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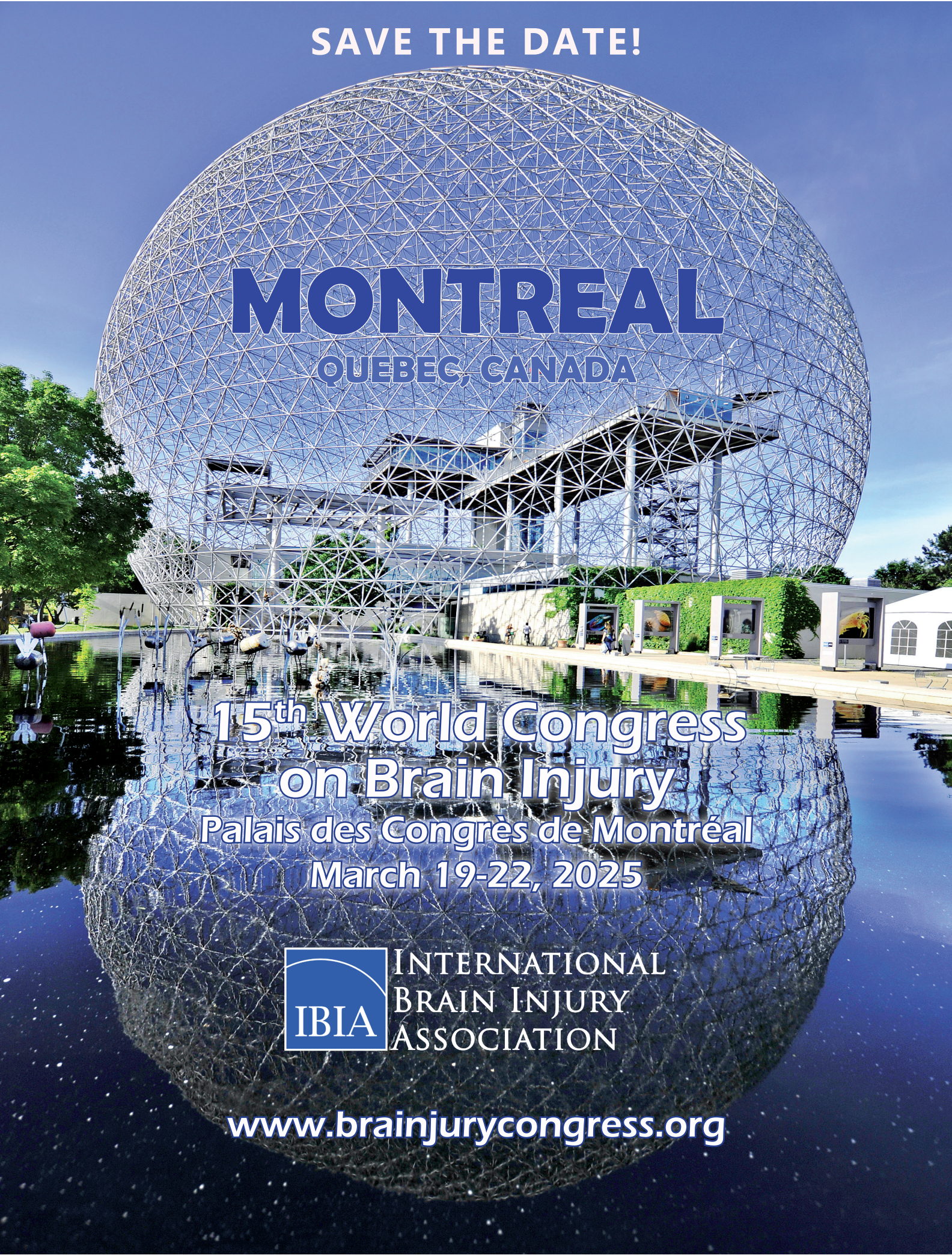
vol. 21 issue 3

Evaluation and Rehabilitation in Children and Young People following **Acquired Brain Injury** in Low- and Middle-Income Countries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Dr. Juan Carlos Arango Lasprilla

from the editor

We are proud to present the upcoming issue of Brain Injury Professional, titled "Evaluation and Rehabilitation in Children and Young People Following Acquired Brain Injury in Low- and Middle-Income Countries." This special issue is dedicated to addressing the unique challenges faced by healthcare professionals in the area of assessment and rehabilitation of pediatric brain injuries in resource-limited regions.

The feature article by Dr. Schrieff-Brown and colleagues "Challenges to Neuropsychological Evaluation and Rehabilitation Following Pediatric Acquired Brain Injury in Africa," provides a comprehensive review of the barriers and emerging solutions in this critical field. Complementing this analysis, we present four supporting articles that expand the discussion to other regions of the world. Dr. Juan Carlos Arango Lasprilla explores strategies and challenges in Latin America, while Dr. Lisa Kalungwana provides insights into the situation in Zambia. Dr. Sharon Truter shares her experience from South Africa, focusing on the neuropsychological assessment of children from low socio-economic backgrounds. Finally, Dr. Mishali Bhattacharjee and Dr. Michelle Manasseh offer an overview of neurorehabilitation in India.

Additionally, we feature an expert interview with the renowned Dr. Lucia Braga from Brazil, who shares her perspectives and experiences in pediatric rehabilitation in low-resource settings. This issue also includes two brief articles on neurohealth for youth and cross-cultural cognitive test norms.

We hope that this issue not only provides valuable information but also inspires professionals in the field to innovate and collaborate in the quest for effective solutions to improve the lives of children and young people affected by acquired brain injuries on this regions of the world.

Editor Bio

Dr. Juan Carlos Arango Lasprilla is an affiliate graduate faculty member at the college of Humanities and Sciences at Virginia Commonwealth University in the United States. His areas of expertise include brain injury, neurorehabilitation and cross-cultural issues. He currently has more than 400 publications between articles and book chapters, and his research has been published in several of the best medical and psychology journals in the world. During his professional career he has received around 20 recognitions, awards and/or distinctions both nationally and internationally. These include the Alejandro Ángel Escobar Award (Colombia), the Colombian Psychology Award (Colombia), three awards from the American Psychological Association (United States), the Early Career Award from the National Academy of Neuropsychology (United States), the scholarship Ramón y Cajal from the Ministry of Education of Spain (Spain), the Arthur Benton Mid-Career award from the International Neuropsychological Society (United States), The Mitchell Rosenthal Mid-Career award from the American Congress of Rehabilitation Medicine (United States United States), and the young investigator award by the International Brain Injury Association (Scotland) among others. Dr. Arango was the founder of the Ibero-American Congress of Neuropsychology, an event that to this day has had five versions and has attracted more than 5,500 participants from 38 countries around the world. Likewise, he has been the founder of the Iberoamerican Journal of Neuropsychology and the Colombian Society of Neuropsychology. Dr. Arango is a member of the editorial committee of 30 journals and a reviewer of articles for more than 60 prestigious international journals. He has been guest editor for six of the most important brain injury and rehabilitation journals in the world. He is the author of 20 books, a visiting professor at 150 different universities on five continents, and a speaker at several national, international, and world congresses in his specialty. Dr. Arango has given more than 700 conferences around the world and has trained students and professionals on five continents, many of whom are currently professors at universities in the United States, Latin America and Europe.

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Leigh Schrieff-Brown, PhD

Editor Bio

Leigh Schrieff-Brown obtained her PhD from, and is currently an Associate Professor in, the Department of Psychology at the University of Cape Town (UCT) in South Africa. She is also currently the Deputy Dean of Postgraduate Studies and Funding in the Humanities Faculty at UCT and a registered neuropsychologist in South Africa. She has built a research program around, and teaches primarily in, the area of pediatric traumatic brain injury (especially around a range of outcomes and predictors of those outcomes) and neuropsychological rehabilitation. She supervises and teaches on the pediatric component of the Masters in Clinical Neuropsychology in the department. She has supervised several postgraduate students (currently from honours to doctoral level), has published book chapters as well as a range of research papers in local and international journals, and presented at several local and international conferences in the above-mentioned fields. In terms of her international profile, she serves as a member of the Board of Directors for the International Paediatric Brain Injury Society (IPBIS), in which she chairs their Trainee/Early Career Subcommittee, as well as serving on the International Neuropsychological Society (INS) Justice and Equity Subcommittee and previously on the INS Science Committee. She is also the Regional representative for South Africa and the deputy chair of the INS Global Engagement Committee (GEC).

from the guest editor

Evaluation and Rehabilitation in Children and Young People following Acquired Brain Injury in Low- and Middle-Income Countries

Acquired brain injuries (ABIs) refer to traumatic and non-traumatic post-birth brain impairments, which are differentiated from congenital disorders, birth injuries/complications, and degenerative conditions[1]. Among ABIs, traumatic brain injuries (TBIs) are a leading cause of morbidity and mortality, previously reported to affect 69 million people annually[2]. Children and young people are unduly affected, particularly in low- and middle-income countries (LMICs), where there are much higher rates of road traffic accidents (a common mechanism of injury). However, the actual burden of pediatric TBI is difficult to quantify in such contexts[3,4].

While some individuals recover post-injury, especially after less severe injuries, many experience chronic symptoms[5]. Such morbidity following TBI and other ABIs translate into many children and young people living with post-TBI sequelae, which can affect various areas of functioning, including cognitive, behavioural, and emotional, but also educational, psychosocial, and familial aspects of their lives[6,7]. Post-ABI investigations, which can often include neuropsychological assessment, are essential to establish the strengths and needs of individuals with brain injuries across these areas of functioning, and to plan for effective interventions[8,9].

As will be evident in the submissions included in this issue and a longstanding focus within cross-cultural neuropsychology[10,11], despite the recognized utility of such post-ABI evaluations across various functional domains, and with neuropsychological assessments in particular, these assessments are largely developed in high-income countries (HICs), which often limits the appropriateness, and consequently, the utility of such evaluations in LMICs, unless specifically adapted for and validated in such contexts[12].

Further, although neurorehabilitation is recommended for children and young people following ABI[13], there are challenges associated with the implementation of some rehabilitation services even in HICs[14]. However, such post-ABI rehabilitation offerings are the least available and not standard practice in LMICs[15], where the need for such services requires greater recognition, as highlighted in a recent policy framework for the prioritization of such services in LMICs[16].

The selection of articles, the expert interview, and sidebars included in this issue, all pertain to and/or address one or more of these issues in various LMIC settings (including foci on Latin America, Zambia, South Africa, India, and Brazil). Distinct messages and recognition of the needs of children and young people following ABIs in LMIC contexts pervade these contributions, including the issue of cost, fair assessments, scarcity of professionals, services, and training around evaluation and rehabilitation. Yet, there are also examples of progress in the evaluation domain (as displayed in our sidebars) and recommendations of how we might progress through, for example, telehealth and neurotechnology, expansion of services and training, and continued advocacy for children and young people with ABI, from our authors. The inspiring SARAH Network of Rehabilitation Hospitals in Brazil, as described in our expert interview, also highlights the efficacy and effectiveness of family- and community-centred rehabilitation in a LMIC setting. I wish to thank all authors for their important contributions to this BIP issue.

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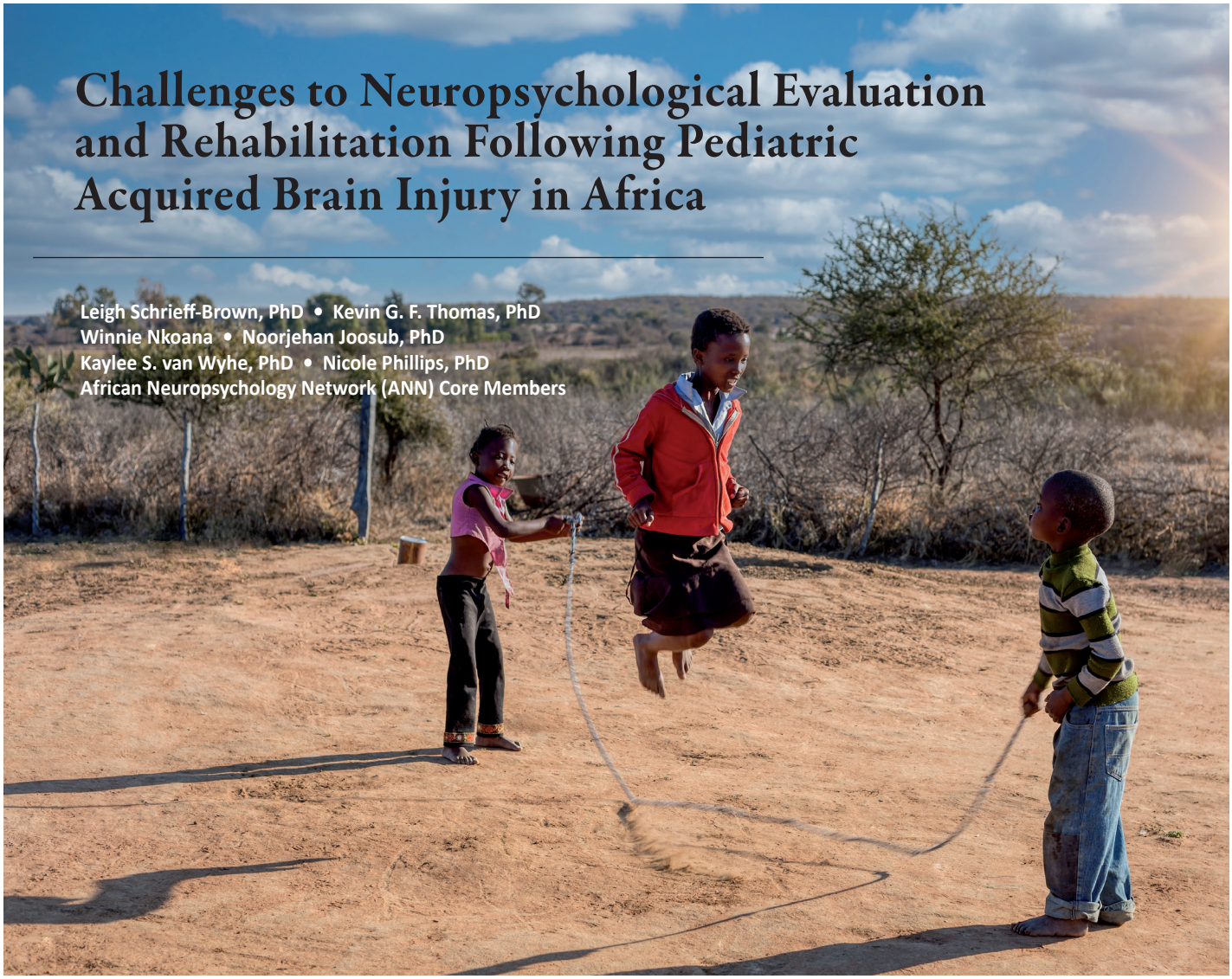
Challenges to Neuropsychological Evaluation and Rehabilitation Following Pediatric Acquired Brain Injury in Africa

Leigh Schrieff-Brown, PhD • Kevin G. F. Thomas, PhD
Winnie Nkoana • Noorjehan Joosub, PhD
Kaylee S. van Wyhe, PhD • Nicole Phillips, PhD
African Neuropsychology Network (ANN) Core Members



Introduction

Africa is home to almost 1.5 billion people[1]. Recent epidemiological statistics indicate that approximately half of that population is aged under 18 years and that the pediatric population of the continent will exceed one billion by 2055[2].

Equally remarkable socioeconomic characteristics accompany this remarkable age-related demographic characteristic. World Bank Group classifications suggest that, compared to other geographic regions, Sub-Saharan Africa (SSA) contains the highest proportion of low- and lower-middle-income countries (LMICs)[3,4]. This means that many African countries have a gross national income (GNI) per capita of $1,145 or less (low income), or of between $1,146 and $4,515 (lower-middle income). Contrast that to high-income countries (HICs); (those with a GNI per capita of more than $14,005), and it is clear that this continent faces greater economic adversity than others.

Another notable characteristic of the African continent relates to language and communication. Less than 1% of individuals on the continent speak English as a first language, even though about half of the African countries (27/54) have English as their first or second official language[5].

In addition to the polyglot nature of the continent, distinct cultural practices (e.g., communitarian rather than individualistic principles and intergenerational transmissions of traditions through oral rather than written information) add to the unique African contextual landscape[6]. Further, in contextualizing Africa, in addition to the diversity found within its people, there are also adversities one must consider that shape development. The degree of exposure to such adversities differs across African countries (e.g., climatic conditions, pandemics, and warfare)[7].

Regarding acquired brain injuries (ABIs) in Africa, most research has focused on traumatic brain injuries (TBIs). Epidemiological evidence suggests there is a higher burden of such injuries in low and LMICs (e.g., as found in Africa) than in higher-income countries[8]. Regarding the characteristics of African children who have experienced TBI, a recent systematic review found that most were male, with an average age of approximately 6.5 years and an injury classified as mild. Furthermore, most injuries occurred due to motor vehicle accidents (MVAs) and falls[9]. Another recent local publication also shows that pedestrian, bicycle, and MVAs contribute significantly to the high incidence of ABIs in the African context[10].

High rates of neurodisabilities like TBI, with a wide range of associated neuropsychological sequelae, create a high demand for neuropsychological services. However, despite this demand Africa has seen slow progress in the development of neuropsychology (i.e., education and training in the field, and the degree to which the role of neuropsychologists is defined locally)[11,12]. South Africa is a notable exception in this regard, with relatively well-developed research and clinical training programmes and an active professional association[13,14]. For example, in a scoping review of the burden of TBI in SSA from a neurosurgical perspective, more than 50% of the sample of 107 studies emerged from South Africa[15].

Against this backdrop, we discuss Africa-specific challenges to neuropsychological evaluation and rehabilitation following pediatric acquired brain injury.

Challenges to local neuropsychological evaluations

Although there's been extensive growth in the field of neuropsychological assessment[16], and its utility is recognised[17], challenges persist, particularly in diverse contexts such as those found in Africa. These challenges are deeply rooted in the socio-economic and healthcare disparities that exist across Africa. For one, the interpretation of neuropsychological tests relies on the use of normative data, against which to assess an individual's performance. Herein lies one of the major challenges to such assessments. The socioeconomic, linguistic, and cultural diversity in Africa, in addition to the slow development of neuropsychology in this context (as outlined above), poses multiple challenges to the conduct of neuropsychological assessments and the use of neuropsychological tests. Researchers have consistently reported that such diversity, juxtaposed against neuropsychological assessment test norms, which primarily stem from western, educated, industrialized, rich, and democratic (WEIRD) countries, and which may therefore not apply and/or be fair to individuals from local, non-WEIRD contexts, are problematic and even an ethical issue in neuropsychological practice[13]. Thus, researchers have reported that challenges to local neuropsychological outcome assessments include the lack of locally developed, socio-demographically, educationally appropriate, and culturally fair or sensitive assessment measures and norms, as well as financial constraints around the purchase of neuropsychological tests[18,19]. These challenges drive efforts regarding test adaptation and translation, as well as norm development which has been reported in some African countries, e.g., Kenya, South Africa, Uganda, Zambia, and Zimbabwe[20-27]. Once normative data has been established they need to be regularly updated to reflect the changes within the population, which is influenced by the shifts in the economic and education climate. In addition to the dearth of culturally appropriate assessments, treatment is further denied when there is a lack of appropriately trained neuropsychologists to administer and interpret these assessments. This creates further disparity as those most vulnerable to brain injury often do not receive the care they need due to not having access to appropriate assessment. While there is a premise for task shifting in primary health care to address healthcare worker shortages[28], this approach has not yet been adopted in the field of neuropsychology. While we are not aware of the exact number of neuropsychologists in Africa, overall there is a shortage of psychologists on the continent, especially those serving in the public sector, suggesting that the number of neuropsychologists is likely also very limited. Training programs are limited, and the number of graduates from these programs is not enough to meet the demand[29].

In our pursuit of developing more culturally appropriate assessments, we also need to establish financially feasible assessments that can accommodate task shifting in the context of the LMIC healthcare systems in Africa. In doing so, we require a multifaceted approach, which includes the development of culturally appropriate tests, local normative data, and expanding training programs for neuropsychologists and allied mental health care workers.

Challenges to neuropsychological rehabilitation

According to the World Health Organisation (WHO) "rehabilitation addresses the impact of a health condition on a person's everyday life by optimizing their functioning and reducing their experience of disability"[30]. Even though there is a greater need for rehabilitation services many countries are not adequately equipped to offer rehabilitation services, with more than 50% of individuals in LMICs having no access to rehabilitation (WHO). In a paper looking at local and global challenges in pediatric traumatic brain injury (pTBI) outcomes and rehabilitation assessment, researchers also demonstrate that although availability and access to rehabilitation is a challenge globally, this challenge is exacerbated in LMICs[19].

Regarding such challenges to neuropsychological rehabilitation following ABI in children, many of the local assessment challenges described overlap with challenges put forward for rehabilitation, and especially, neuropsychological rehabilitation. This is likely because outcomes thereof are most often assessed, using neuropsychological measures. Regarding cultural beliefs, for example, how individuals may conceptualize and understand the causes of ABI, can pose a barrier to accessing neuropsychological rehabilitation. For example, such individuals may hold beliefs that one has sustained an ABI due to their wrongdoings and therefore, such injuries are a form of punishment. There may also be a belief of an ancestral calling and therefore consulting available mainstream treatments where neuropsychological rehabilitation is available may not be an option[31]. Therefore, these researchers recommend that Western biomedical providers and African traditional healers should work together for the benefit of the patient.

Further global challenges to rehabilitation (e.g., methodological challenges, availability of cognitive rehabilitation, and awareness of deficits post pediatric TBI) are compounded in lower-income contexts, given infrastructural and resource limitations and development of the discipline of neuropsychology, as well as the cultural and socioeconomic diversity described[19]. For example, children with ABI are exposed to different levels of discrimination and power differentials due to many evidence-based rehabilitation practices being developed in Western contexts, which may not be generalisable to culturally diverse and low SES contexts[31].

There are however, other challenges also put forward that are unique to the implementation of neuropsychological rehabilitation. The preparedness of communities to assist patients with rehabilitation once discharged from medical care is another significant contextual factor. In the African context, the lack of widespread education on ABI and the need for lifelong rehabilitation assistance after such an injury contributes to communities not being prepared for residual impairments post-TBI. Cognitive and psychosocial sequelae are often invisible and are therefore difficult to predict and prepare for at discharge from acute care settings[10].

Family members are integral to optimal rehabilitation outcomes, however, the psychoeducation and preparation of these family members need more consideration, specifically in rural areas. This could include Community Rehabilitation Facilitators (CRFs) who are members of communities who have been trained and can be instrumental in the transfer of knowledge and skills back to communities. There are cultural strengths within African communities that could also improve rehabilitation outcomes, such as indigenous healing practices, rituals involving music, and communal integration[10]. Further, children rely on their primary caregivers for advocacy and agency to be able to access required healthcare services, and this may be challenging in households that are child-headed. For example, in 2022 in South Africa, the figure of child-only households was 0.2% of all children (or approximately 44000)[32].

In sum, the design of rehabilitation interventions should ideally incorporate principles from systems theory, where contextual factors, such as linguistic diversity, are taken into account[10]. Further, other considerations that have been put forward for better TBI management in SSA, but which can be extrapolated to other countries in Africa, more generally, include infrastructural development and improvement in healthcare, better pre-hospital admission care, and transportation, and improving knowledge and awareness of TBI[33]. These authors, consistent with others, put forward the ongoing necessity for unique, locally appropriate interventions aimed at addressing the public health issue of TBI in SSA through holistic and evidence-based approaches[33].

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Author Bios

Leigh Schrieff-Brown obtained her PhD from, and is currently an Associate Professor in, the Department of Psychology at the University of Cape Town (UCT) in South Africa. She is also currently the Deputy Dean of Postgraduate Studies and Funding in the Humanities Faculty at UCT and a registered neuropsychologist in South Africa. She has built a research program around, and teaches primarily in, the area of pediatric traumatic brain injury (especially around a range of outcomes and predictors of those outcomes) and neuropsychological rehabilitation. She supervises and teaches on the pediatric component of the Masters in Clinical Neuropsychology in the department. She has supervised several postgraduate students (currently from honours to doctoral level), has published book chapters as well as a range of research papers in local and international journals, and presented at several local and international conferences in the above-mentioned fields. In terms of her international profile, she serves as a member of the Board of Directors for the International Paediatric Brain Injury Society (IPBIS), in which she chairs their Trainee/Early Career Subcommittee, as well as serving on the International Neuropsychological Society (INS) Justice and Equity Subcommittee and previously on the INS Science Committee. She is also the Regional representative for South Africa and the deputy chair of the INS Global Engagement Committee (GEC).

Kevin G. F. Thomas holds the position of Professor and Dean of the Faculty of Humanities at the University of Pretoria in South Africa. He completed doctoral training in clinical psychology and neuropsychology at the University of Arizona and a neuropsychology internship at the University of Florida before moving to the University of Cape Town, where he was Professor and Head of the Department of Psychology. His research, which has been funded by the US National Institutes of Health and the South African National Research Foundation, focuses on cross-cultural neuropsychology and on modifiable causes of cognitive dysfunction (e.g., HIV, fetal alcohol spectrum disorders).

Winnie Nkoana is a lecturer in Cognitive Neuroscience in the department of Psychology at the University of the Witwatersrand, Johannesburg, South Africa. She is also completing her PhD in Psychology at the University of Cape Town. Her expertise are in social work, neuropsychology, research methods and teaching. Her research interests are in forensic neuropsychology, looking at neurodevelopmental disorders (e.g., TBI, LDDs, etc.) and access to education in populations within this context. She is also passionate about improving brain literacy in South African communities.

Noorjehan Joosub is a neuropsychologist specializing in traumatic brain injury (TBI) and neuropsychological rehabilitation. Research interests focus on exploring psychosocial and neurocognitive outcomes post-TBI, and neuropsychological rehabilitation interventions.

Kaylee S. van Wyhe holds a PhD specializing in Neuropsychology, with expertise in conducting longitudinal cognitive and behavioral assessments of children in low-income countries. Her research focuses on cross-cultural assessments, particularly the adaptation and development of fair and culturally appropriate testing measures. Over the past decade, Dr. van Wyhe has been actively involved in pediatric HIV research. She currently serves as a neurocognitive assessment and research specialist at Stellenbosch University, where she manages a project investigating the long-term effects of in utero exposure to HIV and antiretroviral treatment on child development.

Nicole Phillips earned her PhD from the Department of Psychiatry at the University of Cape Town and has nearly a decade of experience in the fields of child and adolescent HIV and mental health. Her research includes examining the long-term effects of antiretroviral therapy on brain development and conducting neuropsychological investigations to improve screening for HIV-associated neurocognitive disorders. Dr. Phillips' work addresses neurocognitive effects of HIV, treatment adherence, and care engagement. Her expertise also spans the intersections of substance abuse and HIV risk behavior, HIV testing strategies, mental health services for individuals living with HIV, and interventions to screen for and address various mental health disorders in this population.

African Neuropsychology Network (The ANN) is an emerging network led by a set of African neuropsychologists in academia, based at various institutions, currently in Sub-Saharan Africa. We aim to expand the network across the continent to be truly representative of an African network. The ANN aims to be the first International Neuropsychological Society (INS) Global Engagement Committee (GEC) (pilot) network, focused on developing, networking, transforming, and mobilising neuropsychology in academia across Africa, and from within Africa. It aims to foster a culture of connectivity and collaboration in neuropsychology across academic institutions and related educational settings in Africa, to expand education and training in neuropsychology. Currently, our core members include Bjorn Christ , Debra Machando, Jean Ikanga, Kaylee van Wyhe, Kevin Thomas, Leigh Schrieff-Brown, Lingani, Mbakile-Mahlanza, Lisa Kalungwana, Nicole Phillips, Noorjehan Joosub, Progress Njomboro, Ridwana Timol, Sizwe Zondo, and Winnie Nkoana.

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Addressing Pediatric Traumatic Brain Injury in Latin America: Challenges and Strategic Solutions

Juan Carlos Arango Lasprilla, PhD

Traumatic brain injury (TBI) is among the leading causes of mortality and disability in children and adolescents[1]. A significant number of children who survive such injuries often suffer from long-term physical, cognitive, and emotional sequelae[2], which frequently hinder their reintegration into family, social, and educational settings.

Factors such as inadequate road infrastructure, less stringent safety regulations, socioeconomic disparities, limited access to emergency medical care, cultural norms or beliefs, interpersonal and community violence, and the lack of prevention programs contribute to the higher incidence and prevalence of pediatric TBI in lower-income regions compared to more developed countries[3]. For instance, in Latin America, thousands of children experience TBIs annually due to some of these causes such as traffic accidents, falls, sports-related injuries, or acts of violence, among others[2].

In Latin America, there is a scarcity of accurate data on the incidence and prevalence of TBI, with existing data often varying significantly between countries and regions[2]. For example, in Argentina, TBI-related deaths account for 30 to 35% of total fatalities among children aged 1 to 14 years. Following motor vehicle accidents, falls are the most frequent cause of death in children, with those under 2 years being the most affected age group[4]. In Peru, a study at the National Hospital Cayetano Heredia in Lima from 2004 to 2011 reported a significant number of TBI cases in children[5], while another Peruvian study indicated that TBI was the leading cause of death among children from infancy to 14 years old6. Further, a study conducted at a hospital in Cali, Colombia, found that 57.3% of mortality cases due to trauma in children were attributable to TBI[7], while studies in Uruguay indicated that traffic accidents, followed by falls and abuse, are the primary causes of pediatric TBI[8,9]. In Honduras, falls have been reported to account for up to 76% of TBI cases[10].

More recently, Valdivia-Tangarife and colleagues[11] investigated the incidence and associated factors of TBI in the western region of Mexico, finding a high incidence of moderate to severe TBI, with a substantial number of cases related to traffic accidents, falls from heights, and sports activities. A higher prevalence of TBI was observed in boys compared to girls.

Identified risk factors included the lack of appropriate protective equipment, inadequate adult supervision, and unfavorable environmental conditions.

Overall, there is a significant lack of public awareness in Latin America regarding what a TBI is, its consequences, and the available treatment and rehabilitation options. For instance, Olabarrieta and colleagues[12] conducted a study with teachers in Latin America and Spain to assess their knowledge and understanding of TBI and their consequences. The results revealed that the vast majority of teachers were unaware of what a TBI was, how to identify these issues in school settings, the specific symptoms associated with TBIs, and the short- and long-term consequences for affected children.

This situation is concerning, as it is likely that many children in Latin America, particularly those with mild TBI, have never been to a hospital or received any form of evaluation. Conversely, children with moderate to severe TBI typically receive initial hospital care in emergency services, and due to the severity of their condition, some are transferred to intensive care and neurosurgery units.

For those who survive the trauma, it is common to be discharged from the hospital and referred for physical, speech, or occupational therapy. This varies greatly depending on the country and geographic area, as in some cases there are no specialists available in these fields at the local hospital, or the hospital is far from the patient's home, making access to rehabilitation services difficult. Additionally, many families lack the financial resources to pay for these services, leading to some children receiving only minimal rehabilitation or none at all.

Upon discharge, a significant percentage of these children are found to have cognitive issues such as attention deficits, memory difficulties, language problems, slowed cognitive processing, and executive function disorders, among others[2]. In a study by Ramos and colleagues 2019 aimed at exploring the trajectory of cognitive functioning during the first year post-injury in a group of Mexican children with TBI, it was found that: 1) children with TBI exhibited significant impairments in working memory, inhibition, attention, and overall executive functioning compared to healthy controls; 2) there was a significant improvement in executive function scores at 12 months post-injury, although children with more severe injuries continued to show deficits compared to controls; and 3) injury severity was correlated with worse cognitive outcomes, with children who sustained severe TBI exhibiting greater deficits in fluid reasoning and processing speed[13].

In addition to cognitive issues, these children often experience emotional and behavioral problems such as anxiety, depression, stress, conduct disorders, aggression, and impulsivity, among others[2]. However, to date, no studies have been conducted in this area on children with TBI in Latin America. It is common that once these children are discharged and return home, their immediate family members, particularly their parents, assume the role of caregivers. However, due to the almost complete absence of patient or family associations for individuals with TBIs or specialized public or private institutions dedicated to the rehabilitation of these issues, it is often the parents who must empirically manage the rehabilitation and address the physical, cognitive, emotional, and behavioral problems of the patients without adequate information or knowledge on what to do in such cases. This situation leads to many of these caregivers developing emotional problems, which in turn affects their quality of life and, consequently, that of the entire family.

Taking all of the above into account, we can say that cranial trauma in children and adolescents in Latin America is a public health problem due to its high incidence and prevalence, the short- and long-term consequences it usually entails, and the high economic costs it imposes on both families and society. Below, I will list some actions that should be taken to improve the care of these children and their families in the region:

Strengthening Health Systems

It is crucial to equip existing hospitals with the latest technologies and necessary equipment to offer specialized rehabilitation services. Additionally, it would be important to create more specialized hospitals to treat these patients, given the high demand for these services. It is also important to train medical, nursing, psychological, speech therapy, physical therapy, and occupational therapy staff in the latest advances in pediatric rehabilitation.

Creating Education and Awareness Programs

Informative campaigns should be created to teach how to recognize cranial trauma and its main symptoms. It is also important to develop prevention and awareness programs through media and social networks about the importance of using protective measures such as helmets, seat belts, and other precautions like not driving under the influence of alcohol or while talking on the phone.

Training Rehabilitation Professionals

It is essential to create undergraduate and postgraduate programs at universities to train professionals in various health fields related to pediatric neurorehabilitation, such as medicine, occupational therapy, psychology, physical therapy, and speech therapy. It is also important to train these professionals in the use of new technologies such as robotics, computer use, virtual reality, and tele-rehabilitation, among others.

Access to Rehabilitation Services

It is not only important to have access to professionals and specialized rehabilitation centers, but also to ensure these services are accessible to people of all socioeconomic levels and social strata. It is crucial that the quality and quantity of rehabilitation available to patients are accessible to all, ensuring no one is left without these services. In cases where patients live in rural areas, telemedicine should be utilized to provide the necessary services.

Research

Professionals in rehabilitation should be trained in research methodology, statistics, and scientific writing, so they can conduct quality research and present their results at conferences and in specialized journals, both nationally and internationally.
More epidemiological studies should be conducted to understand the incidence and prevalence of these problems in all Latin American countries, as well as the risk and prognostic factors. Efforts should be made to create culturally adapted evaluation instruments for our patients and families. Local and regional multicenter studies should be conducted to investigate the short- and long-term physical, cognitive, emotional, and behavioral outcomes of these patients. Additionally, work should be done to create physical, emotional, and cognitive rehabilitation programs, as well as treatment and support programs for families.

Creation of Scientific Associations

The creation of national and regional scientific associations of professionals in the field of rehabilitation is of utmost importance. Through these associations, conferences and scientific events can be organized where professionals can share the latest advances in this field, and collaborative work between professionals and institutions at both local and international levels can be fostered.

Creation of Patient and Family Associations

These associations play a very important role in providing information, emotional support, education and awareness, advocacy, and promotion of research.

Currently, there are many such associations internationally (International Brain Injury Association, North American Brain Injury Association, Federation of People with Acquired Brain Injury) that could provide help and advice for the implementation of similar organizations in different Latin American countries.

Public Policies

Implementation of public policies that improve current safety regulations and the creation of prevention programs is necessary. Investment in health, especially in emergency care and neurorehabilitation, should be increased, and pension plans for disability should be improved, along with the creation of subsidy policies and economic support for these patients and their families.

Collaboration and Alliances in the Region

It is important to create working groups and alliances at both national and regional levels to promote teamwork and the execution of academic activities that lead to the acquisition of resources for the development of future rehabilitation programs and initiatives aimed at improving the quality of life of these patients and their families in our region.

Conclusion

In conclusion, TBI in children and adolescents is a significant public health issue in Latin America due to its high incidence and prevalence, as well as its short- and long-term consequences. This problem is exacerbated by the lack of accurate data, socioeconomic disparities, and the insufficiency of prevention and rehabilitation programs. The situation is alarming as many affected children do not receive adequate care or the necessary rehabilitation to fully recover, negatively impacting their social, educational, and familial reintegration.

To address this issue, it is imperative to strengthen health systems by equipping hospitals with the necessary technology and equipment to offer specialized rehabilitation services. The creation of education and awareness programs is fundamental to prevent TBI and recognize its symptoms early. Additionally, it is essential to train professionals in pediatric rehabilitation, ensuring that all patients, regardless of socioeconomic status, have access to these services. Research plays a crucial role in understanding and treating TBI. Epidemiological studies should be conducted to identify risk and prognostic factors, and culturally adapted evaluation instruments should be developed. The creation of scientific and patient associations is vital for knowledge exchange and providing emotional and educational support to affected families.

Finally, public policies must be implemented to improve current safety regulations, invest in emergency care and neurorehabilitation, and provide economic support to the families of patients.

Collaboration and regional alliances are fundamental to fostering teamwork and developing rehabilitation programs that improve the quality of life for patients and their families in Latin America.

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Author Bios

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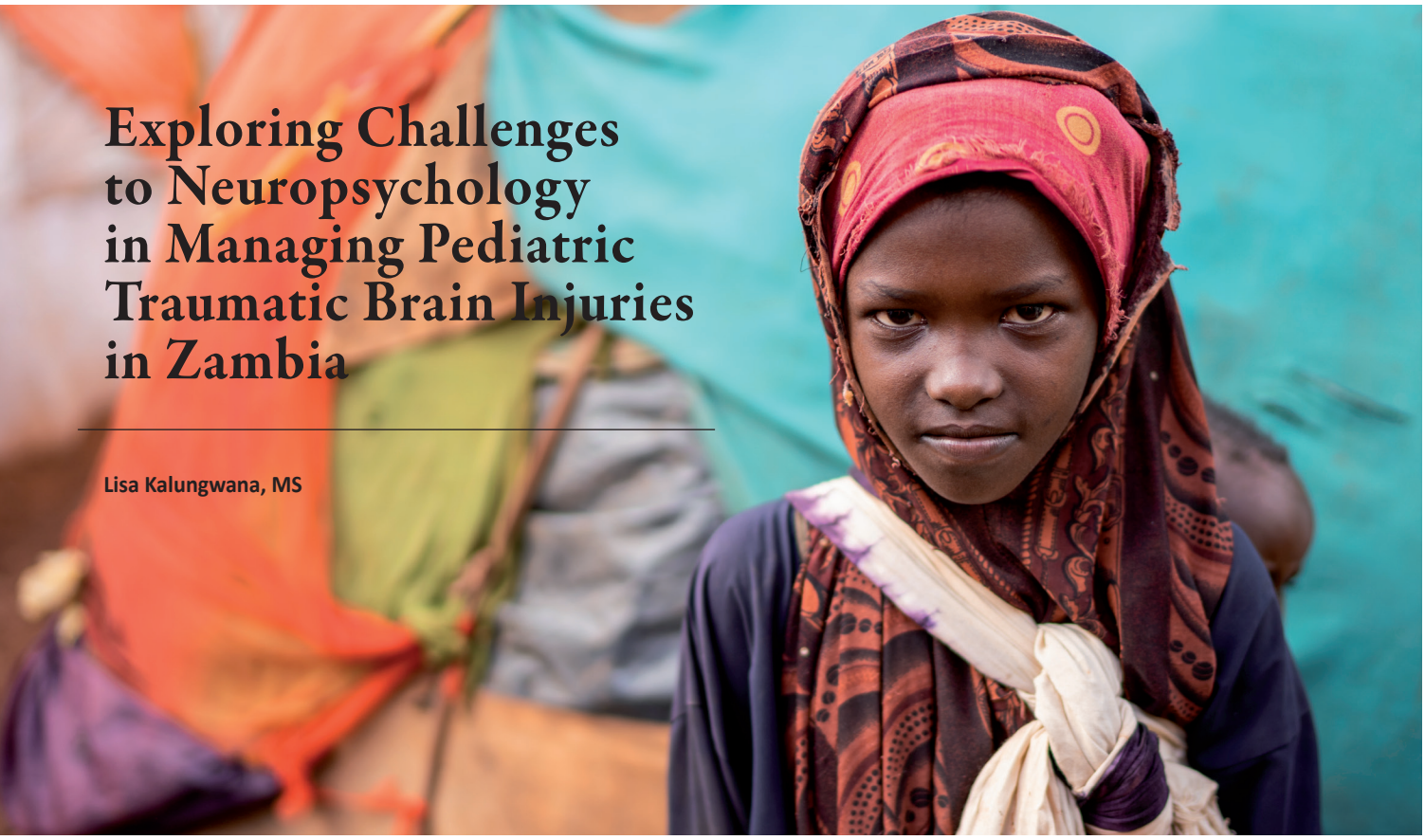

Exploring Challenges to Neuropsychology in Managing Pediatric Traumatic Brain Injuries in Zambia

Lisa Kalungwana, MS

Traumatic brain injury (TBI) is a prevalent condition in childhood. However, outcomes of pediatric TBI (pTBI) tend to vary depending on the age of the injury, the severity of the injury and treatment services accessed, and how long it took to access treatment after the TBI incident[1]. Pediatric TBI (pTBI) often results in damage to brain functioning with consequent neurocognitive and behavioral sequelae. The effect of damage to the developing brain, especially after more severe injuries, and in the context of other stressors, tends to have long-term effects[2]. It is further reported that children from low socio-economic status backgrounds are particularly at risk of TBI, and are less likely to receive comprehensive health care and social support for the long-term effects, which can also exacerbate such long-term outcomes[3].

Low- and middle-income countries (LMICs) tend to experience more TBI cases than high-income countries (HICs), with countries such as Zambia tending to have some of the poorest outcomes for pTBI[4]. In developing world countries, health care systems to manage TBI or provide follow-up services are barely present, contributing to high mortality rates and significant life lived with disability and familial burden. The focus of this paper will be to explore the challenges associated with managing pTBI in Zambia. The paper will explore specific areas such as lack of resources, shortage of trained specialists, access to care, testing challenges, interdisciplinary collaboration, as well as long-term follow-up and care.

Background

TBI has previously been reported to be the leading cause of admission to the intensive care unit (ICU) at the University Teaching Hospital (UTH), which is the largest tertiary hospital in Zambia[5].

Other studies on patient outcomes among those admitted to the ICU at the UTH show that road traffic accidents (RTAs) were the major cause of TBIs with TBI-related deaths estimated between 51% and 56.9 %[6,7].

One of the first challenges in managing pTBI is being able to identify cases; the records of all pediatric cases are normally managed in the adult emergency care unit. Of all cases that were included in the study referenced above[6], 15% were under the age of 16. However, these children are rarely referred to the children's hospital for further management. This indicates that the majority of children with TBI may be falling through the cracks in terms of such follow-up, which increases the likelihood of experiencing poorer outcomes. To the best of my knowledge, there is only one study that evaluated neuropsychological deficits of TBI among adults. Results of the study indicated that 90% of the participants had deficits in the executive functioning domain[8]. All three TBI-related studies carried out in Zambia have recruited patients from the emergency room with no mention of clear post-traumatic care. This indicates a greater need for further exploration and management of TBI beyond managing medical outcomes. The 90% incidence of executive functioning deficits in the adult population speaks to a greater need to explore additional ways of understanding and addressing outcomes of children experiencing TBI.

In addition to poor identification, neuropsychological interventions tend to be a secondary service that if not requested, or when both health practitioners and recipients of care are unaware of it, cannot be accessed. Between 2011 and 2024, there were 9 trained neurologists in Zambia[9]. The training of neurologists has seen an improvement in the identification of patients in the system, however, it may take time before the collaboration between neurologists and other service providers can create the link required for patient care[10].

Currently, the UTH in Zambia only has one neuropsychologist attached to the hospital for secondary services. The lack of placement of neuropsychologists in primary healthcare facilities limits the extent to which interventions may be provided when needed.

Neuropsychological Testing Resources: In Zambia, as the field of neuropsychology has grown, there has been an increase in the number of standardized neuropsychological tests available for use. However, Zambia's diverse cultural landscape with 7 major languages and up to 73 dialects[11] presents challenges in conducting neuropsychological assessments that are culturally and linguistically appropriate. The first set of neuropsychological tests that were standardized for use in the Zambian population is a revised version of the International HIV Neuropsychological Assessment Tool, which has been adapted and standardized for use in Zambian adults with at least 5 years of education and aged 16 and above[12]. Early standardization of pediatric neuropsychological tools was done with the NEPSY[13]; however, the sample was small and limited to urban populations, which makes it difficult to standardize the tools for use in rural settings. More recently, the National Institute of Health (NIH) toolbox was validated for use with children in the Zambian community; similar to other tools, the tests were validated in Lusaka and used in English[14]. Despite these developments, none of these tools have been translated for use in any of the local languages, which makes it difficult to administer these tools to the majority of children who have little to no exposure to the English language. Even among those who can speak English, acculturation to standardised testing may be a challenge and this tends to impact test outcomes. The standardization of tests for the Zambian context is a positive step in the management of pTBI in Zambia, however, there remains the greater challenge of translating and contextualizing the tests to the majority of Zambian children who cannot understand English or reside in the rural parts of the country.

Access to Care: Although there has been a steady increase in the number of neuropsychologists trained in Zambia, access to neuropsychological services is limited. Currently, only one neuropsychologist is attached to the health facility at the UTH. Other neuropsychologists are working either in academia or in private facilities that are not accessible to the majority of Zambian children in need of such care. Additionally, until early 2020, neuropsychologists could not be registered as health practitioners under the Health Professional Council of Zambia (HPCZ). The lack of the identification of neuropsychology as a profession meant that the government could not create positions for psychologists or neuropsychologists at primary or tertiary health care facilities. It is hoped that with the identification as a healthcare profession by the HPCZ, there will be placement of neuropsychologists in health facilities which may reduce barriers to accessing timely assessment and intervention services.

Like other LMICs, Zambia is faced with a scarcity of resources to manage pTBIs, including specialized equipment such as MRIs and CT scans, neuropsychological assessment tools, as well as rehabilitation facilities. It is estimated that there are only 6 MRI scanners in Zambia that are meant to serve the entire population; even basic equipment such as X-rays and ultrasounds tend to be scarce in rural areas or do not have staff to run and interpret findings[15]. Poor services, lack of consumables and trained staff have further negatively affected the extent to which children with TBI may receive the immediate care they need.

Interdisciplinary Collaboration: Interdisciplinary collaboration in the management of pTBI has been established to provide better patient outcomes[16-18]. The need for interdisciplinary collaboration among various healthcare professionals, including neuropsychologists, neurologists, rehabilitation specialists, and educators is required for the effective management of pTBIs. This collaboration has steadily been improving with the growth of professions in neurology and neuropsychology in Zambia evidenced by the studies carried out in other areas of brain health such as HIV[19]. However, challenges such as resource constraints, undefined communication chains, high burden of care on healthcare providers such as neurologists, across the country, create a challenge to undertake the needed collaboration. The availability of research grants from international research bodies such as the United States of America NIH has seen increased communication and interdisciplinary collaboration. Investment in a sustainable way, supporting this continued collaboration, is needed to ensure there is continued access to care in pTBI.

Follow-up and Long-Term Care: Being cognisant of the various challenges listed above regarding continuity of care, long-term follow-up and care is a challenge in Zambia. Patients lost to follow-up, poor documentation, and limited resources and infrastructure have impeded efforts to provide ongoing support and monitoring of children's progress over time, potentially compromising their long-term outcomes[20]. Although there is no record of the sort of care children with TBI receive, lessons from other documented areas of interventions such as HIV, have shown that it is difficult to maintain children in long-term care[21]. Some of the challenges to such care include orphanhood, which leads to children living with other guardians such as grandparents who may not have the capacity to continue keeping children in long-term care.

As the field of neuropsychology and neurology continues to grow in Zambia, there is a need for investment in other interventions that may ensure keeping children in care, such as setting up mobile community clinic days, the use of telemedicine, and other cost-effective ways of ensuring continuity of care[22].

Conclusion

The field of pTBI remains an unchartered and unexplored field with several opportunities for interventions and growth. To accomplish this growth and overcome the challenges, several measures need to be put in place, including investing and training in pediatric neuropsychology, and raising awareness about the importance of early intervention. The revision of the Master of Science in Clinical Neuropsychology curriculum at the University of Zambia to ensure there is training in pediatric neuropsychology with a clear focus on the comprehensive management of pediatric TBI with linkages to other points of care, contributes to this end. Development and adaptation of culturally relevant pediatric neuropsychological tests will meet a large unmet need in the early diagnosis and development of relevant rehabilitation interventions for improved patient outcomes. Additionally, leveraging technology and telemedicine can help improve access to neuropsychological services, especially in remote areas with limited access to specialized care.

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Author Bios

Lisa Kalungwana is based in Zambia and has a Master's degree in Clinical Neuropsychology. Over the last 12 years, Lisa's research and professional work has focused on neuropsychological evaluations for patients across the lifespan in areas of paediatric HIV, epilepsy, mental health as well as the prevalence and risk factors of Alzheimer's disease in Zambia, exploring various neurocognitive outcomes, and enhancing the well-being of adolescents living with HIV. Through her work in paediatric HIV, she has developed a greater interest in the neuropsychological management of traumatic brain injury. Lisa is passionate about education and is committed to advancing the field of neuropsychology and mental health through advocacy, research, and increasing awareness for people.

events

2025

March

12 - 15: *35th Annual Meeting*, March 12-15, 2025, Montréal, Québec, Canada. For more information, visit anpaonline.org.

19 - 22: *15th World Congress on Brain Injury,* March 19-22, 2025, the Palais de Congres in Montreal, Canada. For information, please visit braininjurycongress.org.

April

3 - 5: *2025 AOTA Annual Conference and Expo*, April 3 – 5, Philadelphia, PA, USA. For more information, visit aota.org.

May

5 - 6: *15th Annual Traumatic Brain Injury Conference*, May 5 – 6, Boston, MA. For more information, visit tbiconference.com/home.

19 - 22: *ISPRM 2025* – The 19th World Congress of the ISPRM, May 19 – 22, 2025, Dead Sea, Jordan. For more information, visit www.isprm2025.org.

October

22 – 25: *2025 Annual Assembly*, October 22-25, Salt Lake City, UT, USA. For more information, visit aapmr.org.

27 – 30: *ACRM 102nd Annual Fall Conference & Expo*, Chicago, IL, USA. For more information, visit acrm.org

2026

April

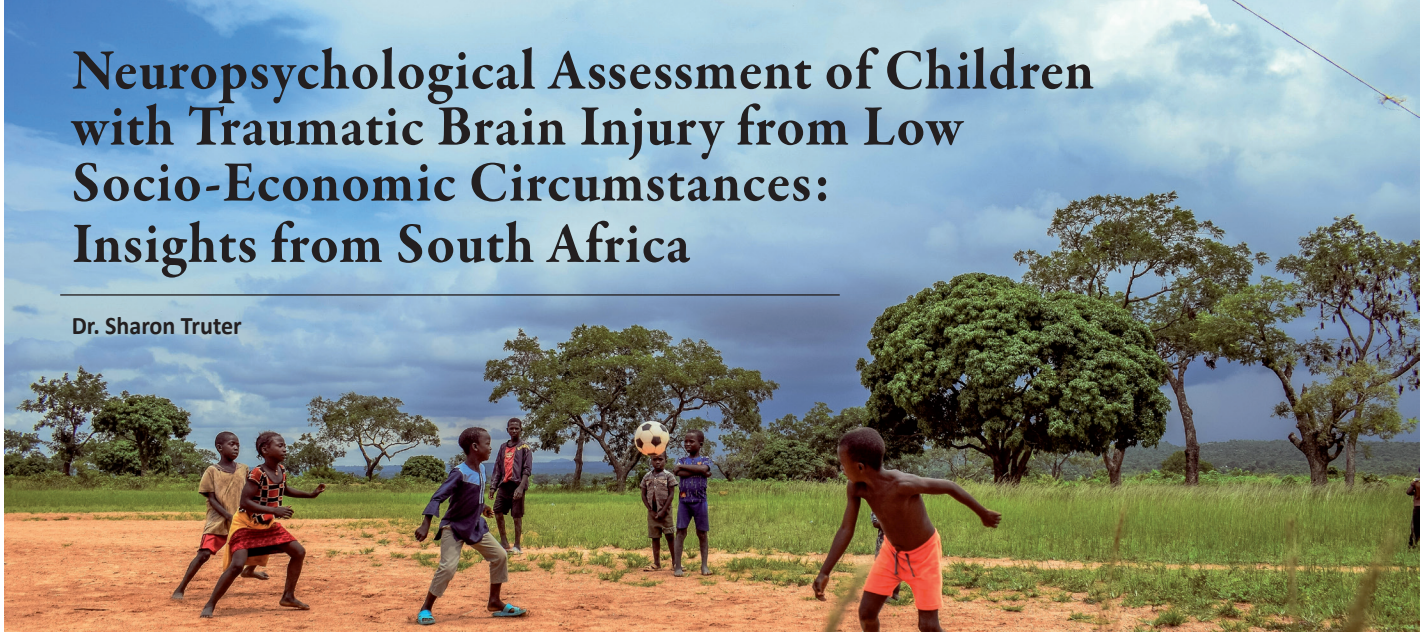
29 – 2: *6th International Paediatric Brain Injury Society Conference*, April 29 – May 2, Calgary, AB, Canada. For more information, visit ipbis.org/calgary-2026.

October

30 – 2: *ACRM 103rd Annual Fall Conference & Expo*, October 30 – November 2, Washington, DC. For more information, visit acrm.org.

Neuropsychological Assessment of Children with Traumatic Brain Injury from Low Socio-Economic Circumstances: Insights from South Africa

Dr. Sharon Truter



Introduction

South Africa (SA) is characterized by diversity. It has 12 official languages with many more dialects and significant educational and socio-economic disparity, with 1% of the population owning 50% of the wealth[1-3]. SA also has a high prevalence of traumatic brain injury (TBI). A leading cause is road traffic accidents (RTAs), with 19.1% of TBI-related deaths being attributable to such accidents[4]. RTA fatality rates in SA are twice the global rate in children aged 0–4 years and boys aged 5–14 years[5]. Most children who sustain TBI as a result of RTA are pedestrians[6]. Since many children in SA are left at home alone while caregivers are at work, live in child-headed households, and are unsupervised by adults while playing outdoors and walking long distances to school[6-8], it is not surprising that many children in SA are involved in RTAs as pedestrians, particularly those from low socio-economic status (SES) backgrounds.

Challenges in Neuropsychological Testing in South Africa

Neuropsychologists in low- and middle-income countries (LMICs) like SA have significant challenges in providing services to children with TBI. These include having limited qualified neuropsychologists and limited assessment tools.

Limited Qualified Neuropsychologists

In October 2022, there were 119 registered neuropsychologists in SA[9] with most having been allowed onto the register by providing the Health Professions Council Of South Africa (HPCSA) with sufficient evidence of training and experience in neuropsychology. Since then, the only pathway to becoming a registered neuropsychologist in SA is by competing for an HPCSA-approved neuropsychology master's degree. Currently, the only university offering this is the University of Cape Town (UCT). Neuropsychologists make up a small percentage of the approximately 9474 registered psychologists in SA[10]. UCT usually accepts six new applicants per year. As older registered neuropsychologists retire, unless other training opportunities arise, neuropsychological services in SA are likely to become increasingly fewer.

Limited Use of Neuropsychological Tests

Neuropsychologists in SA are limited in the tests available to them. The reasons for this include financial restraints and the unsuitability of available tests due to cultural factors, influenced by education and language.

Financial Restraints

In SA, developing tests suitable to each cultural group would be too expensive and time-consuming[11]. The development of multi-cultural neuropsychological tests[12] holds promise but still requires extensive research into the suitability across the cultures in SA. While some psychologists in SA purchase tests from other countries, the relatively weak SA currency makes this extremely expensive and not an option for those working in under-resourced settings who tend to then revert to using outdated tests. One solution pursued has been to utilize tests that are in the public domain, thus free for psychologists to use[13].

Influence of Education on Neuropsychological Assessment

Both the level and quality of education affect how children respond to neuropsychological tests. In SA, there is a large discrepancy between the qualities of education, with many children receiving poor/disadvantaged quality of education, which negatively affects cognitive test scores[14-15]. Comparing the cognitive test scores of a child receiving a disadvantaged quality of education to those receiving an advantaged quality of education can lead to misdiagnosis, as the child would incorrectly seem impaired.

Influence of Language on Neuropsychological Assessment

Language has a profound effect on neuropsychological testing. Most well-researched neuropsychological tests are available in English, but not in the first language of most children in SA. When children have reasonable proficiency in English, it is often feasible to test them using English tests. However, what the tests are measuring, whether or not examinees are required to respond to the tests using language (e.g., speech or reading), and the level of English proficiency, all affect how children will score on the tests and the normative data with which those scores should be compared[13]. In SA, English proficiency varies amongst children and young adults. English- and Afrikaans-speaking children have the opportunity to be educated in their first language throughout their schooling.

This is not the case for the other language groups, where children are taught in English from about their fourth year of school[16]. Still, English is the language of government, business, and most media in SA. Implications include: many young children have minimal to no exposure to English; Afrikaans-speaking children are often unfamiliar with being tested in English; and many older non-Afrikaans children prefer to be tested in English as the practice is familiar to them.

Normative Data for Neuropsychological Tests

The lack of normative data is an ethical concern[17]. Shuttleworth-Edwards and Truter[13] collected and collated normative data for children and adults on various neurocognitive tests, stratified not only for age, level of education, and sex (where relevant), but also language and quality of education. These data were mostly from SA, but also 15 other countries in Africa. In this volume, normative data for children from the ages of eight years, with advantaged and disadvantaged quality of education, tested in their first language, are available for tests that are in the public domain and therefore inexpensive to acquire (e.g., Trail Making Test A and B, Rey Auditory Verbal Learning Test, and verbal fluency tests). However, there are still large gaps of normative data that need to be filled, particularly for tests that are copyrighted and expensive to acquire, such as the Children's Color Trails Test, NEPSY, and Wechsler Intelligence Scale for Children.

While Africa-focused, these norms can be useful for psychologists working in other countries with linguistic, educational, and cultural diversity, such as those with a large influx of immigrants. For example, tests that measure non-verbal functions such as hand motor or visuospatial functions can arguably be used with children who do not speak English at all, provided they understand what to do and their test scores are compared with demographically similar normative data, in terms of age, level, and quality of education. This is in line with the principle that "… it is the meaning of the instructions which should be the same for all people rather than the wording"[18]. Tests that are not designed to measure language functions but require a response using language (such as repeating digits or saying aloud names of colors as in Stroop tests), should be used more cautiously and those test scores compared with normative data that also match the language administration methods exactly. Importantly, psychologists still need to be mindful of other cultural factors that could affect test results such as unfamiliarity with the testing situation including using a pencil, shyness of an examiner from a different culture, having a first language that does not use the English alphabet, and where reading and/or writing is not done from left to right.

Conclusion

TBI is one of the most common causes of brain injury in children in SA with RTAs being the primary cause for those injuries. In SA, children and young adults with low SES and with low levels of education are at greater risk of TBI[19], possibly because they are often left unsupervised. To make matters worse, children from socioeconomically disadvantaged backgrounds often have reduced access to healthcare services[20].

Neuropsychologists are needed to assess cognitive deficits in children such as those who sustained a TBI, but there are several challenges in meeting these needs in SA. The first is that there are few registered neuropsychologists in the country and they are likely to become proportionately fewer unless other universities start to offer master's level training in neuropsychology, or the HPCSA starts to accept qualifications from universities outside of SA. A second challenge is the lack of suitable tests with appropriate adaptation and normative data. While a collation of normative data for neuropsychological tests is now available for psychologists in Africa, continued work is necessary to fill in the gaps where normative data are not yet available.

This article has focused on the South African context. However, the needs in SA are similar in other countries with significant cultural, educational, and linguistic diversity and/or where there is a lack of financial resources to purchase and/or design tests. These insights from SA will hopefully help psychologists in these countries and in the neuropsychological assessments that they do.

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Author Bios

Sharon Truter, a Neuropsychologist and Counselling Psychologist, is registered with the Health Professions Council of South Africa, an Honorary Research Associate of Rhodes University, a Full Member and past-president of the South African Clinical Neuropsychological Association (SACNA) and a Medico-Legal Practitioner of the South African Medico-Legal Association (SAMLA). In 2019 she was the recipient of the Neuropsychology International Fellowship (NIF). She co-authored "Cross-Cultural Test Norms: An Advanced Collation from Africa". At her private neuropsychology practice, she offers training and supervision in neuropsychology and does research in cross-cultural neuropsychology, which she has presented at several national and international conferences.

Neurorehabilitation in Children and Young People in India: An Overview

Mishali Bhattacharjee • Michelle Manasseh

Neurological disorders are a critical global health concern, affecting millions of children worldwide. In India, with its massive population and diverse needs, the burden of childhood neurological conditions is particularly high[1]. These conditions can arise from various factors, including a range of acquired brain injuries (ABIs) such as stroke and traumatic brain injuries (TBI). They can lead to a range of impairments, including motor dysfunction, cognitive deficits, communication difficulties, and behavioural problems.

There is limited understanding of the full scope of neurological disorders in India. While some local studies have shed light on the burden of specific conditions, a thorough and recent nationwide picture is lacking. This knowledge gap impedes the development of evidence-based prevention strategies, healthcare planning, prioritization of needs, and efficient resource allocation[2] .

A previous paper on the hidden epidemic of neurological disability in India[3] indicated that, at that time, there was a marked increase in disabilities due to TBI and stroke. The prevalence was reported to be double in rural than in urban areas and the key challenge for most of the population residing in rural India was the lack of awareness of 'availability, accessibility and affordability' of neurorehabilitation services[4]. Today, the number of trained professionals handling the millions of people, which includes a large proportion of children, with neurological disabilities, is very small[5].

Rehabilitation services in India have developed along two different tracks, with specialist-run programs in urban medical institutions and grassroots, community-based rehabilitation programs, in rural and semi-urban areas. In almost all programs, physical and mobility issues are the primary focus and there is a poor understanding of the cognitive and psychosocial issues[4].

Neuropsychological rehabilitation, more specifically, emerged as a sub-specialty only in the mid-1980s at the national institutes in India.

Most of the neuropsychological rehabilitation literature from India to date is about cognitive retraining, restitution, or restoration, with impairment analysis and development of tasks for component retraining[2].

Computer-based retraining packages were later developed, and the emphasis shifted to tasks that were easily administered by families in home-based retraining modules[6]. In recent years, there have been important shifts in viewing neuropsychological rehabilitation as holistic rehabilitation addressing psychosocial functioning and community reintegration[7].

However, the literature reported is mainly on the adult population; literature about neuropsychological rehabilitation in children and young people in India is still very much underreported[2].

Importance of Neurorehabilitation

Early intervention through neurorehabilitation is vital for children with neurological disorders. The developing brain has incredible plasticity, meaning it can adapt and learn new skills even after an injury, at least within some post-brain injury parameters (age of the child, degree and nature of brain injury, premorbid functioning, etc.).

By providing targeted therapies during this crucial window of opportunity, neurorehabilitation can help children: 1) improve motor skills - this might include regaining mobility; developing new movement patterns, and increasing coordination; 2) enhance cognitive function - therapies can target memory, attention, problem-solving, and learning abilities; 3) develop communication skills - neurorehabilitation can assist children in learning to speak again or develop alternative communication methods; and 4) promote social participation - rehabilitation helps children integrate into their communities by improving their ability to interact with others and participate in daily activities[8]. Access to such and timely interventions could affect the trajectory of children post-injury.

Challenges in Paediatric Neurorehabilitation in India

Despite the acknowledged importance of neurorehabilitation for children, several challenges hinder its widespread and effective implementation in India. We address some of these challenges below.

a) Reduced access to services: India has a vast landscape with a large population, leading to an inequality in access to neurorehabilitation services. These services are often focused in urban areas, leaving children in rural areas with limited to no options[9].

b) Scarcity of qualified professionals: There is a significant shortage of trained psychiatrists, neuropsychologists, occupational therapists and other specialists who are crucial for delivering neurorehabilitation programs[9].

c) Treatment cost: Neurorehabilitation can be a long-term process, and the financial obligation can be substantial for families. Limited insurance coverage and high out-of-pocket expenses can create a barrier to accessing necessary therapies[9].

d) Lack of Awareness: There is a general lack of awareness among the public and healthcare professionals regarding the importance and benefits of neurorehabilitation. This can lead to delayed referrals and missed opportunities for early intervention[9].

Opportunities for Improvement

Despite the challenges, there are promising opportunities to improve access to and quality of neurorehabilitation for children in India. These include the following:

a) Telehealth: Telehealth interventions allow children in remote locations to receive therapy remotely from professionals. Studies have shown the efficacy of telehealth in delivering paediatric neurorehabilitation services[10].

b) Community-based rehabilitation: Community-based rehabilitation programs can provide accessible and affordable care through training local healthcare workers and community members to provide basic rehabilitation services.

c) Capacity building: Investing in education and training programs can increase the number of qualified neurorehabilitation professionals in India. This includes training for existing healthcare professionals in paediatric neurorehabilitation techniques.

d) Advocacy and awareness campaigns: Raising awareness among the public and healthcare professionals regarding the benefits of neurorehabilitation can increase demand for services and promote early referrals.

e) Government initiatives: The Indian government can play an important role by introducing policies to increase insurance coverage for neurorehabilitation services and allocate resources for establishing rehabilitation centres in underserved regions[10].

However, most childhood neurological disorders are being managed by pediatricians or adult neurologists in India, due to a lack of sufficient child neurologists. Other major challenges to child neurology in India, like other developing countries, are high disease burden, poverty, predominant urban-centered child neurology services, and prevalent social issues. There is a need for quality research to explore affordable and sustainable healthcare solutions.

Conclusion

Neurorehabilitation is essential for improving the lives of children with neurological disorders in India. Addressing the existing challenges and harnessing the available opportunities is crucial to ensure equitable access to high-quality rehabilitation services for all children nationwide. It is predicted that the growth curve of child neurology will witness a sharp climb in the coming years. There are various challenges and research opportunities. Emerging child neurologists should face the challenges and seize the opportunities. Through sustained efforts to improve access, awareness, and resources, India can empower children with neurological conditions to reach their full potential and lead fulfilling lives.

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Author Bios

Michelle Manasseh: I am a psychotherapist with over 12 years of experience in the field of mental health. I work with a diverse people who have issues ranging from career, relationship, personal growth, depression and other mental health concerns. I have been a lecturer at Christ University for 5 years and have had my own practice for over 6 years. With a master's degree in counselling psychology from Lehigh University, USA. I've been trained to be a Multicultural Counsellor who has worked successfully with individuals from multiple cultures and backgrounds in USA and in India. My approach to working with my clients is integrated.

Mishali Bhattacharjee: I am a clinical psychologist and currently a PhD student at the University of Cape Town. I have a master's in clinical psychology from Bangalore University and MPhil in Psychology from Christ University, India. I am currently at the University of Cape Town pursuing my PhD. My area of research is neuropsychology and pediatric and adolescent HIV. I have over five years of experience and have worked with many clients at clinics and rehabilitation centers and now in my own practice with diverse mental health issues. My approach is integrative and holistic.

BIP expert interview

Interview with Professor Lucia Braga

The SARAH Network of Neurorehabilitation in Brazil

Lucia Braga is a neuroscientist, author, researcher, and clinician experienced in working with children, adolescents, and adults with brain injury. Her focus has been on long-term quality of life and context-sensitive ecological rehabilitation, having pioneered programs such as the Family Training Methodology and the MetaCognitive Dimension Programs for children and adolescents with TBI. Her research uses neuroimaging to explore the impact of neurorehabilitation on neuronal plasticity. She is President of the SARAH Network of Rehabilitation Hospitals, a 9-hospital system with over 1,000 beds. Her awards include a docteur honoris causa from Reims University (France), the National Order of Scientific Merit bestowed by the president of Brazil, and the Distinguished Career Award from INS. She is on the faculty of the University of Massachusetts Medical School's Psychiatry Department, and is engaged in neuroscientific research, often collaborating with European and American institutions.

At the outset, let me thank you Prof Braga for your time and willingness in participating in this interview.

It is a pleasure to do this interview with you. Thank you for the invitation.

Question 1. Please tell us some interesting facts about yourself.

I started university very young and decided to study music, specifically, musical composition and conducting. But, during the coursework, I became interested in the processes of children with acquired brain injuries (ABI). So, I changed my major to neuropsychology, with a focus on the child and adolescent. When I graduated, I started working at the first SARAH Rehabilitation hospital, in the Pediatric Neuropsychology Division, in the unit that treated spinal cord injury. I became a part of their interdisciplinary team. Thirty years ago, I became Director of this hospital and subsequently opened 8 more centers that now comprise the SARAH Network of Rehabilitation Hospitals. Today, in addition to my research and clinical work in neuropsychology, I am also the President of the Network, coordinating the nine centers in operation. So, you see, in the end, instead of becoming a composer and conductor of music, I construct and coordinate rehabilitation hospitals, and continue to see children with ABI with my specialized interprofessional teams.

Question 2. How did you first become involved in neurorehabilitation and long have you been working in the field?

I have been working in the field of neuropsychological rehabilitation for 45 years. As I mentioned, when I went to do an internship at the first SARAH rehabilitation hospital to play and teach music to children with ABI, I developed an abiding interest in neuropsychology and neurorehabilitation. I was hired as a neuropsychologist for the SARAH Network as soon as I graduated from college, and went on to complete my Masters, my PhD and two post-docs in neuropsychology (one in France). Since then, my work has focused on the lifelong development of the child and adolescent with ABI, accompanying them across their lifespan.

Question 3. Tell us about the SARAH Network of neurorehabilitation in Brazil and how it serves children and young people following acquired brain injury in the country.

The SARAH Network of Rehabilitation Hospitals comprises 9 centers located throughout Brazil. It treats over 2 million patients annually - of all ages.

While most are seen as outpatients, the Network hospitals are fully equipped with surgical suites, as well as 700 beds total. For the rehabilitation of children with ABI, the SARAH Network created an ecological, context-sensitive model of intervention based on family and community; this approach has been shown to be effective in randomized, controlled peer-reviewed studies. The basic tenet of this methodology includes family participation in all stages of the child's rehabilitation; individual goals established jointly by the child, family, and team of practitioners; and a playful approach to increase adherence to the program – all built upon each child's potential within an ecological perspective that permits easy insertion of protocol into daily life in a way that feels natural to both child and family. The family engages the child in the rehabilitation activities at home and in the community – with consistent guidance by the team of practitioners. This method was published and implemented in all the SARAH Network hospitals, as well as in other rehabilitation centers in Brazil and abroad.

For the rehabilitation of adolescents and pre-adolescents with ABI, we created a methodology based on the development of metacognition, with the participation of college students who act as capable pairs. The adolescents work in groups and learn to think about their behavior, which helps them develop more self-control, control their impulsivity, and attenuate social conflicts – in addition to increasing their potential. This methodology was also studied, proven effective, and published several years ago. All of the work at the SARAH Network is performed by integrated interdisciplinary teams of medical and rehabilitation professionals.

Question 4. Are there opportunities for trainees and early career professionals to visit Brazil and participate in or complete internships as part of the SARAH network?

Yes, every year the SARAH Network receives students, residents, and newly minted medical professionals from all over the world. In addition to providing training, the Network offers room and board at the hospital for these interns. Anyone can apply, via the email: RECURSOSHUMANOS@SARAH.BR.

Question 5. What advice would you give to those wanting to expand neurorehabilitation for children and young people in areas where it is less or underdeveloped?

I would suggest developing interventions based on the family's participation, whenever possible, as well as on community and peers – which has been proven efficient and cost-effective.


SARAH

The follow-up of children, adolescents, and families can be done via telemedicine, which permits reaching populations in more distant and underdeveloped regions, without the incursion of transportation costs. Most of all, though, I would encourage the creation of programs that are humanistic, empathetic, and welcoming so that the child and adolescent – and their families – can grow and develop within a safe environment of mutual empowerment.

Thank you for your time and willingness to participate in this interview for this special issue of BIP.

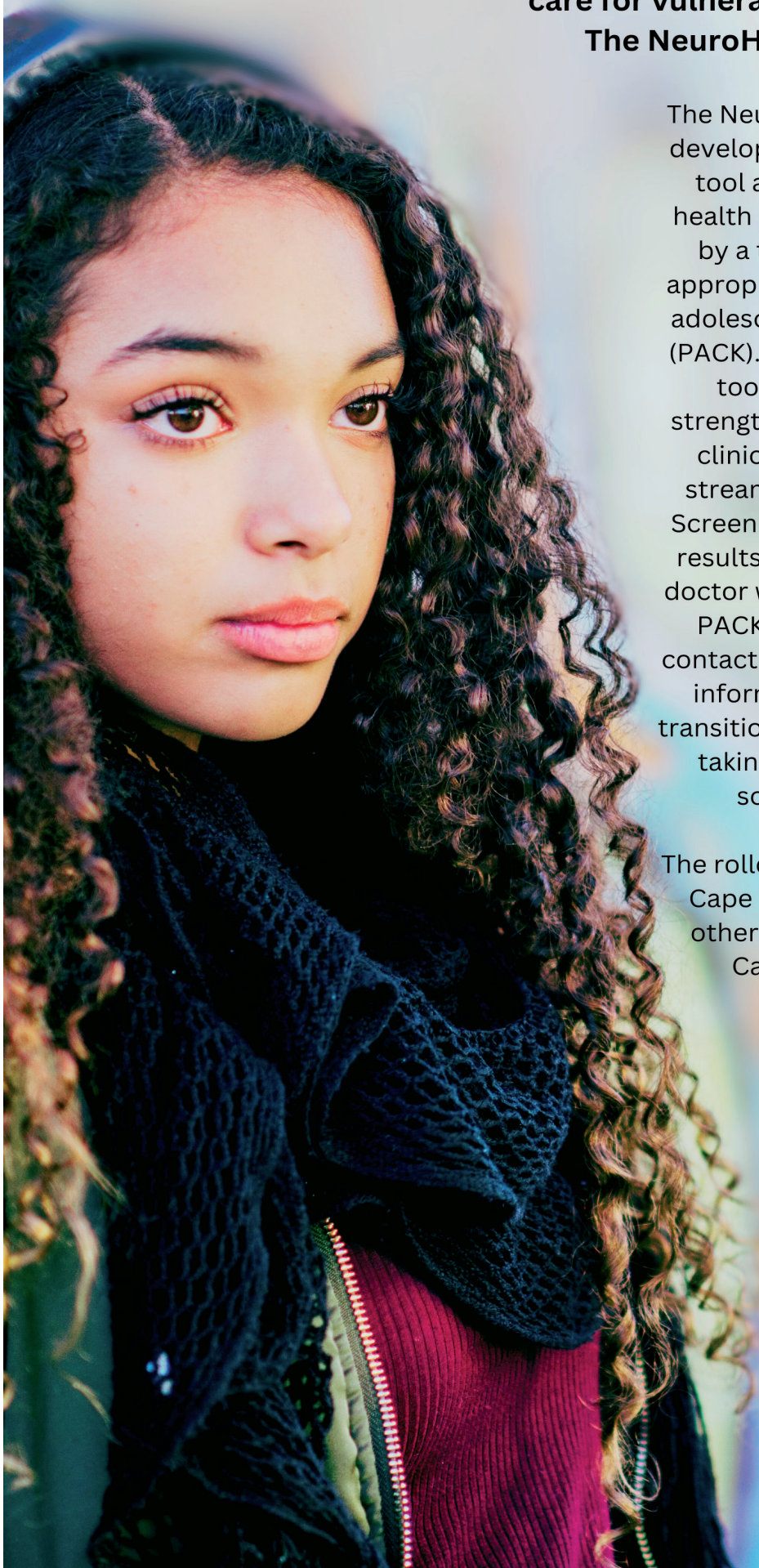
Question 6. Do you have any encouraging words for health professionals interested in a career in neurorehabilitation and not knowing where to begin?

Of course. The field of neurorehabilitation is a growing one – with many opportunities and interesting, ever-changing ways of helping patients. It is very rewarding. Over the last couple of decades, we've seen exciting new challenges for practitioners, with the addition of neurotechnology, new diagnostic tools and protocols – and new approaches to engaging the child and adolescent in the rehabilitation process. Graduate programs in neuropsychology all over the world offer opportunities for internships, so that new professionals can zero in on which branch of neuropsychology most interests them. There is a lot of work to be done, with populations growing exponentially every year that need our help. For those interested in research, there are exciting opportunities in the sphere of neurorehabilitation and neuroimaging, the overlap of establishing the diagnosis and proceeding with the creation of a targeted treatment protocol.

Today at the SARAH Network, we have been working (with the aid of tractography and fMRI) on how rehabilitation impacts the brain's physical structure, connectivity, grey and white matter, prognoses, and so much more.

About the Interviewer

Leigh Schrieff-Brown obtained her PhD from, and is currently an Associate Professor in, the Department of Psychology at the University of Cape Town (UCT) in South Africa. She is also currently the Deputy Dean of Postgraduate Studies and Funding in the Humanities Faculty at UCT and a registered neuropsychologist in South Africa. She has built a research program around, and teaches primarily in, the area of pediatric traumatic brain injury (especially around a range of outcomes and predictors of those outcomes) and neuropsychological rehabilitation. She supervises and teaches on the pediatric component of the Masters in Clinical Neuropsychology in the department. She has supervised several postgraduate students (currently from honours to doctoral level), has published book chapters as well as a range of research papers in local and international journals, and presented at several local and international conferences in the above-mentioned fields. In terms of her international profile, she serves as a member of the Board of Directors for the International Paediatric Brain Injury Society (IPBIS), in which she chairs their Trainee/Early Career Subcommittee, as well as serving on the International Neuropsychological Society (INS) Justice and Equity Subcommittee and previously on the INS Science Committee. She is also the Regional representative for South Africa and the deputy chair of the INS Global Engagement Committee (GEC).



Integrating mental health and psychosocial risk screening into routine care for vulnerable youth in South Africa: The NeuroHealth for youth study.

The NeuroHealth for youth project aims to develop a technology-delivered screening tool assessing youth at risk for mental health problems. Clinicians are prompted by a treatment algorithm, referring to appropriate local services by means of the adolescent Practical Approach to Care Kit (PACK). PACK is a clinical decision support tool which is also a health systems strengthening intervention which support clinicians to simplify, standardise and streamline the delivery of primary care. Screening occurs in the waiting room, and results are immediately available to their doctor who can then discuss and apply the PACK guidelines within the 10-minute contact time. Doctors, armed with this vital information, will be able to seamlessly transition into a person-centered approach, taking immediate action based on the screening results and the PACK recommendations.

The rollout of the validated tool will start in Cape Town, with incremental rollout to other healthcare clinics in the Western Cape, and eventually nationally.

The NeuroHealth for youth study is supported by the South African Medical Research Council (SAMRC) under a Self-initiated Research grant. The views and opinions expressed are those of the author(s) and do not necessarily represent the official views of the SAMRC.

For more information, or interest in collaborating please email:
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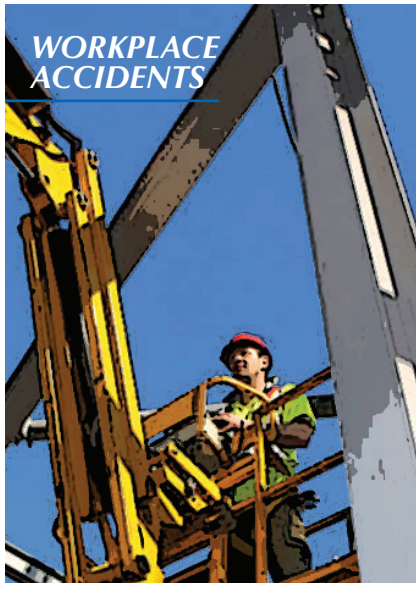

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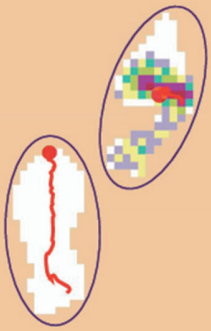

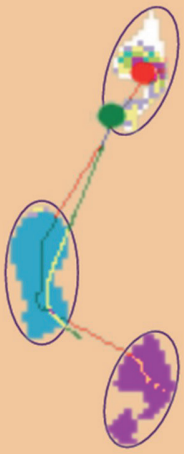

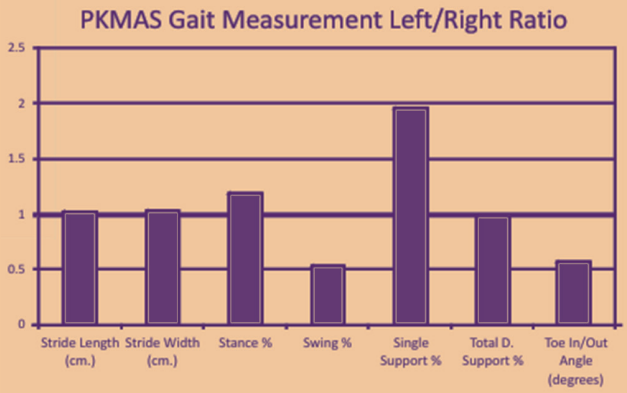

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