

# Effect of Brain drain on Performance of Tertiary Health Care Institutions in Enugu State, Nigeria

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## Abstract

The study was carried out to examine the effect of Brain Drain on performance of Tertiary Healthcare Institutions in Enugu State, Nigeria. Survey research design was adopted. The hypotheses were tested using z-test analysis. The finding revealed that Brain drain has a significant negative effect on patient-to-doctor ratios in tertiary health care institutions in Enugu State, that Brain drain does have a significant negative effect on treatment outcomes in tertiary health care institutions in Enugu State and that Brain drain has a significant negative effect on Patient Wait Time in tertiary health care institutions in Enugu State. The study concluded the effect of brain drain on service delivery in tertiary healthcare institutions in Enugu State, Nigeria, is profound and multifaceted. The departure of skilled healthcare professionals has resulted in a diminished workforce, leading to increased patient wait times, reduced access to specialized care, and challenges in delivering timely and comprehensive medical services. The study recommended among others that The government should invest in increasing medical school capacity, funding scholarships, and implementing targeted recruitment initiatives to address the shortage of healthcare professionals, ensuring a more favorable patient-to-doctor ratio in Enugu State, Nigeria.

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## 1. Introduction

Brain drain, the emigration of skilled professionals from one country to another, has become a pervasive phenomenon with profound implications for service delivery in Nigeria. The departure of highly trained and experienced individuals, such as doctors, nurses, and engineers, significantly undermines the capacity of the country's workforce to meet the growing demands of its population (Adesote & Osunkoya, 2018). This exodus not only depletes the pool of talent available to provide essential services but also exacerbates the challenges faced by the nation's already strained public institutions. The critical and catalytic role of qualified and skilled manpower in facilitating a country's rapid and sustainable socio-economic and technological advancement cannot be underestimated (Nweke & Iheonu, 2021). Nations today depend increasingly on knowledge, ideas and skills for solutions to their developmental problems. The impact that a creative and skilled individual can make via his/her inventions, innovations and/or discoveries can be greater than the labour of thousands of unskilled individuals.

According to the World Bank (2019), Nigeria has experienced a significant brain drain, with an estimated 22,000 doctors and 60,000 nurses emigrating to more developed countries in search of better opportunities. This mass migration of skilled professionals has left a glaring gap in the healthcare system, contributing to shortages in personnel and a decline in the quality of medical services available to the Nigerian population. Additionally, the departure of engineers and other technical experts has hampered infrastructure development, hindering progress in critical sectors such as transportation, energy, and telecommunications (Akinwale & Kuye, 2022). The exodus of skilled healthcare professionals, commonly referred to as brain drain, poses a significant threat to the service delivery landscape in tertiary healthcare institutions in Enugu State. The departure of highly trained doctors, nurses, and other medical experts not only depletes the workforce but also jeopardizes the overall quality and accessibility of healthcare services. While the impact of brain drain on the global healthcare sector is well-documented, understanding its specific implications at the local level is crucial for effective policy making. Studies on brain drain in the broader context indicate that countries, including Nigeria, often experience a loss of skilled healthcare workers to more economically developed regions, creating a critical shortage of personnel in their healthcare systems (World Health Organization, 2006). This phenomenon is particularly pertinent in Enugu State, where the healthcare infrastructure heavily relies on the expertise of these professionals to provide essential medical services.

The ramifications of brain drain on service delivery in tertiary healthcare institutions in Enugu State are profound and multifaceted. The departure of skilled healthcare professionals, including doctors, nurses, and specialists, undermines the capacity of these institutions to provide quality care, resulting in critical shortages and diminished expertise (Akinyemi, George, & Ogundele, 2022). The scarcity of personnel exacerbates the strain on an already fragile healthcare system, leading to increased patient-to-doctor ratios, longer waiting times, and compromised treatment outcomes. Moreover, the loss of experienced professionals hampers the transfer of knowledge and skills within the healthcare workforce, impeding the training of the next generation of practitioners. This knowledge gap can have cascading effects on the overall competency and efficiency of healthcare delivery in the region. Patients in Enugu State face challenges accessing specialized medical services, and the quality of care may be compromised due to insufficient staffing and expertise. The implications extend beyond the immediate healthcare landscape, affecting public trust in the system and hindering advancements in medical research and innovation (Amorha, Irobi

& Udoh, 2022). Addressing the brain drain in Enugu State's tertiary healthcare institutions necessitates strategic interventions, such as improved working conditions, competitive remuneration, and policies that encourage the retention of skilled professionals. By mitigating the impact of brain drain, Enugu State can strengthen its healthcare infrastructure and ensure the well-being of its citizens. It is based on these, that the study examined the effect of brain drain on service delivery in tertiary health care institutions in Enugu State.

### **1.1 Statement of the Problem**

Globally, the free movement and easily interaction of highly professionals and experts is a positive thing. This is why the Sustainable Development Goals agenda gives recognition to Universal Health Coverage (UHC), which is individuals having access to the healthcare services they need at all times without suffering financial hardships. Indispensable to achieving UHC is adequate human resources for health (HRH), characterized by equitable distribution of optimal skills mix and sufficient support and who enjoy decent work. The health care workers in any country are the people whose responsibility it is to enhance the health of the citizens of their country and without them, quality healthcare cannot be guaranteed or efficiently delivered to the populace.

However, despite the positive impact, brain drain can undermine and exert negative effects on the development and sustainable development of a nation, especially in developing countries like Nigeria, in health care and education, as well as science and technology. The phenomenon of brain drain in tertiary healthcare institutions in Enugu State represents a critical and pressing problem with far-reaching implications for service delivery. The continuous emigration of skilled healthcare professionals, including doctors, nurses, and specialists, poses a direct threat to the effective functioning of these institutions. The systemic depletion of the healthcare workforce results in severe shortages, compromising the ability to provide timely and quality medical services to the local population.

The problem exacerbates existing healthcare challenges, leading to increased patient loads, extended waiting times, and a strain on available resources. This not only impedes the institutions' capacity to meet the growing healthcare needs of the community but also jeopardizes patient outcomes. Additionally, the departure of experienced professionals disrupts the continuity of care, hindering the transfer of knowledge and skills critical for the development of a robust healthcare system. Furthermore, the brain drain adversely impacts the overall healthcare infrastructure, hindering the advancement of medical research and innovation. The problem is rooted in various factors, including inadequate retention strategies, insufficient incentives, and a challenging working environment. Understanding and addressing the underlying issues fueling brain drain in Enugu State's tertiary healthcare institutions are imperative for developing targeted interventions that will safeguard the quality and accessibility of healthcare services for the local population. Therefore, the study examined the effect of brain drain on service delivery in tertiary health care institutions in Enugu State.

### **1.2 Objectives of the Study**

The broad objective of the study is to determine the effect of brain drain on service delivery of tertiary health care institutions in Enugu State, Nigeria. The specific objectives of the study were to:

- i. Establish the effect of brain drain on patient-to-doctor ratios in tertiary health care institutions in Enugu State.

- ii. Examine the effect of brain drain on treatment outcomes in tertiary health care institutions in Enugu State.
- iii. Evaluate the effect of brain drain on Patient Wait Time in tertiary health care institutions in Enugu State.

### **1.3 Research Questions**

The following research questions were raised to guide the study.

- i. To what extent has brain drain affected patient-to-doctor ratios in tertiary health care institutions in Enugu State?
  - ii. What is the extent that brain drain affected the treatment outcomes in tertiary health care institutions in Enugu State.
  - iii. To what extent has brain drain affected the Patient Wait Time in tertiary health care institutions in Enugu State?

### **1.4 Hypotheses**

- i. Brain drain has no significant positive effect on patient-to-doctor ratios in tertiary health care institutions in Enugu State.
- ii. Brain drain does not have a significant positive effect on treatment outcomes in tertiary health care institutions in Enugu State.
- iii. Brain drain has no significant positive effect on Patient Wait Time in tertiary health care institutions in Enugu State.

## **2. Review of Related Literature**

### **2.1 Conceptual Review**

#### **2.1.1 Brain Drain**

Brain drain, a term used to describe the emigration of skilled and educated individuals from one country to another, has garnered attention in academic, economic, and policy spheres. Various definitions underscore the complex dynamics involved in this phenomenon. The World Bank defines brain drain as "the emigration of highly trained and skilled people from a particular country" (World Bank, 2011). Additionally, Lowell and Findlay (2001) emphasize the international movement of professionals, particularly those in science and technology, as a critical aspect of brain drain. The United Nations Educational, Scientific and Cultural Organization (UNESCO) expands the scope, defining brain drain as the "migration of highly skilled or educated people from a less-developed to a more-developed country" (UNESCO, 2009). This definition underscores the economic disparities that often drive skilled professionals to seek better opportunities abroad.

In his article on brain drain of health professionals and knowledge from Africa, Suleiman & Mikail, (2020) defined brain drain as both a loss of health workers (hard brain drain) and unavailability of research results to users in Africa (soft brain drain). A more comprehensive definition, better suited for the purpose of this article from Wikipedia (2013), defines brain drain as "the departure of educated or professional people from one country, economic sector, or field for another, usually for better pay or living conditions." It is a sustained loss of skilled intellectuals, professionals, and technical labor through emigration, where donor nations (developing countries) are denied the services of experts in various areas of knowledge. Human capital flight leads to sustained decrease in income growth rate of developing nations. And it is in support of this that

(O'Connor, 2018)., in his submission on brain drain and capital flight in Nigeria, defined brain drain as movement of financial capital and an economic cost.

### **2.1.2 Service delivery**

Service delivery is a multifaceted concept, and various authors have provided nuanced definitions reflecting different perspectives. Parasuraman, Zeithaml, and Berry (1985) define service delivery as the "extent to which a firm fulfills customer needs by providing the core service as promised and also by its auxiliary services during both pre and post-consumption stages." In the healthcare context, Donabedian (1988) emphasizes the quality and effectiveness of care, defining service delivery as "the provision of care, the technical performance of healthcare, and the interpersonal aspects of care." In a broader organizational context, Zeithaml et al. (2009) describe service delivery as the "process of identifying customer needs and organizing resources to meet those needs."

#### **2.1.2.1 Patient-to-Doctor Ratios**

Patient-to-doctor ratios represent the quantitative relationship between the number of patients seeking medical care and the available healthcare professionals, specifically doctors, in a given healthcare setting. It is calculated by dividing the total number of patients by the total number of doctors. This ratio serves as a critical metric in assessing the workload and efficiency of healthcare delivery. A higher patient-to-doctor ratio suggests increased strain on healthcare resources, potentially leading to longer waiting times, compromised individualized care, and challenges in maintaining quality medical services. Monitoring and optimizing patient-to-doctor ratios are crucial for ensuring a balance between healthcare demand and the capacity of medical professionals to deliver timely and effective care, thereby influencing overall healthcare service quality and patient outcomes.

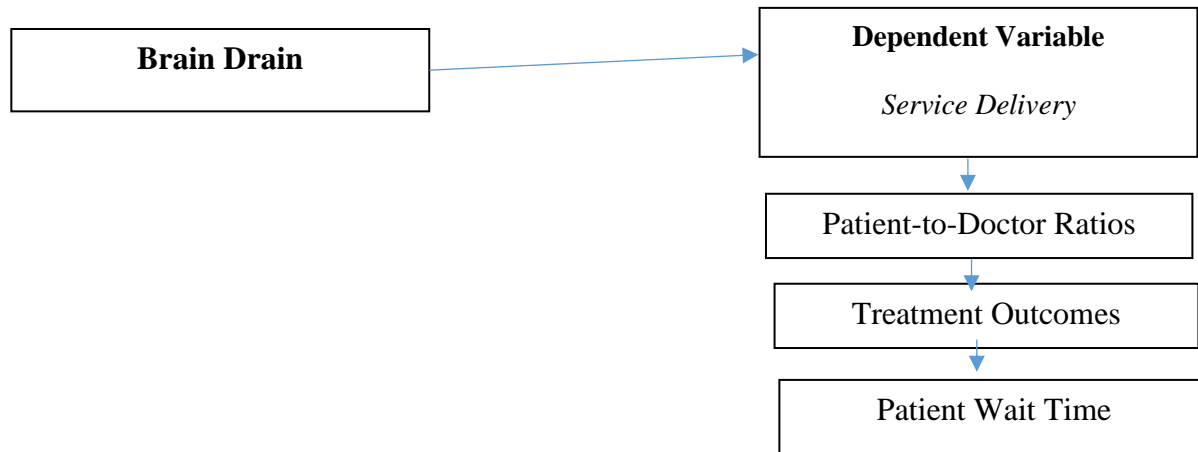
#### **2.1.2.2 Treatment Outcomes**

Treatment outcomes refer to the result or consequence of a medical intervention or therapeutic approach, reflecting the effectiveness of the treatment in achieving its intended goals. The assessment of treatment outcomes involves evaluating changes in patients' health status, functional abilities, and overall well-being after receiving medical care. Donabedian (1988) emphasizes the importance of measuring outcomes as a key component of assessing the quality of healthcare, stating that outcomes are essential indicators of the impact of medical interventions on patient health. Treatment outcomes may encompass various dimensions, including clinical improvements, patient satisfaction, and the prevention of adverse events.

#### **2.1.2.3 Patient Wait Time**

Patient wait time refers to the duration a patient spends waiting for healthcare services, from arrival at a healthcare facility to receiving the necessary medical attention. It is a critical aspect of healthcare service quality, influencing patient satisfaction and overall healthcare efficiency. In the context of patient-centered care, Donabedian (1988) highlights that the time patients spend waiting for medical attention is an essential factor in assessing the quality of care. Shorter wait times are associated with improved patient experiences and contribute to the perception of timely and effective healthcare services. Monitoring and minimizing patient wait times are crucial for enhancing the overall patient experience and ensuring timely access to healthcare resources.

## Independent Variable



**Figure 2.1: Conceptual Framework**  
**Source: Author's Conceptualization 2023**

## 2.2 Theoretical Framework

The theoretical framework that grounded this study was the push-pull theory. The push-pull theory, often applied to understand migration patterns, was first proposed by Everett S. Lee in 1966. Lee, an American sociologist, introduced this theory as a way to explain the factors influencing migration decisions. According to the push-pull theory, individuals are pushed away from their current location by factors such as economic hardship, political instability, or lack of opportunities (push factors). Simultaneously, they are pulled towards a new location by factors like better economic prospects, political stability, or improved living conditions (pull factors). The theory helps to conceptualize migration as a result of the interaction between these push and pull forces, providing a framework for understanding the complex decision-making process involved in migration.

The tenets of push-pull theory underscore the dynamic interaction between these forces. Individuals engage in a rational decision-making process, weighing the disadvantages of staying against the advantages of moving. The theory recognizes that migration patterns are context-specific and subject to change based on evolving circumstances. As such, push-pull theory serves as a valuable lens through which to comprehend the multifaceted nature of migration, acknowledging that individuals are motivated by a complex interplay of factors that propel them away from their current environment while simultaneously drawing them toward more promising prospects elsewhere.

The application of the push-pull theory provides a nuanced framework for understanding the dynamics of brain drain and its impact on service delivery in tertiary healthcare institutions in Enugu State. In the context of healthcare professionals' migration, push factors may include economic disparities, inadequate working conditions, and limited career development opportunities in the source region, prompting skilled individuals to seek better prospects elsewhere. Simultaneously, pull factors may involve attractive opportunities, improved living standards, and professional growth in destination countries or regions.

By adopting the push-pull theory, the study can systematically analyze the motivations driving healthcare professionals to emigrate (pull factors) and the challenges pushing them away from Enugu State (push factors). Economic hardships, political instability, or limited access to advanced medical resources may act as push factors, while the allure of better remuneration, professional development, and enhanced working conditions elsewhere may function as pull factors.

Understanding these push and pull dynamics allows for a comprehensive examination of the factors contributing to brain drain and, consequently, the subsequent effects on service delivery in Enugu State's tertiary healthcare institutions. This theoretical framework offers a structured approach to identify, analyze, and address the multifaceted aspects of brain drain in the healthcare sector, aiding in the development of targeted interventions to mitigate its impact on service delivery.

## **2.3 Empirical Review**

### **2.3.1 Brain Drain and patient-to-doctor ratios**

Olusegun and Olusoji (2022) carried out a study on Personnel brain-drain syndrome and quality healthcare delivery among public healthcare workforce in Nigeria. The study used a structural equation model (SEM) and artificial neural networks (ANNs) to analyse the collected data from the medical personnel of government hospitals. The findings of this study are significant as postulated. The study discovered that poor quality worklife experienced by Nigerian medical personnel was attributed to the brain-drain effect and poor healthcare delivery.

Ogunode and Ishaya (2022) focused on effects of brain-drain on higher Institutions' Administration in Nigeria. The paper employed the Thematic analysis and found identified the causes of brain-drain in the Nigerian higher institutions to include but not limited to; poor salary, unconducive working environment, poor staff development, inadequate infrastructural facilities, strike actions, insecurity and inadequate funding while the identified effects of brain-drain on the higher institutions administration to includes; poor quality education, high student-teacher ratio, shortages of academic staff, poor research development and poor programme development.

Njogwuani (2022) investigated the Reasons for migration in the Nigerian health sector: A case study of Lagos University Teaching Hospital (LUTH) and Federal Medical Centre Asaba (FMC). The descriptive research design was employed. This study found that a very high proportion of Nigerian health workers have the intention to migrate, and this has enormous capacity to further worsen the poor health indices in the country and overburden the remaining health workers with the intention to stay or are still preparing to migrate from the country.

### **2.3.2 Brain Drain and treatment outcomes**

Olorunfemi, Agbo, Olorunfemi and Okupapat (2020) examined the Impact of the emigration of nurses on health care delivery system in selected hospitals, Benin-City, Edo State, Nigeria. A descriptive cross-sectional survey was conducted. Data collected were analyzed using tables, percentages, means, standard deviation and t-test. The result showed impacts of the emigration of nurses on health-care delivery system and identified how to reduce it. The study also showed that there is no significant difference between gender and reason for emigration among nurses. The emigration of nurses is severely affecting the health care delivery system in the country.

Enibe, Umeh & Eze (2021) examined brain drain and sustainable development in Nigeria. The study employed a descriptive study. The study made use of a secondary method of data collection. The findings of the study reveal that the sustained depletion of the stock of Nigeria's health and educational professionals through brain drain necessarily leads to inefficient health care delivery in Nigeria. Although it has also contributed to the lowering of the standard of education in the country, the crop of academics that are available have been doing their best to improve the standard of education in Nigeria.

Oluyemi and Oluwaseyi (2021) explored Human capital flight and output growth nexus: evidence from Nigeria. Leveraging on the macro-level approach to migration, remittances and the economy, this research considers the nexus among the human capital flight and output growth variables by using the autoregressive distributed lag (ARDL) method of analysis for time series data between 1986 and 2018. The net migration rate from Nigeria was found from the empirical analysis to be more disadvantageous for the economy, given its negative relationship with economic growth despite the large volume of foreign incomes (remittances). It also shows that secondary school enrolment positively and significantly impacted the Nigerian growth rate in the long run.

### **2.3.3 Brain Drain and Patient Wait Time**

Okolo and Ayah Iruo (2021) investigated Perceived Determinants of Brain Drain among Mental Health Professionals in Specialist Health Care Facilities in Benin. A cross sectional predictive research design was adopted. Percentages, frequencies and Chi-Square statistics were used in analyzing the data. Result revealed that there was significant relationship between condition of service and migration intention, professional development and migration intention, foreign technology and migration intentions. The study concluded the service conditions are improved upon, brain drain among the mental health care professionals may be reduced.

Oluwakemi (2021) examined the Medical Brain Drain and its Effect on the Nigerian Healthcare Sector. A heuristic phenomenological method was used in this study to explore the lived experiences of 12 Nigerian healthcare practitioners that migrated to the United States. The study used Moustakas's heuristic phenomenological approach, which allowed the use of thematic analysis to record and identify passages of the text that fell into categories. The finding from the research puts the brain drain phenomenon on the Nigerian government and its lack of support in rebuilding the healthcare system.

Lukman et al, (2022) focused on the COVID-19 pandemic and health workforce brain drain in Nigeria. The study employed both content and thematic analysis. The study concluded that the health workforce brain drain in Nigeria is not a new phenomenon, but the current increasing trend is alarming. The worsening of the "push factors" and strengthening of the "pull factors" by the COVID-19 pandemic has resulted in the mass emigration of Nigerian health workers to developed countries. The negative impact on healthcare delivery and medical education in Nigeria is unprecedented.

Yakubu, Blacklock, Adebayo, Peiris, Joshi & Mondal (2022) worked on Social networks and skilled health worker migration in Nigeria: An ego network analysis. The study combined semi structured qualitative interviews with an ego-network analysis of 22 SHWs living in Nigeria, used R-Studio to display and visualise their networks, and NVivo for thematic analysis of transcribed interviews. The influence of social networks on SHW migration intentions was observed within



the following themes: access to information on migration opportunities, modelling of migration behaviour, support for decision making, and opportunities for policy engagement.

### 3. Methodology

#### 3.1 Research Design

In order to ensure an effective study, the researcher adopted a survey research method. In this survey design, the researcher does not aim to control or manipulate any of the variables under investigation. Therefore, the rationale for using the research methods is because, survey provides the best means of collecting the views of the respondents concerning the effect of brain on service delivery in tertiary health care institutions in Enugu State, Nigeria.

#### 3.2 Sources of Data

The researcher made use of primary and secondary data for the study.

**Primary Data:** These involve the use of questionnaire. In this study, the researcher used questionnaire as the main tool for the primary data collection.

**Secondary Sources of Data:** These are the data were collected from publication and articles on works of other researchers and authors, which are closely related to the study.

#### 3.3 Area of Study

The study's major area was the Tertiary Health Institutions in Enugu State of Nigeria. The study covered the renowned tertiary health care institutions in Enugu State namely: National Orthopedic Hospital, University of Nigeria Teaching Hospital and ESUT Teaching Hospital Parklane. The reason for choosing these institutions was that they have been in existence for a good number of years and have vast experienced work force.

#### 3.4 Population of the Study

The population of the study was three thousand, six hundred and ninety-four (3,894) staff. The population is presented in table 3.1 based on the Departments in the Hospitals under study.

**Table 3.1: Population Distribution Table**

Hospitals and Departments	Population
University of Nigeria Teaching Hospital	2031
ESUT Teaching Hospital Parklane.	902
National Orthopaedic Hospital, Abakpa Junction Enugu State	761
<b>Total</b>	<b>3694</b>

**Source:**  
Personnel Unit  
of the  
Hospitals  
under Study,

2022

#### 3.5. Sample Size Determination

The population of three thousand, six hundred and ninety-four (3,694) was considered too large, the researcher applied Yamane, (1964) statistical formula. The formula is stated under.

$$n = \frac{N}{1+N(e)^2}$$

Where n = Sample size, N = Population size, e = Error margin allowed, 1 = Constant  
The translation of the formula is show below.

$$n = \frac{3,694}{1 + (0.05)^2} = \frac{3,694}{1.0025} = 3,684$$

$$n = \frac{1+3,694 (0.04)^2}{6.9104} \quad n = \frac{1+3,891 (0.0016)}{1+5.9104} = 534.556 = 535 \text{ by approximation.}$$

### 3.5 Sampling Techniques

The sampling technique that made use in the selection of sample size of the study is the cluster sampling technique. The hospitals selected were clustered into various department and units. The members of the target population were grouped on the basis of occupational cluster, religious cluster etc. Cluster sampling is a sampling plan used when mutually homogeneous yet internally heterogeneous groupings are evident in a statistical population. The researcher preferred the technique because the target area was too large and by implication, it minimized costs and error involved in studying a large population. From each cluster or units in the hospital, the researcher randomly selected individuals who are more knowledgeable in the subject matter. Purpose sampling was then used to selected individuals who had worked in the hospital from 10 years above, who may have witnessed brain drain at one point in time or the other.

### 3.7 Method of Data Collection

The study data for the study were collected through the administration of questionnaire. The questionnaire was considered as the most appropriate measuring instrument because the researcher was dealing with respondents who are scattered in various hospitals in Enugu State.

The questionnaires in this research was in close-ended format, with Likert scale format. This Likert scale format is a choice from strongly disagree to strongly agree of the statement.

A five point Likert scaling was used as shown below:

- a. Very High Extent = VHE = 5points, b. High Extent = HE = 4points
- c. Undecided =U=3points, d. Low Extent= LE= 2points, e. Very Low Extent = VLE= 1point

### 3.8 Method of Data Analyses

Data analysis were carried out to ensure that the fact and findings of the study are concise and comprehensive. The descriptive content analysis enabled us assess the variables in our research questions. The hypotheses were tested using z-normal distribution (z-test). The use of the normal distribution became necessary following assumption that the population is normally distributed since the sample size of 535 is above 30. The 5-mean Likert scale value was found to be  $\pi = 3.0$ . The population mean response ( $\mu$ ) was therefore be taken as 3.0. The mean of the average responses to the questions as shown in the tables will be calculated and standard deviation found.

#### Decision Rule

The rule in the use of the z-test criterion was to accept the alternate hypothesis of the calculated z-score if it was higher than the tabulated z-score. The hypothesis was not to be rejected if the tabulated value was less than the calculated z-value.

$Z_{critical} > Z_{cal}$ , do not reject, otherwise accept.

## 4. Data Analysis

### 4.1 Data Presentation

To analyze the data obtained from this study, descriptive statistics (frequency and percentages) were used. Figures were tabulated for clarity and easy comprehension of displayed data.

Out of the 532 copies of the questionnaire distributed in the course of data collection, 489 copies of the questionnaire were available for further analysis, which represents 92%.

#### 4.2 Analysis of Data

**Research Question One:** What effect does brain drain have on patient-to-doctor ratios in tertiary health care institutions in Enugu State?

**Table 4.2: The extent to which** brain drain have affected patient-to-doctor ratios in tertiary health care institutions in Enugu State

s/n	Response	VHE	HE	U	LE	VLE	Total	Mean	Decision
1	Brain drain often results in the loss of skilled and experienced healthcare professionals, including doctors, nurses, and specialists.	180	156	20	70	63	489	3.7	Accepted
2	Brain drain may disproportionately affect certain specialties, leading to a shortage of doctors in specific fields.	203	180	10	66	30	489	3.9	Accepted
3	The loss of skilled professionals can also affect medical training and education programs in the region	176	180	17	100	16	489	3.8	Accepted
4	Patients may seek healthcare services outside the region or country if the local healthcare system is perceived as inadequate due to brain drain	178	190	14	57	50	489	3.7	Accepted
5	The departure of skilled healthcare professionals may result in a loss of economic contributions from the healthcare sector	180	186	21	53	49	489	3.8	Accepted

**Source: Field Survey 2024**

Table 4.1 above shows the mean distribution of opinions of the respondents on how brain drain have affected patient-to-doctor ratios in tertiary health care institutions in Enugu State. Items (1,2,3,4,5), the mean score of 3.7, 3.9, 3.8, 3.7 & 3.8 respectively and Grand Means of 3.56 showed that the respondents agreed that brain drain have affected patient-to-doctor ratios in tertiary health care institutions in Enugu State.

**Research Question Two:** How has brain drain affected the treatment outcomes in tertiary health care institutions in Enugu State?

**Table 4.3: Responses on** how brain drain affected the treatment outcomes in tertiary health care institutions in Enugu State

s/n	Response	VH E	H E	U	LE	VL E	FRE Q	Mea n	Decisio n
1	With skilled healthcare professionals leaving the region, there may be a shortage of specialists in various medical fields.	180	195	17	55	42	489	3.9	Accepted
2	Brain drain may result in a lack of expertise in handling and	200	181	11	56	41	489	3.9	Accepted

	implementing advanced medical technologies.									
3	The departure of healthcare professionals can disrupt the continuity of care, particularly in cases that require long-term or follow-up treatments.	178	180	9	67	55	489	3.7	Accepted	
4	The reduction in the number of skilled surgeons and procedural specialists may lead to longer waiting times for surgeries and medical procedures.	182	186	10	80	31	489	3.8	Accepted	
5	Nurses play a vital role in patient care, and brain drain can also affect the nursing workforce.	196	165	15	70	43	489	3.8	Accepted	

**Source: Field Survey, 2024**

Table 4.2 indicates the mean distribution of opinions of the respondents on how brain drain affected the treatment outcomes in tertiary health care institutions in Enugu State. The grand mean of 3.7, means that respondents are agreed that brain drain affected the treatment outcomes in tertiary health care institutions in Enugu State

**Research Question Three:** To what extent has brain drain affected the Patient Wait Time in tertiary health care institutions in Enugu State?

**Table 4.4: Responses on how brain drain affected the Patient Wait Time in tertiary health care institutions in Enugu State**

s/n	Item	SA	A	U	SD	D	Total	Mean	Decision
1	Brain drain lead to longer wait times for appointments, consultations, and other healthcare services.	173	206	13	56	41	489	3.8	Accepted
2	Departure of specialized healthcare professionals due to brain drain can result in a shortage of specialists in various medical fields.	178	200	19	49	43	489	3.9	Accepted
3	Personnel struggle to meet the demands of a higher patient load, resulting in longer wait times for patients seeking both routine and emergency care.	186	159	17	87	40	489	3.7	Accepted
4	In emergency departments, brain drain can exacerbate the strain on resources as longer wait times for emergency care can be particularly critical	200	186	9	60	34	489	3.9	Accepted
5	Surgical specialties may be significantly affected by brain drain. Longer wait times for surgeries can occur as a result of a reduced number of skilled surgeons and an increased demand for procedures	161	201	10	90	27	489	3.8	Accepted

**Source: Field Survey, 2024.**

Table 4.3 above shows the mean distribution of opinions of the respondents on how brain drain affected the Patient Wait Time in tertiary health care institutions in Enugu State. Their mean responses were positive. The grand mean of 3.75 revealed that the respondents strongly agreed that brain drain contributed to long patient wait time in the hospital.

**4.2 Test of Hypotheses**

To facilitate inferential analysis, the study adopted the z-test. The mean of the average responses to the questions as shown in the tables were calculated and standard deviation found.

**Decision Rule**

The rule in the use of the z-test criterion was to accept the alternate hypothesis if the calculated z-score was higher than the tabulated z-score. The hypothesis was not to be rejected if the tabulated value was less than the calculated z-value.

**Restatement of Hypothesis One**

**Restatement of hypothesis in null and alternate forms**

Ho: Brain drain has no significant positive effect on patient-to-doctor ratios in tertiary health care institutions in Enugu State.

**Table 4.4: Normalizes z-score for mean responses**

S/N		N	Mean	Std. Deviation	z-score	Z <sub>0.05</sub>	Decision rule for hypothesis
1	Brain drain has no significant positive effect on patient-to-doctor ratios in tertiary health care institutions in Enugu State.	489	4.2929	1.03359	43.38	2.33	Accepted

**Source: Author’s compilation SPSS 22.0 Output**

From table 4.4, the z-score for the responses to the questionnaire items are computed and juxtaposed with the ztable value of  $\pm 2.33$  at 2% significance level. The analysis indicates that the proposition that “Brain drain has a significant negative effect on patient-to-doctor ratios in tertiary health care institutions in Enugu State is accepted at 2% significance level as the computed, z value of 43.38 exceeds the table value of  $\pm 2.33$ .

**Decision:**

As seen from Table 4.4 and the subsequent analysis of result the computed Z-scores for the statements exceed the table z value of  $\pm 2.33$ . at 2% significance level. Therefore, we reject the null hypothesis and accept the research hypothesis that Brain drain has a significant positive effect on patient-to-doctor ratios in tertiary health care institutions in Enugu State.

**Test of Hypothesis Two**

**Step 1: Restatement of the hypothesis in the null and alternate forms**

**Restatement of Hypothesis Two**

Ho: Brain drain does not have a significant positive effect on treatment outcomes in tertiary health care institutions in Enugu State.

**Source of Data from Table 4.2**

**Table 4.5: Normalizes z-score for mean responses**

S/N		N	Mean	Std. Deviation	z-score	Z <sub>0.05</sub>	Decision rule for hypothesis
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S1	Brain drain does not have a significant positive effect on treatment outcomes in tertiary health care institutions in Enugu State.	489	4.37 49	1.1048	42.75	2.33	Accepted
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Source: Author's compilation SPSS 22.0 Output

From table 4.5, the z-score for the responses to the questionnaire items are computed and juxtaposed with the z-table value of  $\pm 2.33$  at 2% significance level. The analysis indicates that the proposition that "Brain drain does have a significant negative effect on treatment outcomes in tertiary health care institutions in Enugu State is accepted at 2% significance level as the computed, z value of 42.75 exceeds the table value of  $\pm 2.33$ .

**Decision:**

As seen from Table 4.8 and the subsequent analysis of result the computed Z-scores (42.75) for the statements exceed the table z value of  $\pm 2.33$ . at 2% significance level. Therefore, we reject the null hypothesis and accept the research hypothesis that Brain drain does have a significant negative effect on treatment outcomes in tertiary health care institutions in Enugu State.

**Test of Hypothesis Three**

**Step 1: Restatement of the hypothesis in the null and alternate forms**

Ho: Brain drain has no significant positive effect on Patient Wait Time in tertiary health care institutions in Enugu State.

**Source of Data from Table 4.4**

**Table 4.6: Normalizes z-score for mean responses**

S/N		N	Mean	Std. Deviation	z-score	Z <sub>0.05</sub>	Decision rule for hypothesis
1	Brain drain has no significant positive effect on Patient Wait Time in tertiary health care institutions in Enugu State.	489	4.42 46	1.06924	46.30	2.33	

Source: Author's compilation SPSS 22.0 Output

From table 4.6, the z-score for the responses to the questionnaire items are computed and juxtaposed with the z-table value of  $\pm 2.33$  at 2% significance level. The analysis indicates that the proposition that Brain drain has a significant negative effect on Patient Wait Time in tertiary health care institutions in Enugu State is accepted at 2% significance level as the computed, z value of 46.30 exceeds the table value of  $\pm 2.33$ .

**Decision:**

As seen from Table 4.9 and the subsequent analysis of result the computed Z-scores (46.30) for the statements exceed the table z value of  $\pm 2.33$ . at 2% significance level. Therefore, we reject the null hypothesis and accept the research hypothesis that brain drain has a negative significant effect on Patient Wait Time in tertiary health care institutions in Enugu State.

### 4.3 Discussion of Results.

The first hypothesis revealed that Brain drain has a significant negative effect on patient-to-doctor ratios in tertiary health care institutions in Enugu State. The z-score ( $z=43.38$ ,  $z_{cal} = \pm 2.33$ ). This finding is in agreement with the responses as presented Table 4.2 revealed that the respondents affirmed that accepted that Brain drain often results in the loss of skilled and experienced healthcare professionals, including doctors, nurses, and specialists, Brain drain may disproportionately affect certain specialties, leading to a shortage of doctors in specific fields. The finding revealed that the loss of skilled professionals can also affect medical training and education programs in the region and that Patients may seek healthcare services outside the region or country if the local healthcare system is perceived as inadequate due to brain drain.

Hypothesis two established that Brain drain does have a significant negative effect on treatment outcomes in tertiary health care institutions in Enugu State. The result of (z-score ( $z=42.75$ ,  $z_{cal} = \pm 2.33$ ). The finding falls in line with the data shown table 4.3 where the majority of the respondents accepted that Human capital flights leads to depletion of skilled workers needed to improve service, the majority of respondents agreed that the ability of the health institution to perform their functions effectively is limited and that the respondents agreed that Brain drain results in the lack of professionals and skilled individuals necessary for the advancement of the health institutions.

The third hypothesis revealed that Brain drain has a significant negative effect on Patient Wait Time in tertiary health care institutions in Enugu State. The significant value of z-score ( $z=46.30$ ,  $z_{cal} = \pm 2.33$ ). The findings agree with data in table 4.4 is assumed to be indicative responses that Human capital flight decreases quality workforce resulting in poor handling of cases that often leads to death. The respondents affirmed that it engendered high Innovativeness and curtailed high death rate, that Brain drain has ushered in creative personnel who attend to reduce death rate, that it helps to address the most common problems in the community. Lastly that the respondents agreed that Human capital flight helps the remaining health care professional to offer best nest medical services to reduce the mortality rate.

## 5. Findings

- i. That Brain drain has a significant negative effect on patient-to-doctor ratios in tertiary health care institutions in Enugu State. This suggests that the critical shortage as a result of brain drain causes a delay in accessing quality healthcare, low usage of accredited health facilities, and higher patronage of unorthodox healthcare.
- ii. It was discovered that Brain drain does have a significant negative effect on treatment outcomes in tertiary health care institutions in Enugu State. This implies that Brain drain often results in the loss of skilled and experienced healthcare professionals, including doctors, nurses, and specialists.
- iii. Brain drain has a significant negative effect on Patient Wait Time in tertiary health care institutions in Enugu State. This implies that Brain drain lead to longer wait times for appointments, consultations, and other healthcare services.

## 5.2 Conclusion

In conclusion, the effect of brain drain on service delivery in tertiary healthcare institutions in Enugu State, Nigeria, is profound and multifaceted. The departure of skilled healthcare professionals has resulted in a diminished workforce, leading to increased patient wait times, reduced access to specialized care, and challenges in delivering timely and comprehensive medical services. The scarcity of specialists, overworked remaining staff, and limited resources have collectively contributed to a strain on the healthcare system, impacting the overall quality of patient care. To address these challenges and improve service delivery, concerted efforts are required to retain healthcare professionals, invest in training programs, and create an enabling environment that fosters professional growth and job satisfaction. Sustainable strategies are crucial to mitigate the adverse effects of brain drain and ensure the resilience and effectiveness of tertiary healthcare institutions in Enugu State of Nigeria

### 5.3 Recommendations

- i. The government should invest in increasing medical school capacity, funding scholarships, and implementing targeted recruitment initiatives to address the shortage of healthcare professionals, ensuring a more favorable patient-to-doctor ratio in Enugu state, Nigeria.
- ii. Prioritize the retention and attraction of specialists through competitive salaries, professional development, and state-of-the-art facilities. The government should create an environment conducive to research and innovation, improving treatment outcomes in tertiary health care institutions in the state.
- iii. To reduce patient wait times, the government should implement policies to retain healthcare professionals, streamline administrative processes, and invest in technological solutions. Expanding healthcare infrastructure and optimizing emergency services can contribute to more efficient and timely patient care in Enugu State,, Nigeria.

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