**A**

**TECHNICAL REPORT**

**ON**

**STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)**

**UNDERTAKEN AT**

**NATIONAL INSTITUTE OF PHARMACOLOGICAL RESEARCH AND DEVELOPMENT (NIPRD), 205 IDU INDUSTRIAL LAYOUT, LUGBE, ABUJA.**

**BY**

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**DEDICATION**

This report is dedicated to God Almighty who gave me the strength to finish this journey, who was with me throughout the good and the bad times during my work experience. I also dedicate this report to my beloved Parents (Pst. and Dr. Mrs. Benjamin Nsien), my Lecturers, Supervisors, Friends and everyone who supported me in any way during this 3-month experience.

**ACKNOWLEDGEMENT**

I wish to express my profound gratitude to my Almighty Father for his love, guidance and grace that he has shown in my life. I also want to express my gratitude to Dr Bulus Adzu, the HOD of the P&T department of my industry, my industrial based supervisor, Pharm Aisha, the entire P&T staff and the Interns for making my industrial attachment practice interesting, educative and very worthwhile.

I would also love to show my appreciation to my HOD, Dr Adeoluwa, my supervisor, Pastor Oni and to all my wonderful departmental lecturers in my department, may God continue to bless you all for all your hard work in Jesus name, Amen.

My special regards to my parents who support my educational pursuit financially, I pray that at

the end of the day, you’ll reap the fruits of your labour. I would also like to thank my siblings, friends and basically everyone that supported me in anyway, I say remain blessed in Jesus name, Amen.

**ABSTRACT**

The Student Industrial Work Experience Scheme (SIWES) which was established by the Federal Government of Nigeria, was created with the aim of exposing students of higher institutions to industrial and practical work related to their course of study. This is to ensure that they not only have the theoretical knowledge of the course but that they also have practical skills so that when they eventually graduate, they will be conversant with what they are about to face outside. This report is based on the training and experiences I gained during my three months of Industrial training at the National Institute of Pharmaceutical Research and Development, Idu Industrial Area, Garki, Abuja. This report highlights the handling of animals, the taking of blood from the jugular vein of a rat, the inoculation of some parasites into healthy animals, the studies we carried out, majorly, the Wound healing study and the breeding of animals.

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**CHAPTER ONE**

* 1. **About SIWES**

The Student Industrial Work Experience Scheme (SIWES) is a skills training program designed to expose and prepare students of higher institutions for the Industrial work situation they will likely meet after graduation. It is also a planned and structured programme based on stated and specific career objectives which are geared towards developing the occupational competencies of participants (Mafe, 2009).

SIWES was introduced and founded by the Industrial Training Fund (I.T.F) in 1993 to help students get experience and exposure of what their course entails in the industrial sense.

The Industrial Training Fund (I.T.F) solely funded the scheme during its formative years. However, due to financial issues, the fund withdrew from the Scheme in 1978 in which the Federal Government took over and handed the scheme over to both the National Universities Commission (N.U.C) and the National Board for Technical Education (N.B.T.E) in 1979.

However, the management and implementation of the scheme was however reverted to the I.T.F by the Federal Government in November, 1984 and the administration was effectively taken over by the Industrial Training Fund in July 1985, with the funding solely borne by the Federal Government.

* 1. **Scope and Objectives of SIWES**
* SIWES provides the avenue for students in higher institutions to acquire industrial skills and experiences in their course of study.
* Expose students to work method and techniques in handling equipment and machinery that may not be available in their institutions.
* Make the transition from school to the world of work easier and enhance students contact for later job placement.
* SIWES provides students with an opportunity to apply their knowledge in real work situations thereby bridging the gap between theory and practice.
* Enlist and strengthens Employers involvement in the entire educational process and prepare students for employment after graduation.
  1. **About the institution(NIPRD)**

The National Institute for Pharmaceutical Research and Development (NIPRD) is a Federal Government Parastatal under the Federal Ministry of Health. The Agency was established by Government Order No. 33 Vol. 74 of 11th June 1987 Part B under the Science and Technology Act Cap 276. It became functional in the year 1989. In 2001 following a Federal Executive Council decision, NIPRD was moved to the Federal Ministry of Health (FMOH), with a huge investment in scientific equipment and human resources.

NIPRD is the only one of its kind in the Region, and is statutorily charged with the responsibility for research and development of drugs, vaccines, phytomedicines, commodities, and diagnostics aimed at improving sustainable access to safe, affordable and high-quality healthcare. NIPRD also undertakes activities relating to capacity building, policymaking, data collation, drug distribution and the development of contextual partnerships that can expedite access to healthcare.

NIPRD comprises of different departments which are: The department of Microbiology and Biotechnology (MB&BT), The department of Medicinal Chemistry and Quality Control (MC&QC), The department of Medicinal Plant Research and Traditional Medicine (MPR&TM), The department of Pharmacology and Toxicology (P&T) and The department of Pharmaceutical Technology and Raw Materials Development (PT&RMD).

**CHAPTER TWO**

* 1. **Introduction to the Department**

On the first day of my training, I was given a tour around the Institute after which I was deployed to the department of Pharmacology and Toxicology (P&T) which is made up of four (4) units, namely Pharmacology, Toxicology, Laboratory that manages the in vivo and in vitro, and Animal Facility Centre (AFC).

Some of the departmental functions are:

* Evaluate safety of drugs and drug products using acute, sub-acute, chronic and in vitro toxicological procedures.
* Perform efficacy studies of drugs and drug products for the treatment of common and emerging diseases; including verification of claims by traditional medicine practitioners.
* Determine potential of interaction between herbal products and synthetic medicines using in vivo and in vitro techniques.
* Breed quality laboratory animals.

**2.2 Laboratory Equipment and Various studies done in the laboratory**

During my training, I became acquainted with some of the equipment there like: Isolated tissue equipment, Planter aesthesiometer, Auto reflex conditioner, Blood bank refrigerator, Rota rod, Water bath, Neuro box, Microscope, Plethysmometer, Ultrasonic Homogenizer, Iso-fuge, Microfuge, Centrifuge, Multicanter, Bronchospasm transducer, Soxhalet extractor etc. Although, I was not opportune to use all the equipment there, I became well acquainted with most of the equipment there.

Apart from getting acquainted with the equipment, I also acquired quite a bit of knowledge either from seminars or presentations or studies that were carried out in the laboratory.

Some of the studies that were carried out are: Ulcer studies, Pylorus-ligation study, Trypanosome study, Anti-inflammatory study, Anti-pyretic study, Wound healing study etc.

Also, I acquired some good laboratory skills needed in my field of study. Some of them are: Proper handling and care of laboratory animals. I learnt that if routine handling procedures are aversive, animals are likely to develop anxiety and show exaggerated stress responses when approached which is bad to animal welfare and will increase the difficulty of handling as animals attempt to avoid contact/restraint and may show defensive aggression. Therefore, I had to learn the proper way to handle the animals.

The next skill I learnt throughout my training there is the taking of blood from the jugular vein of the rat. I was actually taught the different ways of withdrawing blood but we focused on this part.

Another skill I learnt was the inoculation of parasites (trypanosomes) into healthy rats. You take the blood of an infected animal and put it on a slide, you also put normal saline on the same slide, mix them together on the slide, take the blood and then inoculate the infected blood into an uninfected animal and then observe the growth process of the parasite in the uninfected animal.

**CHAPTER THREE**

**WOUND HEALING STUDY**

Wound healing can be defined as the process which occurs when there is a breakage or discontinuity of a tissue. It can also be referred to as a living being's replacement of destroyed tissue by living tissue. Wound healing is a dynamic process consisting of four continuous, overlapping, and precisely programmed phases. The events of each phase must happen in a precise and regulated manner. Interruptions, aberrancies, or prolongation in the process can lead to delayed wound healing or a non-healing chronic wound.

**Stages or Phases of Wound Healing**

In adult humans, optimal wound healing involves the following the events:

* Rapid hemostasis.
* Appropriate inflammation.
* Mesenchymal cell differentiation, proliferation, and migration to the wound site.
* Suitable angiogenesis
* Prompt re-epithelialization (re-growth of epithelial tissue over the wound surface).
* Proper synthesis, cross-linking, and alignment of collagen to provide strength to the healing tissue. (Gosain and DiPietro, 2004; Mathieu et al., 2006.)

**Different models in Animal wound healing**

There are different models that can be used to carry out wound healing study and they are:

* Excision model.
* Incision model.
* Burn model.
* Partial thickness model.
* Blister model and
* Rabbit ear model.

A wound healing study was carried out using the excision model. We first of all carried out an acute toxicity test before carrying out the experiment itself. This test was carried out to see if the extracts (G0, G1, G2 and G5) to be used had any side effects on the animals (mice).

**Acute toxicity or Skin Irritation Test**

This test was carried out on four (4) mice (one mice for each extract) between the weights of 25g and 30g. They were weighed, coded and then shaved (on their backs) the day before the test began. The acute toxicity test was carried out for about 7 days. The extracts were applied on the shaved backs of the mice on the first day and then observed for the next 7 days. At the end of the 7 days, the results showed that the extracts had no toxic effect on the mice.

**Wound healing Study Procedure**

After we found out that the extracts had no toxic effect on the mice, we then went ahead with the study which lasted for about 21 days. About 25 mice within the weights of 20g and 30g were used for this experiment.

They were each weighed, coded, shaved (on their backs) and randomized into 5 different groups (G0, G1, G2, G5 and Control groups) the day before the study began. On the day of the study, they were each anaesthetized with 5ml of diluted ketamine which enabled us to create wounds on their shaved backs easily using forceps and scissors.

The extracts and control drug (Generic name: Povidone Iodine, Trade name: Wosan) were then applied on the wounds of the animals respectively. The extracts were applied on the wounds daily and measurements of the wounds were taken (using a Vernier caliper) every 3 days.

The results showed that the extracts had positive effects on the wounds of the mice. This is because all the wounds were healed and with no infection before the end of the 21 days. The result of the extracts matched up closely with the positive control ointment, Povidone-Iodine. This means that the extracts possess wound-healing activities.

**CHAPTER FOUR**

**4.1 Summary of the Industrial Training**

In summary, we had mostly seminars, lectures and presentations sometimes from the staffs but most times from the Pharmacist interns and Corpers there. There were quite a number of studies that I partook in or that I was available for e.g. I was involved in an anti-inflammatory study where we used the plethysmometer to measure the inflammation on the animals right hind paw. I also learnt how to make De Jalon solution and to also operate the Electronic Isolated tissue equipment. I was also opportune to witness and be involved in a pylorus-ligation study and many more studies.

**4.2 Challenges Encountered and Recommendations**

During my training, there were some challenges I encountered which I would love to share and some recommendations I would also love to give in order to improve the situation there. Some of the challenges I encountered are:

* Bad roads leading to the institute.
* Scarcity of some laboratory equipment.
* Less than 100% quality laboratory equipment.
* No proper washing and sterilization equipment.
* Poor power supply.
* Disappointments.

Some of the recommendations I’ll make is that the government please see what they can do about the bad roads, scarcity of equipment, the medium quality equipment, poor power supply and the no proper washing and sterilization equipment of the institute. This is because, this is supposed to be a National body and therefore, is expected to have top notch standards, quality and quantity in order to achieve the goals, visions and missions they aim and stand for and basically, they cannot do this without the help of the government.

Also, about the disappointments, I’d like to advise that schools and companies or industries or institutes work together for the sake of the students so, that it’ll be easier for a student to find a placement in an organization. If the school could have a kind of collaboration with the industries in which the industries already expect the students to come to them. It will be easier and less time consuming for the students in their search of a suitable workplace. This would enable the school to be confident that their students are receiving the best training and that they are not just wasting the training period.

**4.3 Conclusion**

In all, I’d like to say that I really enjoyed my training/learning period cause despite the challenges, I was able to learn a whole new lot of things, not just academically but economically too. This has helped me to do things better and things said or taught in the classroom has become easier for me too. NIPRD is a good place for all pharmacology students to do their IT. I highly recommend it for pharmacology students.

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