Review

Careers in Physiology: A Guide for Nigerian Students

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Careers in Physiology: A Guide for Nigerian Students

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Abstract: A degree in physiology in Nigeria offers a enormous opportunities that many undergraduates may be unaware of.This article explores different career paths available to physiology undergraduate and graduates in Nigeria. It outlines various fields within clinical and healthcare settings, research and academia, biotechnology and pharmaceuticals, and even alternative careers. It also details specific specializations within clinical physiology, including cardiovascular, respiratory, neurophysiology, sleep, gastrointestinal, and renal physiology.The article emphasizes the importance of gaining practical experience through internships, volunteer work, and networking to equip physiology them with essential skills for job market.

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1. Introduction

Physiology is a branch of biology, it aims to the understand the intricate mechanisms that govern life, from the molecular processes within cells to the complex interactions of the entire body. By understanding how the body works in both health and disease, physiology plays a crucial role in developing new therapies and strategies for maintaining well-being [1].

In Nigeria, physiology undergraduates often find themselves immersed in rich academic curricula, gaining a solid theoretical foundation. However, the transition from the classroom to the professional world can be challenging, as many students grapple with the question: What lies beyond graduation?

This article aims to shed light on the diverse career paths available to physiology students in Nigeria, also it explores the essential skills, qualifications needed and opportunities that await them.

Career path for Physiologist

1. Clinical and Healthcare Careers

Physiology graduates who enjoy applying their knowledge to improve patient care can find rewarding careers in clinical and healthcare settings. These roles allow them to have direct access to patients and make a positive impact on people's lives.

- **Physician or Surgeon:** If you aspire to become a doctor, your physiology degree provides an excellent foundation for medical school. You will need to apply for additional 5 years for MBBS degrees as a direct entry students to Nigerian universities. You may also consider other countries offering 4 years MD programs such as Philippines, Cyprus, Poland, Georgia United Kingdom . Some required standardized tests before admission but many do not not.
- **Clinical Physiologist:** Clinical physiologists specialize in areas such as cardiovascular, respiratory, or neurophysiology. In this role, you will work with patients to diagnose and monitor conditions related to specific physiological systems. Training during your undergraduate study and experience will prepare you for these roles,

2. Research and Academia

A career in research or academia may be the perfect occupation for those with that has passion for teaching, investigating, discovery and a desire to contribute to scientific knowledge. These roles

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allow them to explore new areas of physiology, contribute to scientific advancements, and educate the next generation of scientists and healthcare professionals.

- **Research Scientist:** Research scientists work in universities, private and government owed research institutions , conducting experiments and studies for the betterment of human lives[2].
- **Academic Lecturer :** If you enjoy teaching and mentoring, a career in academia might be best for you. As a lecturer or professor, you will teach undergraduate and graduate students, guide research projects, and contribute to the academic community through your research and publications.

3. Biotechnology and Pharmaceutical Industries

The biotechnology and pharmaceutical industries offer diverse career opportunities for physiology students as well . These industries develop new treatments, drugs, and technologies that improve health.

- **Biotechnologist:** They apply their knowledge of biology and technology develop products and devices that address health challenges [3].
- **Pharmaceutical Research Scientist:** In the pharmaceutical industry, research scientists focus on discovering and developing new drugs that treat various diseases and conditions.
- **Regulatory Affairs Specialist:** Regulatory affairs specialists ensure that pharmaceutical products comply with all regulations and standards set by government agencies[4].
- **Sales Representative:** If you have strong communication skills and enjoy interacting with people, a career as a sales representative for pharmaceutical industry or biotechnology might be a good for you .

4. Alternative Careers

Physiology graduates are not limited to traditional roles in healthcare or research. The skills and knowledge gained during your degree and other training you did can be applied to various alternative careers that allow you to leverage your scientific background in unique ways.

- **Science Writer or Communicator:** Science communication is a growing field that bridges the gap between scientific research and the public.
- **Public Health Specialist:** Public health specialists work on initiatives to improve health outcomes at the community or population level.
- **Medical Device Specialist:** Medical device specialists work in the development, testing, and marketing of medical devices.
- **Health and Wellness Consultant:** With a strong understanding of how the body functions, physiology graduates are well-suited to careers in health and wellness consulting.
- **Entrepreneurship in Health and Wellness:** If you have an entrepreneurial spirit, you might consider starting your own business in the health and wellness industry.
- **Alternative therapist:** This include complementary and alternative medicine professionals e.g Cupping therapist, Naturopahth and others.

Common Specializations under clinical physiology and specific tests they perform.

1. Cardiovascular Physiologist

Cardiovascular physiologists specialize in diagnosing and monitoring conditions related to the heart and blood vessels [5]. This may includes speciality such as interventional cardiovascular physiologist as well. They play a important role in identifying, monitor and treating a wide range of heart diseases, from arrythmias to other chronic heart disease. Some of their test include:

- **Electrocardiogram (ECG/EKG):** Records the electrical activity of the heart.

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- **Echocardiogram:** An ultrasound of the heart that provides images of the heart's structure and function.
- **Stress Testing:** Monitors the heart's response to physical exertion.
- **Holter Monitoring:** A continuous ECG recording over 24-48 hours.
- **Blood Pressure Monitoring:** Includes both resting and ambulatory blood pressure measurements.

2.Respiratory Physiologist

Respiratory physiologists focus on assessing lung function and diagnosing respiratory disorders[6]. They play a vital role in managing conditions such as asthma, Chronic Obstructive, Pulmonary Diseases (COPD), and sleep apnea. They ensuring patients receive appropriate treatment and care.

- **Spirometry:** Measures the volume and flow of air that a patient can inhale and exhale.
- **Lung Volume Tests:** Assess the total amount of air in the lungs after a deep breath.
- **Gas Diffusion Tests:** Measure how well oxygen and other gases move from the lungs into the blood.
- **Bronchial Challenge Tests:** Evaluate airway responsiveness by measuring lung function before and after exposure to specific substances or exercise.
- **Polysomnography (Sleep Studies):** Though more commonly associated with sleep physiologists, respiratory physiologists often conduct sleep studies to diagnose conditions like obstructive sleep apnea.

5. Neurophysiologist

Neurophysiologists specialize in evaluating the function of the nervous system, particularly the brain, spinal cord, and peripheral nerves[7]. They play a critical role in diagnosing and managing neurological disorders, such as epilepsy, multiple sclerosis, and spinal cord injuries.

- **Electroencephalogram (EEG):** Measures electrical activity in the brain.
- **Nerve Conduction Studies (NCS):** Assess the speed and strength of electrical signals traveling through the peripheral nerves.
- **Electromyography (EMG):** Evaluates the electrical activity of muscles at rest and during contraction.
- **Evoked Potentials (EP):** Measure the brain's electrical response to sensory stimuli.
- **Intraoperative Monitoring:** Neurophysiologists may monitor the nervous system's function during surgeries.

6. Sleep Physiologist

Sleep physiologists specialize in diagnosing and managing sleep disorders[8]. They play a crucial role in improving patients' quality of life by addressing issues such as , insomnia, narcolepsy and sleep apnea.

- **Polysomnography (PSG):** A comprehensive sleep study that records brain activity, eye movements, muscle activity, heart rate, breathing patterns, and oxygen levels.
- **Multiple Sleep Latency Test (MSLT):** Measures how quickly a person falls asleep in a quiet environment during the day.

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- **Actigraphy:** Involves wearing a wristwatch-like device that monitors movement to assess sleep patterns and circadian rhythms.
- **Positive Airway Pressure (PAP) Titration:** Involves adjusting the levels of air pressure during a sleep study to determine the optimal settings for treating sleep apnea with a CPAP machine.

7. Gastrointestinal Physiologist

Gastrointestinal physiologists specialize in assessing and diagnosing disorders related to the digestive system[9]. They play a crucial role in managing conditions such as gastroesophageal reflux disease (GERD), irritable bowel syndrome (IBS), and other digestive disorders.

- **Esophageal Manometry:** Measures the strength and muscle coordination of the esophagus when swallowing.
- **pH Monitoring:** Tests the amount of acid that flows back into the esophagus from the stomach over 24 hours.
- **Gastrointestinal Motility Studies:** Assess the movement of food and liquids through the digestive tract.
- **Breath Tests:** Measure the production of hydrogen or methane gases, which can indicate issues like bacterial overgrowth, lactose intolerance, or other malabsorption syndromes.

8. Renal Physiologist

Renal physiologists specialize in assessing and diagnosing disorders related to kidney function and urinary system health[10]. They play a crucial role in managing conditions such as kidney stones, chronic kidney disease, and urinary tract infections.

- **Renal Function Tests:** Include blood and urine tests to assess kidney function.
- **Ultrasonography:** Uses sound waves to produce images of the kidneys, bladder, and ureters.
- **Urodynamic Studies:** Evaluate how well the bladder and urethra are storing and releasing urine.
- Dialysis

9. Perfusionist

Cardiovascular Perfusionist: Operates the heart-lung machine during cardiac surgery, ensuring adequate blood flow and oxygenation to the body while the heart is stopped.

Vascular Perfusionist: Assists in vascular surgery procedures, such as bypass surgery, by managing blood flow and oxygenation during the operation.

10. Cath Lab Technician:

Cardiovascular Technician: Provides essential support to cardiologists during procedures in the catheterization laboratory, assisting with equipment, patient care, and monitoring vital signs.

Angiography Technician: Specializes in procedures involving X-ray imaging of the heart and blood vessels, such as coronary angiography and angioplasty.

Preparing for Your Chosen Career

1. Gaining Relevant Experience

Experience is one of the most important elements in preparing for a career in physiology. Practical, hands-on experience not only enhances your understanding of the field but also makes you more competitive in the job market.

A. Internships and Work Placements

Internships and work placements offer invaluable opportunities to bridge the gap between theoretical knowledge and practical application. By immersing yourself in real-world settings, you

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can utilize the six-month Student Industrial Work Experience Scheme (SIWES). by the federal government and your university, to gain hands-on experience.

Don not limit yourself solely to SIWES. Whenever you find extra time for extracurricular activities or when there is industrial strike by workers unions in the university (ASUU and others), consider applying for internships at organizations that align with your interests. The more internships you complete, the stronger your skills will become.Internships can also help you to:

Understand workplace dynamics
Build professional relationships
Enhance your CV

B. Volunteering

Consider volunteering for paid or unpaid roles. This presents another opportunity to gain experience, especially for tho are interested careers in patient care, public health, or community outreach. Volunteering allows you to:

Develop soft skills: Communication, teamwork, empathy, and problem-solving are all crucial for success in many fields. Volunteering provides a platform to hone these skills in a practical setting.

Make a difference: Contribute directly to a cause you care about while gaining valuable experience. The sense of purpose and positive impact can be incredibly rewarding.

Expand your network: Volunteering often connects you with professionals in your desired field. Build relationships, learn from their experiences, and potentially gain valuable mentorship.

C. Networking

- **Attend Conferences and Seminars:** Participate in industry conferences, seminars, and workshops where you can meet professionals, learn about the latest research, and discover job opportunities.
- **Join Professional Organizations:** Membership in professional organizations, such Physiological Society of Nigeria (PSN), American Physiological Society or Physiological Society (Physoc, UK), Society of Human and Environmental Applied Physiology (Nigeria) , Most of these bodies have student membership which does not require you to pay. They provide access to job, networking events, workshops educational resources, and sometimes give academic grants for workshop, conferences and research.
- **Use Social Media:** Platforms like LinkedIn are excellent for connecting with professionals in your field, joining relevant groups, and staying informed about job openings.

1. **Further Education and Certification**

Depending on your career goals, further education and professional certifications can be essential in advancing your career in physiology.

A. Graduate Studies

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For many careers in physiology, especially in research and academia, a graduate degree (Master's or Ph.D.) is a crucial stepping stone. Many public universities in Nigeria that offer Bachelor's degrees in Physiology also provide Master's and Ph.D. programs. If you are interested in specializing in a particular field, conducting independent research, or pursuing advanced career opportunities, consider pursuing a graduate degree at one of these institutions.Additionally, many schools offer specialized diplomas in various clinical physiology areas. For example:

-Diploma in Echocardiography by Lagos State University Teaching Hospital (LASUTH) and Lagos University Teaching Hospital (LUTH)

-Diploma in Dialysis Technician by Regions Health

-Diploma in Neurophysiology by Medical Consult and Regions Health

These programs can equip you with specific skills and knowledge, allowing you to specialize in a particular field, work independently , and enhance your career prospects.

B. Professional Certifications

Certifications can significantly enhance your qualifications and open doors to specialized roles within the field of physiology. Depending on your career goals, consider pursuing relevant certifications and board registrations, such as:

-RCCP (UK): Registration as a Clinical Physiologist in the UK

-ABRET (American): Certification for EEG Technicians

-BONNE (American): Certification for Dialysis Technicians

Additionally, explore other relevant professional bodies and certifications within your specific area of interest. By obtaining these credentials, you can demonstrate your expertise, increase your marketability, and gain a competitive edge in the job market.

11. Conclusions

A degree in physiology equips graduates with strong background essential to numerous professions . By actively seeking experience and pursuing further education when necessary, graduates can navigate the various career paths within the field of physiology and achieve their professional and career goals.

Recommendations : Identify areas within physiology that interest you and align with your passions. This will guide your career path selection.-Gain practical experience by actively seeking internships, volunteer positions, or research opportunities related to your desired field. Real-world experience enhances your understanding and marketability.-Develop your skill set and continuously hone these skills and consider acquiring additional skills specific to your chosen career path.

-Network and stay informed: Build relationships with professionals in your field through conferences, seminars, professional organizations like the Nigerian Physiological Society, SHEAP and others and use social media platforms like LinkedIn to connect and Stay updated on industry trends and job market developments.

-Depending on your career goals, consider pursuing a Master's degree, Ph.D., or specialized diplomas in clinical physiology which can significantly enhance your qualifications. Additionally, relevant professional certifications like RCCP, ABRET, or BONNE can demonstrate your expertise and increase your competitiveness.

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