
World 191 Range (Median)	1-174,187 (37)	0 – 4,406,449 (371)	0 - 410 (11)

## State of Clinical Neuroscience Research in Saudi Arabia

### Results

#### KSA Adjusted Ranking in CNS Research

1) USA	11) Switzerland	21) <b>Turkey</b>	31) New Zealand	41) Thailand
2) UK	12) Sweden	22) Norway	32) Czech Rep.	42) <b>Egypt</b>
3) Germany	13) China	23) Taiwan	33) Mexico	43) Croatia
4) Canada	14) Austria	24) India	34) Hong Kong	44) Slovenia
5) Japan	15) Belgium	25) Poland	35) Singapore	45) Colombia
6) Italy	16) Brazil	26) Portugal	36) <b>Iran</b>	46) Slovakia
7) France	17) Finland	27) Hungary	37) Russia	47) <b>Lebanon</b>
8) Netherlands	18) Denmark	28) Ireland	38) South Africa	48) Bulgaria
9) Australia	19) South Korea	29) Greece	39) Chile	49) Cuba
10) Spain	20) <b>Israel</b>	30) Argentina	<b>40) Saudi Arabia</b>	50) Malaysia

## State of Clinical Neuroscience Research in Saudi Arabia

### Results

#### KSA Features Compared to the Top 50 Countries in CNS Research

Country Characteristic	KSA	Top 50 Range (Median)
Population (million)	<b>29</b>	2 – 1394 ( <b>23.5</b> )
GDP/capita (\$1000)	<b>52</b>	6 – 83 ( <b>31.5</b> )
Percentage GDP on R & D	<b>0.25%</b>	1.6 - 4.36% ( <b>1.4%</b> )
NS Journals in SCR	<b>2</b>	0 – 94 ( <b>1</b> )
Universities in top 500	<b>4</b>	0 – 164 ( <b>3</b> )

## State of Clinical Neuroscience Research in Saudi Arabia

### Results

Feature		Rank 1-25	Rank 26-50	Significance
Population (millions)	≤23.5	10(40%)	15(60%)	P=0.1573 (NS)
	>23.5	15(60%)	10 (40%)	
GDP/Capita (\$1000)	≤31.5	5(20%)	20(80%)	P<0.0001 (Sig)
	>31.5	20(80%)	5(20%)	
Percentage of GDP for R & D	≤ 1.4%	6(24%)	21(84%)	P<0.0001 (Sig)
	>1.4%	19(76%)	4(16%)	
Journals in SCR	≤ 1	9(36%)	18(72%)	P=0.0107 (Sig)
	>1	16(64%)	7(28%)	
Universities in Top 500	≤3	5(20%)	22(88%)	P<0.0001 (Sig)
	>3	20(80%)	3(12%)	

## State of Clinical Neuroscience Research in Saudi Arabia

### Results

#### CNS Performance Compared to Other Specialties in KSA

Specialty	Documents Rank	Documents RSI	Citation Rank	Citation RSI
<b>Clinical Neuroscience</b>	<b>37</b>	<b>-0.122</b>	<b>41</b>	<b>-0.201</b>
Median (46 subjects)	42	-0.088	43	0.022

#### Specialties Ranking Above Median with >0 RSI in Both Indices

Ophthalmology  
Transplantation  
Anesthesiology and Pain Medicine  
Pediatrics and Child Health  
Pulmonology and Respiratory Medicine  
Otolaryngology  
Clinical Genetics  
Clinical Biochemistry  
Nephrology  
Medicine (Miscellaneous)

## State of Clinical Neuroscience Research in Saudi Arabia

### Discussion CNS Research in KSA

- Ranked over last two decades **40th in World and 4th in Middle East**
- KSA has 3 out of 4 of the country-specific characteristics that are associated with being amongst the “Top 25”
  - ❖ GDP/capita >\$31,500 [\$ 52,000]
  - ❖ CNS Journals listed in SCR Listed >1 [2]
  - ❖ Universities in “Top 500” in the world >3 [4]
  - ❖ GPA spent on R & D < 1.4% [0.25%]

**KSA ranking in CNS research can be considered as low**



## State of Clinical Neuroscience Research in Saudi Arabia

### Discussion CNS Research in KSA

- **CNS RSI <0** [based on total documents and total citations]
- Our share in the world's CNS publications and citations is lower than KSA's share in the world's total publications and citations
- KSA's Total Documents (1996-2014)
  - Clinical Neuroscience:1,189**
  - Medicine: 10,361
  - Surgery: 2,194
  - Paediatrics: 1,533
  - ID: 1,496
  - Cardiology: 1,474
  - Ophthalmology: 1,253

**CNS research can be considered as lagging behind some specialties in KSA**

## State of Clinical Neuroscience Research in Saudi Arabia

### Discussion KSA Total Publications

1996	1998	2000	2002	2004	2006	2008	2010	2012	2014
943	901	804	844	936	940	1,131	1,603	2,620	3,513

KSA research activity increased in recent years

Tendency for publishing in local/ regional journals with low IF

- 1562 articles in 5 years, 0.26% journals with IF>7 (Latif 2015)
- Only 30 KSA articles in HIMJs over 30 years (Jamjoom 2015)

## State of Clinical Neuroscience Research in Saudi Arabia

### Discussion

#### Factors Affecting Quality of Research in KSA

- ❑ Lack of experience, time and interest
- ❑ Limited logistic and financial support
- ❑ Difficulties in initiating national collaborative research between different health sectors
- ❑ Difficulties in initiating international collaborative research
- ❑ Dilution of clinical load due to non-regionalization of tertiary care services
- ❑ **Absence of qualified Saudi clinicians holding higher research degree (PhD, MD)**

## State of Clinical Neuroscience Research in Saudi Arabia

### Discussion

#### Factors Affecting a Country's Ranking in Research

- Researchers
- Resources: **Highly Ranked Universities**  
**Journals with high IF**  
GDP/Capita  
% GDP on R & D
- Research Visibility: Journal (IF, Indexing, Open Access)  
Specialty & Topic  
Presentation in scientific meetings  
Reputation of the authors  
Language
- **Research Collaboration** with advanced countries

## State of Clinical Neuroscience Research in Saudi Arabia

### “Ophthalmology Experience”

Specialty	Documents Rank	Documents RSI	Citation Rank	Citation RSI
Ophthalmology	26	0.375	27	0.609

- King Khalid Eye Specialist Hospital (KKESH) (1983)
- Saudi Ophthalmological Society (1986)
- Saudi Journal of Ophthalmology (1986)

## State of Clinical Neuroscience Research in Saudi Arabia

### Study Limitations

- SCR web site accuracy: errors possible particularly with multi-national publications
- Topic overlap between different specialties
- Neurosurgery is mixed with other Neurosciences
- Exact role of KSA researchers not determined
- Bias against publications in recently-indexed journals which receive minimal citations
- Productivity indices may not provide true reflection of the quality of research

## State of Clinical Neuroscience Research in Saudi Arabia

### Conclusions

- KSA possesses a number of the country-specific characteristics that are associated with being amongst the top 25 in the world in CNS research
- CNS research in KSA can be considered lagging behind in world ranking and in comparison to some of the other specialties
- We need to promote “research culture” and develop our elite research minds in elite academic centres
- Universities and Neuroscience centres should establish clinical- academic departments staffed by Board certified PhD-holding clinicians
- National and International collaboration should be highly encouraged



Thank You