**REPORT ON STUDENTS INDUTRIAL WORK EXPERINCE SCHEME (SIWES)**

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**BY**

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**TOPIC: EFFECTS OF VITAMIN B COMPLEX ON ACETIC ACID INDUCED GASTRIC ULCER IN ADULT WISTAR RATS**

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**DEDICATION**

I dedicate this SIWES report to God Almighty for guiding me through my Industrial Training period. I also dedicate it to my parents, Dr. and Mrs. Francis Zirra for their earnest and unending support.

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I’m grateful to Dr. Peter Obi Adigwe, the Director General of National Institute for Pharmaceutical Research and Development (NIPRD) for giving me the opportunity to learn. I’m also grateful the HOD of Pharmacology and Toxicology, NIPRD Dr. Bulus Adzu for his kind support. And to my supervisor Mr. Solomon Fidelis, for his supervision and lectures, I remain grateful.

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**ABSTRACT**

Drugs with multiple mechanism of protective action may be effective in minimizing tissue injury diseases. Vitamin B complex has shown varied positive biological properties in reverting diseased conditions. There is dearth of information regarding its effects on gastrointestinal integrity, hence the aim of the study.

Adult Wistar rats were used in this study. They were randomly placed into groups of five animals each (n=5). Gastric ulcers were created by injection of acetic into the sub-serosa of the gastric wall after which rats were treated with distilled water, vitamin B Complex 50 mg/kg and omeprazole (20 mg/kg). Drugs were administered for 28 days and animals’ weights were carried out weekly. The last group had no surgical procedure carried out on them. 24 hours after the last treatment, rat’s stomachs were isolated and pH of gastric determined. The organs were photographed and subjected to histological analysis. The digital pictures of the rat stomachs were processed using Imagej software.

The result revealed that surgical procedures cause ulcers in all rats operated. Treatment with Vitamin B Complex also caused an increase in pH of gastric content and decreased the severity of ulcers. This is shown by the reduction in percentage of ulcers. These results were furthered buttressed by histological findings that revealed reduction in the degree of ulceration form deep to moderate and slight ulceration in Vitamin B treated group. Omeprazole was used as the reference drug.

 Findings on this study suggest that vitamin B complex might possess healing effect on ulcer, can reduce the pH of gastric juice and also reduce the reddish coloration and severity of the ulcer.

**SIWES HISTORY AND OBJECTIVES**

The Federal Government of Nigeria created the Industrial Training Funds (ITF) in the year 1972 in an effect to boost the educational standard and industrial development of Nigeria.

ITF insisted that Students Industrial Work Experience Scheme (SIWES). This is accepted skill training program, which form part of the approved minimum academic standard in some different Degree, Diplomas and N.C.E. for Nigerian universities, polytechnics and co

The SIWES programmed expose students to the needed experience of training, such as handling machine and equipment.

It provide job opportunities for students whose graduate from universities, polytechnics and colleges of education, the effectiveness of this scheme gives the job specification in which technical lecturers, students and employers contribute after employed.

**AIMS AND OBJECTIVES OF SIWES**

* To expose and prepare student for the industrial work situation, they are to meet after graduation.
* To improve the relationship between educational institutions and industrial sectors.
* To give the student chance of putting the theoretical part of what they learnt in the class into practice.
* To expose the student to the practical aspect of what they learnt in the classroom
* To give student opportunity to decide and appreciate this practical experience.

**INTRODUCTION**

Peptic ulcer is one of the most common disease affecting gastrointestinal tract which could be gastric ulcer or duodenal ulcer depending on its site (localized) disease, (Malfertheiner *et al*.,2009). Gastric ulcer, also called stomach ulcer, is a break in the normal gastric mucosa integrity that extends through the muscularis mucosa into the submucosa or deeper. The incidence varies with age, gender, geographical location and is associated with severe complications including hemorrhages, perforations, gastrointestinal obstructions and malignancy. Thus, this clinical condition represents a worldwide health problem because of its high morbidity, mortality and economic loss (Dimaline and Varro, 2007). The normal stomach mucosa maintains a balance between protective and aggressive factors. Some of the main aggressive factors as gastric acid, abnormal motility, pepsin, bile salts, use of alcohol and nonsteroidal anti-inflammatory drugs (NSAID), as well infection with microorganisms (*Helicobacter pylori* and others). On the other hand, mucus secretion, bicarbonate production, gastro protective prostaglandin synthesis and normal tissue microcirculation protect against ulcer formation. Although in most cases the etiology of ulcer is unknown yet, it is generally accepted that gastric ulcers are multifactorial and develop when aggressive factor (endogenous, exogenous and/or infectious agents) overcome mucosal defense mechanism (Tulassay and Herszenyi, 2010).

 Figure 1: Gastric ulcer *Source:gastriculcer.blogspot.com*

Vitamins are essential nutrients that are sourced from food. They are required for their vital physiological Functions and are significant contributors to the maintenance of optimal health (Bellows L and Moore R, 2012). A tremendous amount of data from research was published over the past decades concerning the roles of different vitamins in various gastrointestinal for instance, most vitamins showed an inverse relationship with the risk of colorectal carcinoma as well as other malignancies like gastric and esophageal cancer in observational trait, however interventional trials fail to prove a clear beneficial preventive role of certain vitamins in specific entities. The B vitamins are a class of water soluble vitamins that play important roles in cell metabolism. Though these vitamins share similar names, they are chemically distinct compounds that often co-exist in the same food. Some of the B vitamins are also synthesized by the intestinal bacterial but in insufficient quantity. In general, dietary supplements containing all eight are referred to as vitamin b complex (Australian dietary guidelines, 2013).

**METHODS AND PROCEDURES**

**Materials/Equipment**

The materials/equipment used in this research includes, 20 males and females adult Wistar rats with body weight ranging from (150k– 280 g), Vitamin B Complex (Masons Nature), Omeprazole, methylated spirit, ketamine, cicatrin (GlaxoSmithKline Pakistan Limited, BN00035), formalin, methylated spirit, nose mask, weighing scale, **s**uture, acetic acid, diazepam. metabolic cages, EDTA bottles, 1ml syringes, centrifuge tube, Hand gloves, cotton wool, weighing scale, centrifuge (Quality Lab System, ISO-Fuge/416R), Digital pH meter (Metler Toledo Seven compact, pH/ionS220).

**Experimental grouping and treatment protocol**

Twenty animals were divided into 4 groups of five animals each. Groups one to three were treated while group four was left untreated. Treatments were administered orally with the use of Orogastric cannula and the experiment lasted for twenty-eight (28) days.

Group 1: Received 10 ml/kg of Distilled water for 28 days

Group 2: Received 20 mg/kg of omeprazole for 28 days

Group 3: Received 50 mg /kg of Vitamin B complex for 28 days

Group 4: No treatment was administered

**Induction of ulcer**

Gastric ulcer was induced by acetic acid according to Okabe *et al*., (1972) and Wang *et al*., (1989). Under ketamine and Diazepam (50/10 kg/kg) anesthetization, a laparotomy (surgical procedure involving a large incision) was done through a midline epigastric incision. After exposing the stomach, it was clamped with eye forceps. 0.03ml of 20 % acetic acid solution was injected using a micro syringe into the border between the antrum and fundus along the anterior gastric walls and the abdomen was statured. Animals were allowed to recover and then returned to their cages having free food and water. They were weighed weekly throughout the study.

**Sacrificing of animals/analyzing of stomach ulceration**

24hrs after the administration of the last treatment, rats were euthanized by inhalation using diethylether. The rats stomach was rapidly removed and opened along the greater curvature, the stomach content was collected in a centrifuge tube, the stomach tissue was rinsed with water and Photographs were taken (using Digital camera) and the pictures were analyzed using Image j software to determine the area of ulcer (Sarkar *et al*., 2010)

**Determination of ph and volume**

The entire gastric content was transferred into centrifuge tubes. It was used for determination of pH. The tubes were centrifuged at 1000 rpm for 15 min in a refrigerated centrifuge (Quality Lab System, ISO-Fuge/416R), Gastric pH and Volume was determined by a digital pH meter. This was carried out in triplicates (Shahrani *et al*., 2007).

**RESULTS**

**Effect of Vitamin B complex on gastric pH and Volume**

Oral administration of Vitamin B Co for 28 days increased pH of gastric content to 5.1 when compared to distilled water group and omeprazole with pH of 2.71 and 2.14 omeprazole respectively.

**Effect of vitamin B complex on macroscopic features on gastric ulcer and gastric tissues**

 Vitamin B complex (50 mg/kg) was effective following oral administration in reducing ulcer area as well as its severity (histology) compared to groups treated with Distilled water. In control group, there was presence of dark reddish ulceration with hemorrhage as shown in Figure 2A. In Vitamin B complex (50 mg/kg) treated group, there was reduction in ulcer spot, reduction in hemorrhage and also a reduction in the reddish coloration of gastric tissue (Figure 2B). In groups that received omeprazole 20 mg/kg, there was reduction in ulcer spots, hemorrhage and reddish coloration (Figure 2C).



Figure 2A: Distilled water (10ml/kg)



Figure 2B: Vitamin B complex (50mg/kg)

 

Figure 2C: Omeprazole (20mg/kg)

**DISCUSSION**

The results from this study showed that vitamin B complex had a potent effect on the healing of ulcerated rat. pH is highest in disease control (distilled water) rats and minimum in animals treated with Vitamin B complex which means Vitamin B complex has the ability to treat hyperacidity. This result shows the gastric mucosal protective actions of Vitamin B complex and this result is in agreement with Umammaheswari et al., 2007. It has been demonstrated that many drugs and formulations that possess potent antioxidant action are effective in healing experimentally induced gastric ulcers (salim,1994 and Dhuley,1999).

**CONCLUSION**

This study demonstrates that treatment with 50 mg/kg of vitamin B complex has the ability to heal ulcer, also increase in gastric pH and the reduction in ulcer severity proves the anti-ulcer potential and anti-hyperacidity of vitamin B complex.

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