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Intermediate care for Traumatic Brain Injury Patients and Caregivers in Low-Middle Income Countries: A Narrative Review

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ABSTRACT

The continuity of intermediate care in low-middle-income countries (LMIC) is fundamental to support the sustainability of hospital care. Continuity of care is needed for patients with TBI and their caregivers, including intermediate care. However, there is not much literature that discusses intermediate care in patients with TBI and caregivers in LMIC. Therefore, this article is a narrative review to identify intermediate care programs for patients with TBI and caregivers in LMIC. This narrative review was conducted the electronic databases: Proquest, PubMed, Science Direct, MedLine, and Google Scholar. The search terms were developed based on MESH terms: 'intermediate care,' 'traumatic brain injury,' 'outcome,' 'caregiver, and 'low-middle income countries.' The articles searched with participants were patients with TBI after discharge from the hospital ≥ 18 years old. At the same time, the caregivers were the person who cared for the patients after discharge at home, published in English between January 2011–December 2021. This article search resulted in articles discussing intermediate care for patients with TBI and their caregivers in LMIC on several continents, including Asia, Africa, Latin America, and Europe. In general, there are no intermediate care programs that specifically treat patients with TBI and caregivers at LMIC. When a patient with TBI is discharged from the hospital, a patient rehabilitation program will be provided in the rehabilitation unit in the hospital's outpatient departments. There is variability among LMICs regarding public support for rehabilitative services and disability-related care, in part due to very diverse economic and cultural conditions. The intermediate care program for patients with TBI and caregivers at LMIC is currently undergoing reconstruction and rehabilitation of the health care system. Therefore, a particular program is needed in the intermediate period that focuses on patients with TBI and caregivers to optimize continuity of care and discharge outcomes.

Keywords: Caregiver, Intermediate care, Low-middle income country, Patient, and Traumatic brain injury.

INTRODUCTION:

Intermediate has turned into an approach to forestalling medical clinic confirmation and supporting patients prepared to leave the clinic yet need further help at home (Cornes *et al.*, 2018). According to the Ministry of Health, (2009) intermediate care is a role that combines multiple services based on the context of local needs and available facilities. The continuity

of intermediate care in low-middle-income countries (LMIC) is fundamental to support the sustainability of hospital care. This is a challenge for countries included in the LMIC category (Nugraha *et al.*, 2023).

Traumatic brain injury (TBI) is a complex injury with a broad spectrum of symptoms that can cause several impairments or the disabilities (Sharp *et al.*,

2014). The impact of the TBI on a person and their caregivers can be devastating, as these injuries are not only physical but can cause mental & emotional challenges to the patient (Carlozzi *et al.*, 2015). Therefore, continuity of care is needed for patients with TBI and their caregivers, including intermediate care. Evidence highlights the importance of comprehensive assessment, empowerment, & rehabilitation to optimize function, especially in times of deteriorating health or the when moving between homes, hospitals, or nursing homes (Sezgin *et al.*, 2020). Intermediate care is an essential element of the continuum of care that enables patients with TBI to maintain or restore their independence after a period of illness, injury, or hospitalization (Fleming *et al.*, 2012).

After a patient with TBI goes through clinical adjustment, they can take different treatment bearings (Lee *et al.*, 2019). For instance, patients might be moved to an actual restoration unit at an overall emergency clinic, a specific recovery care focus, or a talented consideration unit. Physical, word related, discourse, mental, & neuropsychological administrations can be given seriously in every one of these setting regions. A few patients don't need talented nursing care and might be moved to a unit for mind injury patients. A few patients will return home with their parental figures and return to an emergency clinic or specific short term program for treatment and drug. Patients requiring expanded talented nursing care might be moved to long haul care offices, while certain patients will get back to get nonstop treatment and care. In the rehabilitation phase, some processes help individuals achieve optimal functioning by providing various services. However, the essential care team members are the patients and their caregivers. In all of these processes, intermediate care is a treatment that can cover the procedure. However, there is not much literature that discusses intermediate care in patients with the TBI and their caregivers in LMIC. Therefore, this article is a narrative review to the identify inter-mediate care programs for patients with TBI and caregivers in LMIC.

MATERIALS AND METHODS:

This narrative review aims to describe intermediate care programs for patients with TBI and caregivers in LMIC. The search was conducted the electronic databases: Proquest, PubMed, Science Direct, Med-Line, & the Google Scholar. The search terms were

developed based on the MESH terms: 'intermediate care,' 'traumatic brain injury,' 'outcome,' 'caregiver,' and 'low-middle income countries.' We also scanned reference lists of the relevant studies, searched vital journals, & searched relevant internet sources. Studies needed to meet the following inclusion criteria: the article with participants was patients with TBI after discharge from the hospital ≥ 18 years old, while the caregivers were the person who cared for the patients after discharge at home, published in English between January 2011 - December 2021, including the research for patients with TBI and their caregivers.

RESULTS:

This article search resulted in the articles discussing intermediate care for patients with TBI and their caregivers in LMIC on several continents, including Asia, Africa, America, and Europe. These articles include intervention research, the descriptions, and reviews. The following are the search results for articles on intermediate care in patients with TBI and their caregivers in LMIC.

Asia

Srilangka

A study in Sri Lanka identified patients with TBI after discharge from the hospital. No intermediate care program specifically handles patients with TBI and their caregivers. Of the patients who lived three months after injury, 43(86%) stayed at home while the rest were in a rehabilitation center or a hospital. This study demonstrated the feasibility of telephone follow-up in patients with moderate and severe TBI admitted to a tertiary neuro-critical care unit in this LMIC setting (Samanamalee *et al.*, 2018).

India

An Indian study identified patients with TBI after the discharge from the hospital. The study had an appropriate follow-up of 61.4% of patients at six months and showed poor outcomes in this subgroup of patients. The study also showed that most patients (nearly 85%) who were the discharged in an unconscious state would die or become vegetative. However, hospital deaths only tell part of the story about these patients' outcomes (Agrawal *et al.*, 2015). Six-month outcomes are often poor due to a lack of rehabilitative care and facilities. In situ, most of the patients were discharged to home-based rehabilitation with tracheostomy and the orogastric tube. In addition, unconscious patients with severe TBI were

discharged with a tracheostomy tube in situ after confirming that the patient could maintain oxygen saturation in the room air and after training relatives about tracheostomy tube care, the suctioning, and rehabilitation at home (Agrawal *et al.*, 2015).

Cambodia

A study of 1200 patients with TBI in the Cambodia showed that the discharge was obtained from 757 patients, with 7% reporting a good Glasgow Outcome Scale (GOS) score of 5, allowing the return to work; 90.0% of patients were GOS 3 or 4 on discharge, so unable to live independently (Peeters *et al.*, 2017). The Cambodia is a low-income country showing signs of rapid economic growth & improvements in health care. It undergoes a period of reconstruction and rehabilitation of its health care system (WHO, 2012). In parallel, efforts are underway to train a new generation of health care professionals capable of delivering modern care.

Pakistan

The study was conducted on 1378 patients with TBI in a Pakistani tertiary hospital (Umerani *et al.*, 2014). Most of our patients (77.9%) made a complete recovery after TBI. However, long-term rehabilitation was required in 17.8% of moderate to severe disability patients. In Pakistan, when a patient with the TBI is discharged from the hospital home, the patient's rehabilitation program will be provided in the outpatient rehabilitation unit of the department. A Pakistani study of 384 patients with TBI showed that patients receiving occupational therapy in an established hospital's acute care outpatient department showed significant recovery in the functional independence in self-care, sphincter control, transfer, locomotion, and communication and social cognition (Zehra, 2020).

Africa

Cameroon

The study was conducted on 101 patients with TBI in Cameroon (Ndoumbe *et al.*, 2018). The patient mortality in this study was 32.59%, with 44 deaths. Ninety-one (67.41%) patients survived, seventy-four (54.81%) had a permanent neurological disability, and only 17 (12.59%) made a full recovery. Moreover, although most of the survivors of this series were functionally independent (51.85%), 33.34% exhibited cognitive or behavioral impairment. In the long term, although most patients with STBI will show good physical recovery with independence in

movement and essential life skills, most will remain with neuropsychological disabilities such as the cognitive and behavioral disorders that hinder social reintegration. However, there is no intermediate care program for patients with TBI in Cameroon.

Kenya

As one of Africa's fastest-growing countries, Kenya has a very high traffic-related death and disability rate, primarily due to brain injury (Kinyanjui, 2016). As there are no hospital-affiliated outpatient brain rehabilitation programs and no private sector, TBI survivors in Kenya currently have nowhere to go to brain injury rehabilitation services such as cognitive rehabilitation, which will enable them to the gain independence and improve their quality of life, including getting a job whenever possible. These patients are usually sent home to their caregivers, where they continue to be present as a direct financial burden to the family and indirectly to society (Saidi *et al.*, 2014). Or, they go to fend for themselves, consequently increasing the chance of additional brain injury. This is in stark contrast to the attention paid to other types of disability conditions in Kenya, such as visual impairment, deafness, and developmental disabilities, where the rehabilitation services include vocational training programs.

Latin America

This article discusses the intermediate care program for patients with TBI in Latin American countries (Bonow *et al.*, 2018). There is significant variability among the countries represented the trial concerning public support for rehabilitative services & disability-related care, in part due to very diverse economic conditions (Dudzik *et al.*, 2002). Older estimates suggest that some public rehabilitative services and that the proportion may be as small as 1% among individuals with disabilities living in rural settings (Kirsh *et al.*, 2009). The direct costs of these services are prohibitive for many, limiting benefits in post-injury rehabilitation in patients with more significant family resources. In addition, the socio-cultural implications of the injury persisting with severe disability vary widely between cultures & countries. For example, in some study sites, the concept of withdrawal of care for patients who are unlikely to make a meaningful recovery is unfamiliar to the providers and the families; to others, the family is willing to let a loved one die if the prognosis is not good. Since cultural conditions also vary quite a bit

by race, it is not surprising that the results are highly dependent on these two variables (Bonow *et al.*, 2018).

Europe

Globally, LMIC Europe's economies are growing and investing in healthcare infrastructure, providing opportunities to fill the existing gaps (Bloom *et al.*, 2004). The LMIC countries of the Republic of Armenia, Georgia, and the Republic of Moldova are developing European economies. As a result, health care training in these countries is intense & evolving. Still, TBI treatment lacks specialists, adequate diagnostic equipment, & the facilities, particularly for rehabilitation (Bloom *et al.*, 2004; Dulf *et al.*, 2021). Trauma hospitals are only located in large cities, and prehospital care, in particular, has gaps in standard triage and transport protocols (Dulf *et al.*, 2021). Without standard triage and transport protocols, patients may be admitted to the hospitals that do not have the trauma specialization required for their optimal care.

DISCUSSION:

This article is a narrative review identifying intermediate care programs for patients with TBI and caregivers at LMIC. Continuity of care in patients with TBI and caregivers needs particular attention, especially in LMICs. This condition is due to the higher incidence of TBI in LMIC compared to high-income countries (Bonow *et al.*, 2018). In addition to a higher incidence of TBI in LMIC, the mortality rate is higher in LMIC for the same injury compared with high-income settings (Krebs *et al.*, 2017). Currently, the intermediate care program for patients with TBI and caregivers at LMIC is still in the process of being developed. This condition is due to several states. For example, the government has not adequately diverted resources towards prevention, management, and rehabilitation of head injuries in LMICs such as India (Agrawal *et al.*, 2015). As a result of a lack of rehabilitative facilities and health insurance, most patients with TBI in developing countries are discharged to the home-based care. Furthermore, patients who are released unconscious are extremely difficult to treat at home, and they are vulnerable to pressure ulcers, lung infections, poor nutrition, & physiotherapy. Epidemiological studies indicate that approximately 43% of the patients with TBI experience disability for six months or more, characterized by functional limitations. These post-

injury symptoms limit activity, cognitive complaints, and mental health problems (Rabinowit & Levin, 2014). The literature explains that cognitive impairment in patients with TBI requires special attention and continuity of post-discharge programs from hospitals to optimize patient out-comes and quality of life (Barman *et al.*, 2016). However, treatment among patients with cognitive impairment and other disabilities due to TBI in LMIC is unavailable. From these initial conditions, it appears that although TBI is a widespread public health problem in Kenya, it has not received proper attention in the public and private sectors, as evidenced by the lack of post-acute rehabilitation services for the TBI sufferers (Kinyanjui, 2016). Therefore, steps must be taken to prevent TBI-related deaths and the rehabilitation of those who acquire cognitive disability due to TBI to help them return to independent and productive lifestyles. At LMIC, access to the neurosurgical services, advanced critical care and rehabilitation is limited (Fuller *et al.*, 2016). In addition, follow-up services that facilitate long-term rehabilitation, & require considerable equipment and personnel, are less well developed, making treatment outcomes & complications more difficult to ascertain and limiting improvement efforts. Similar to other critically ill patients in the LMIC setting, the reason is that long-term effects for TBI patients, including functional status, patient independence, and economic impact after TBI, are unknown in Sri Lanka and not widely known for other LMICs (Samanamalee *et al.*, 2018).

The social and economic status condition can be the reason for the lack of good intermediate care for TBI patients and caregivers at LMIC. In high-income settings, race & socioeconomic status are inextricably linked in many Latin American countries, with whites earning significantly more wages than non-whites (De Ferranti *et al.*, 2004). The out-of-pocket costs of these services are prohibitive for many, limiting post-injury rehabilitation benefits in patients with more significant care givers resources. Also, the sociocultural implications of injury persisting with severe disability vary widely between cultures and countries. For example, in some study sites, the concept of withdrawal of care for patients who are unlikely to make a meaningful recovery is unfamiliar to providers and families; on the other hand, families are willing to let a loved one die if the prognosis is the unfavorable (Bonow *et al.*, 2018). This article highlights the importance of developing intermediate

care for patients with TBI & caregivers in LMIC. Similar to high-income countries, post-discharge outcomes in patients with TBI & care-givers need to receive significant attention from the government. Most significantly, urgent consideration should be given to establishing rehabilitation facilities for TBI patients so that they can resume an independent life-style and participate in life activities like their peers.

CONCLUSION:

The continuity of intermediate care in low-middle-income countries (LMIC) in patient's with TBI and their caregivers is the essential to help the manageability of clinic care. As a rule, there are no intermediate consideration programs that explicitly treat patients with TBI and their caregivers at LMIC. At the point when a patient with TBI is released from the emergency clinic, a patient recovery the program will be given in the restoration unit in the clinic's short-term divisions. The intermediate consideration program for patients with TBI & guardians at LMIC is going through remaking and recovery of the medical services framework. Along these lines, a specific program is required in the transitional period that spotlights patients with TBI and caregivers to upgrade congruity of care and release results.

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CONFLICTS OF INTEREST:

All authors stated that there was no conflict of interest in this study.

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