

# Neuropsychology in Developing Countries: What situation for the African Continent

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## Abstract

The aim of this literature review is to determine the current status and future challenges of neuropsychology in developing countries. The PubMed database was scanned using combinations of keywords and the resulting articles were reviewed for publications regarding the current status of education and practice of neuropsychology in developing countries. By focusing on 157 developing countries our study revealed only 42 studies from 19 developing countries recognized neuropsychology as a distinct discipline with clear formal education and Continuing Professional Development. The steady increase in neuropsychological disorders in developing countries, especially Africa, along with the increased attention for neuropsychological research, underlines the discipline's value and emphasizes the need for improved educational pathways for neuropsychology.

**Keywords:** Neuropsychology; Developing Countries; Africa; Education; Training

## Introduction

The discipline of neuropsychology investigates the relationships between brain processes, mechanisms, cognitions and behaviors [1]. The official emergence of neuropsychology as an independent scientific discipline can be dated back to 1963, when a small group of neurologists, psychologists, and psychiatrists partook in an informal discussion forum called the International Neuropsychology Symposium; resulting in publication of the international specialist journal *Neuropsychologia* [2]. Neuropsychology has an important role to play in the assessment of cognitive impairment in clinical practice, particularly in neurological disorders such as epilepsy, as well as degenerative and inflammatory diseases. So, it is crucial to increase the awareness and to develop research regarding neuropsychological measures in developing countries.

Developing countries have substantially diverse visions and goals. Many of these countries are classified as lower-middle-income like Morocco, Cameroon and Tunisia (with a Gross National Income, "GNI", between \$996 and \$3,895), or low-income such as Mali, Chad and Togo (with a GNI lower than \$995) [3]. What is more, these communities experience an unstable social environment marked by violence, exposure to civil combat and family displacement [3]. Africa holds more than a third of all developing countries worldwide, with many of the communities heavily indebted and impoverished [3]. Yet, neuropsychology, as a recognized practice, is in its infancy in these countries; especially within Africa. Since there is no clear definition regarding what constitutes a neuropsychologist, a number of professionals, such as neurologists, psychiatrists or general practitioners, can serve in this capacity without formal training [4]. There is few data substantiating the number of practicing neuropsychologists, or educational institutions that offer training in neuropsychology [4]. The known training programs are primarily located in developed countries, particularly English-speaking.

Most of the studies reviewed include little data on the state of neuropsychology as a recognized discipline with clear training pathways. The main objective of this study is to a) report, through a literature review, the state of neuropsychology in developing countries and b) to expose the barriers preventing the discipline from developing.

## Research Methodology

### Study Phases and Settings

A literature search was conducted in November 2019 in PubMed (1999 - 2019) in English, peer-reviewed articles using a search strategy related to neuropsychology and each developing country [5]; e.g. (('Neuropsychology')AND('Morocco' OR 'Mozambique'OR ...)).

## Inclusion and Exclusion Criteria

Articles were judged to be relevant upon meeting the following selection criteria: (1) articles must be indexed Medline studies that examine the current state of neuropsychology within a developing country/developing countries; (2) articles must be conducted in developing countries according to the International Monetary Fund's World Economic Outlook Database; (3) articles must not be based on case series or case reports of neuropsychological tests.

## Assessment of Studies

After an initial screening of study titles, abstracts and full articles were further assessed for relevance to the research questions. This strategy yielded 42 studies. An overview of their individual conclusions is presented in Appendix 1. All data and graphics have been stored and analysed using Microsoft Excel software for Windows 2007.

## Results

The PubMed database search revealed 2,474 articles. After eliminating duplicate materials and resources incompatible with our inclusion and exclusion criteria, 133 articles remained. Following a critical analysis of the entire articles, 42 articles illustrated the necessary methodological quality and relevance for our research objectives. Therefore, 42 articles were included in our research (Figure 1).

Of a total of 2474 studies screened, 42 studies met our goals; they come from 19 countries on 157 developing countries, with a percentage of 12%. The origins of the articles were as following from : Argentina (N = 5), Brazil (N = 8), Burkina Faso (N = 1), Cameroon (N = 1), Chile (N = 3), China(N = 4), Colombia (N = 1), Egypt (N = 1), Ghana (N = 1), India (N = 3), Kazakhstan(N = 1), Lebanon (N = 1), Mexico (N = 2), Poland (N = 1), Romania(N = 1), Russia (N = 3), Serbia (N = 1), South Africa (N = 3) and Uzbekistan (N=1) (Appendix 1).

The majority of the studies were published in the last 4 years, with 3 studies in 1999, 4 between 2000 and 2005, 5 between 2006 and 2010, and 30 between 2011 and 2019. About 71% of the studies were carried out in the last 9 years (post-2011), compared to 29% before 2010. Seven studies present the history of neuropsychology, detailing the beginning and chronological development of neuropsychology. Nineteen studies thoroughly assess the current state of neuropsychology, while fourteen studies show educational aspects including training and grants for clinical study. Other studies focus on the clinical validity of many neuropsychological tests and how to make them more efficient and practical.

South America accounted for the majority of the studies, i.e. 19 studies with a focus on the comparative progress of neuropsychology in different countries, particularly Brazil and Argentina. 10 studies were conducted in Asia, with China and India generating most of the publications. Only 7 indexed publications originated from Africa. Most of these were edited in South Africa (Figure 2) and highlighted the need for local standardization of psychology tests with the purpose of achieving consistent and relevant assessment practices. The African studies also focused on training strategies and discipline development.

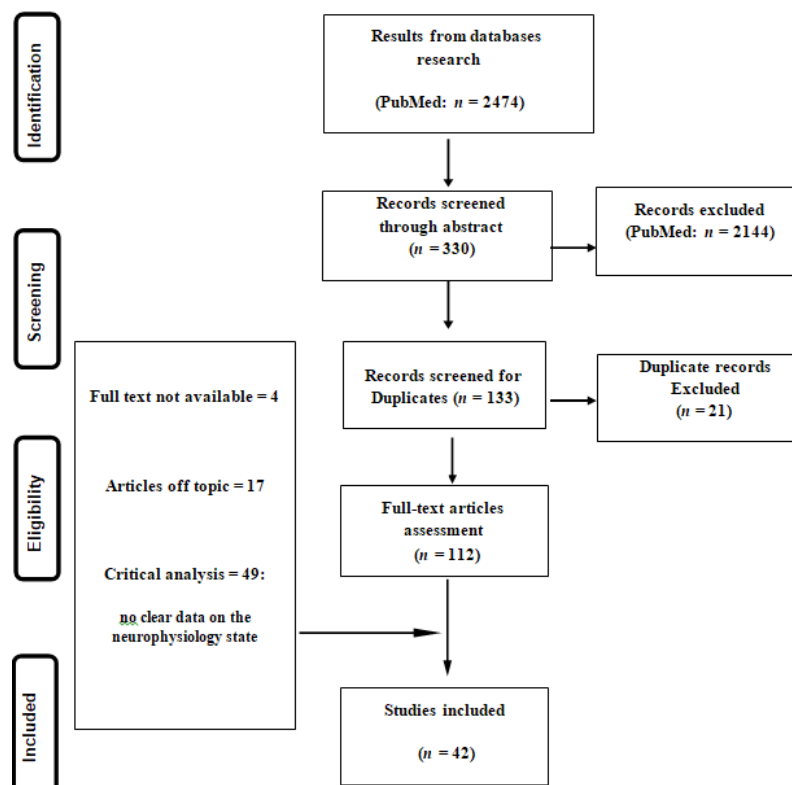


Figure 1: PRISMA flow chart for the systematic literature search for neuropsychology in developing countries

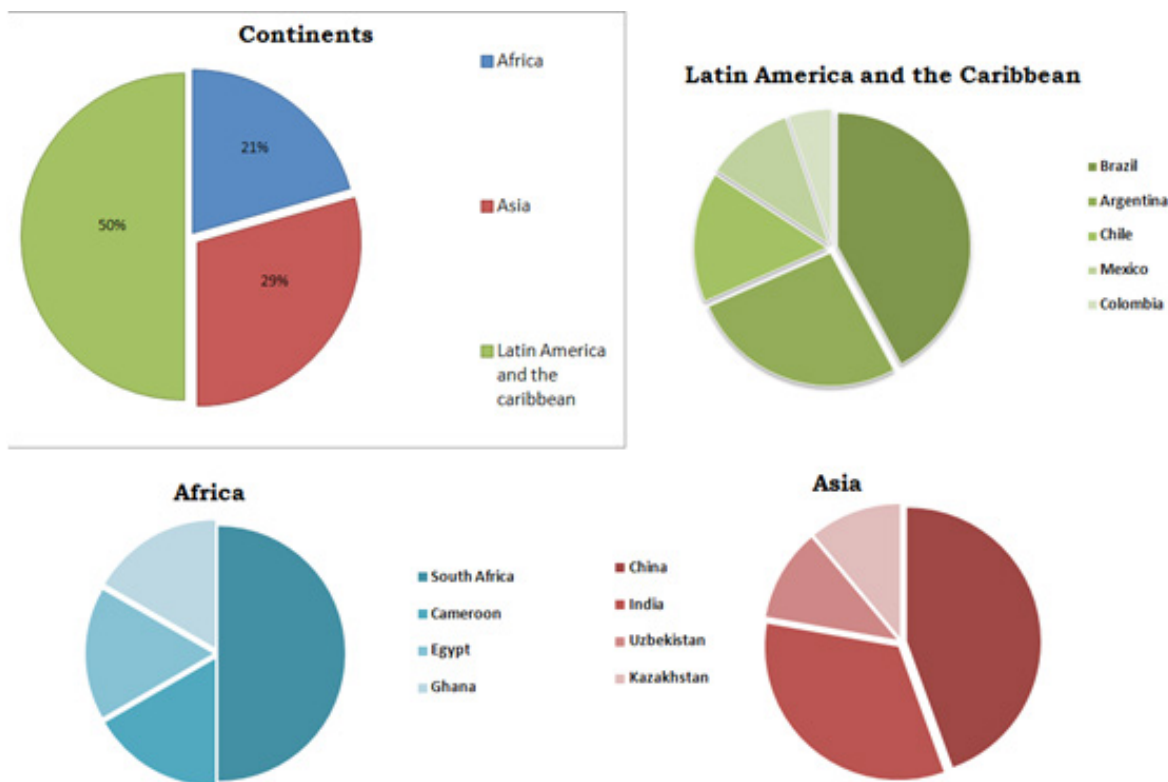


Figure 2: The distribution of articles on neuropsychology retrieved from the literature review in developing countries

## Discussion

Neuropsychology is a scientific discipline that bridges the fields of psychology, neurology and psychiatry [6]. The field of neuropsychology started in North America, Europe, and Australia, with less spread elsewhere [7]. Through our literature review, the large variability in the development of neuropsychology across regions has been made visible. To date, there has been no global systematic data collection to provide estimates on the number of neuropsychologists or educational institutions that offer training in neuropsychology. Our study shows the low level of focus on neuropsychology in developing countries, especially in Africa. The ongoing industrialization of Asia combined with a growing population and aging society, are contributing factors to the increase in the number of neuropsychologists and neuropsychology services. Some major Asian hospital departments have started developing training programs in clinical psychology, particularly in China and India [6,8-10].

Neuropsychology in Latin America has developed comparatively slowly for several reasons, including the heterogeneity of cultural and linguistic backgrounds across its countries [11]. In addition, differences in scientific and economic development influence the access to academic and professional resources [11]. As a result, Latin America has introduced both professional regulations and Higher education programs, as well as validated existing neuropsychological tests and created new culturally-relevant instruments. Currently, there are different postgraduate training programs in several countries, including Mexico, Colombia, Argentina, Chile, and Brazil [11-15].

As a recognized practice, neuropsychology has a slow development on the African continent compared to other continents [1]. It remains the last continent to expand the field of neuropsychology, with many African countries still lacking a high quality education system. Furthermore, the prominence of both traditional culture and traditional healing practices could potentially block the access and development of a neuropsychological assessment [1]. Few articles describe the progress of neuropsychology, and the role of the neuropsychologist in many African countries remains poorly defined. There are no specific criteria or qualifications required for professional practice. South Africa is a notable exception, however, as neuropsychology is well developed and neuropsychologists fulfil roles more compatible with Western countries' standards. Postgraduate programs in neuropsychology can also be pursued at a number of universities [1,4,16].

Our study highlights a huge gap between developing and developed countries in the field of neuropsychology. For instance, in the case of the United States and Canada, learning, training and the general development of skills to practice clinical neuropsychology are more commonly established through clear educational pathways. Moreover, Hong Kong and Canada have a strong representation of neuropsychologists in their territories, one potential cause being the availability of training resources, combined with efficient health systems [17]. Neuropsychology in developing countries, especially Africa, faces many ongoing challenges, mainly socio-political and economic. Consequently, high quality training and internship programs must be created along with large-scale direct funding for brain research. Furthermore, the establishment of neuropsychological units in the African public health system seems compulsory.

## Conclusion

Neuropsychology in the developing countries is a relatively young and unregulated field mainly in Africa. The need for neuropsychological services is increasing, despite the significant challenges in socio-cultural and economic diversity; developing country should improve the educational and training pathways for neuropsychologist along with the recognition of its value in clinical practice.

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## Appendix

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