Advances in Biochemistry
2023; 11(1): 8-14
http://www.sciencepublishinggroup.com/j/ab
doi: 10.11648/j.ab.20231101.12
ISSN: 2329-0870 (Print); ISSN: 2329-0862 (Online)

Effect of Local (*Tsumi*) and Foreign (*Mi Jian Fen*) Aphrodisiac on Biochemical Parameters in Wistar Albino Rats

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To cite this article:
Farida Suleiman Abubakar, Fatima Aminu, Moses Zira Zaruwa, Bawa Yusuf Muhammad, Titilayo Oluwayemisi Bamidele, Chibuzo Carole Nweze, Saratu Steven Audu. Effect of Local (*Tsumi*) and Foreign (*Mi Jian Fen*) Aphrodisiac on Biochemical Parameters in Wistar Albino Rats. *Advances in Biochemistry*. Vol. 11, No. 1, 2023, pp. 8-14. doi: 10.11648/j.ab.20231101.12

Received: April 8, 2023; **Accepted**: May 2, 2023; **Published**: May 18, 2023

Abstract: An aphrodisiac is any substance (i.e. food or drug) that arouses the sexual instinct, increases sexual pleasure and performance. Aphrodisiacs can be classified as natural remedies such as Ambrien, Ginseng and Yohimbine and synthetic aphrodisiacs like ecstasy, synthetic testosterone, phenethylamines and methamphetamine. *Tsumi* concoction (TC) is a herbal concoction made from *Ficus sycomorus*, Ginger, Clove, Honey and Brown sugar (Jaggery). *Mi Jian Fen* (MJF) is an aphrodisiac imported from Spain. This study investigated the effect of TC and MJF aphrodisiacs on biochemical parameters in adult female Wistar albino rats. Adult rats weighing between 160-220g were grouped into six (6) groups with three (3) animals in every group. Group 1 serve as the control, group 2 were administered with 0.2mg/kg of clomid as the standard drug, while group 3 and 4 received high and low (0.4mg/kg and 0.2mg/kg) doses of MJF while group 5 and 6 received high and low (0.4mg/kg and 0.2mg/kg) doses of TC, respectively. The results revealed significant increase ($p<0.05$) in the ALP and AST levels among all the test groups and a slight increase in ALT compared to the control group. It was followed by significant increase ($p<0.05$) in serum level of oestrogen and FSH. There was significant increase ($p<0.05$) in urea and a slight elevations in creatinine levels in all the treated groups. However, moderate changes in the Haematological parameters were also observed. It was concluded that MJF and TC are potent aphrodisiacs with some level of toxicity. Therefore, utilization of MJF and TC which caused kidney and liver damages in albino rats, could have deleterious side effects among human users.

Keywords: Ficus Sycomorus, TC, MJF, Aphrodisiacs, Biochemical Parameters, Clomiphene Citrate, Wistar Albino Rats

1. Introduction

Human sexuality involves pleasure, affection, sociocultural, sexual identity, emotional and cognitive factors and physical experiences. Sexual sensations can be stimulated by a number of stimuli: fantasies, erotic thought, fondling, masturbation and coitus. Sexual response is expressed by a succession of phases that manifest themselves physiologically in a sequential manner, with interconnected stages that complete the cycle of human sexual response. The word libido refers to sexuality. Libido is a Latin word, it is thought to be equivalent to designating one's sexual drive. This scientific meaning was brought closer to our daily experience by the psychoanalysts, defining libido not only as a sexual desire but also as something concrete in the human experience: sex [1].

The differences between specifically masculine and feminine characteristics of response to sexual stimuli become well known as the knowledge about human sexuality advances [2]. These differences are associated with biopsychosocial factors, particularly, sexual hormones (estrogens vs. androgens), sexual education (repressing vs. permissive), and environment (controlling vs. stimulating). In this context, for the sexual desire to settle in a positive manner within an individual, his/her health should be in good state or condition. Sexual health involves a permanent balance of the different sides involved in the sexual act and is not only limited to the absence of disease and dysfunction

and a wide range of factors, including the physical, mental, and emotional characteristics, as well as social wellbeing in all sexual behaviors. This can also be described as the integration and coordination among mind, emotions and body, which control the social aspect of life [3].

Globally, people developed special or unique indigenous healing traditions based on their culture, beliefs and environment, which satisfied the health needs of their communities over centuries [4]. The increasing widespread use of traditional medicine has prompted the WHO to promote the integration of complimentary or alternative medicine and traditional medicine into the health care systems of some countries and they also encourage the development of national policies and regulations as essential indicators of the level of integration of such medicine within a national health care system [5].

Herbal medicines, also known as botanical medicines or phytomedicines, refer to herbs, herbal materials, herbal preparations and finished herbal products that contain parts of plants or other plant materials such as the active ingredients [6]. The plant materials include; leaves, bark, roots seeds, berries, or flowers [7]. Many drugs used in conventional medicine were originally obtained from plants [8].

An aphrodisiac is defined as any substance (i.e. food or drug) that arouses the sexual instinct, causes veneral desire and increases pleasure and performance. This word is derived from the Greek name "*ëAphroditaeí*", the Greek Goddess of love. These substances (aphrodisiac) are derived from plants, animals or minerals and since time immemorial they have been the passion of man [9]. A great deal of natural substances have historically been known as aphrodisiacs in Africa and Europe, such as yohimbine and the mandrake plant, as well as ground rhinoceros horn used in the Chinese culture and "Spanish fly" which is toxic [10]. Even in today's culture, there are some specific foods that are used as aphrodisiacs, such as strawberries and raw oysters. Chocolate, coffee (*Coffea arabica*), Kolanut (*Cola acuminata*), Sugarcane and honey are also believed to have aphrodisiac potential. Although these natural items are claimed as aphrodisiacs, there is no or little scientific confirmation supporting those assertions.

The use of herbal substance to enhance sexual performance is rampant in our community. In a conservative society (Northern Nigeria), issues relating to sexuality are governed by religion and culture and discussion on sexuality are hardly entertained openly and most often is considered as extremely private or taboo. In northern Nigeria, where polygamy is widely practiced (especially Muslim communities), men trying to keep there several wives happy and women competing with co-wives for their husband attention consumed a lot of aphrodisiac [11]. Aphrodisiac herbs are prepared in all forms (liquid, jelly and powder) and are taken orally or rubbed on the penis or virgina. The recipes are handed down generationally and are jealously guarded secrets. There are local variants such as a mixture of local gin and herbs (*Agbo Gbogbonise*, *Sepe* or *Paraga*, *tsumi* etc.). There are also well packaged industrially made variants in packets of powder, pills or tablets such as "Spanish fly, Enpulse, Mi jian fen, Vimax, Virillis, M-Energex, High T, Male X "and those in liquid forms such as Alomo bitters among others [12]. *Tsumi* concoction (TC) is a herbal concoction made from boiling *ficus sycomorus*, ginger, clove, honey and brown sugar (jaggery) in distilled water (As described by Haj. Fa'iha [13]). TC is taken orally by women of different age without a specific dosage while *Mi jian fen* (MJF) is an aphrodisiac imported from Spain. MJF is a white powdery formula taken when diluted in water or soft drinks like lacasera apple drink. It is said to stimulate Varginal secretion, Ejaculation booster, and Sexual pleasure, Libido enhancement, Potency, Stamina among others (As described by Alh. Musa [14]).

2. Material and Methods

2.1. Sample Collection and Preparation

Fresh stem bark of *Ficus sycomorus*, Ginger, Clove, honey and brown sugar (*Mazarkwaila*) were obtained from Keffi, Nassarawa state and are identified and authenticated at the Department of Plant Science and Biotechnology of Nasarawa State University, Keffi. The stem barks was thoroughly washed with water to remove the adherent impurities and shade-dried.

50g of the *Ficus sycomorus* was boiled with 1ltr of distilled water for 30min, and then 10g of clove, 50g of ginger, 50g of brown sugar and 100ml of honey was added and allow to boil for another 30min. and then allow to cool. The concoction was filtered after cooling and stored in a clean plastic bottle (As described by Haj. Fa'iha [11]).

The Clomid and Mi Jian Fen aphrodisiac were purchased from a pharmacy in Keffi town and identified by specialists.

2.2. Animals

Eighteen [18] adult female Wister Albino rats weighing between 160 – 220g each were purchased from the National Veterinary Research Institute (NVRI) Jos, Plateau State. The rats are allowed to acclimatize under standard condition of humidity and temperature in the animal house of the Department of Biochemistry and Molecular Biology, Nasarawa State University, Keffi. The animals were housed in cleaned aluminium cages lined with wood chip beddings. Standard pellet diet (Livestock Feeds, Sapele Nigeria) and water was given ad libitum.

2.3. Experimental Design

Following two weeks (14 days) of acclimatization, the rats were randomly divided into six (6) groups of three (3) rats each: group A as the control group, Groups B as standard (Clomid) was administered in low dose (0.2ml/kg), Group C and D (Mi Jian Fen) was administered in high and low dose (0.4ml/kg and 0.2ml/kg respectively) and Group E and F (Tsumi) was administered in high and low dose (0.4ml/kg and 0.2ml/kg respectively) as the treatment groups for 30 days.

2.4. Biochemical Assay

The rats were slaughtered with a sharp scalpel in the neck area and the blood was transferred into EDTA and plain bottles. The sera were obtained by centrifuging the blood samples and were stored at 20˚c for the biochemical assay. The biochemical analysis involved measuring the levels of Alanine transaminase (ALT), Aspartate transaminase (AST), Alkaline phosphatase (ALP), Urea, and Creatinine; the assay was performed on an automated Hitachi 911 analyser. Hematological parameters like red blood cells (RBC), Hemoglobin and leukocyte count (white blood cells, neutrophils, monocyte, lymphocytes, eosinophil and basophils) were evaluated with an automatic electronic blood count analyzer (Cell Dyne 3700, Abbott diag. USA).

2.5. Hormonal Assays

The serum level of Estrogen, Follicle stimulating hormone and Lutenizing hormone (LH) were analyzed using enzyme linked immunosorbent assay (ELISA) kits. The assay kits were a product of Monobind Inc., Lake Forest California, USA.

2.6. Ethical Clearance

Ethical approval (Number: NSUK-ACUREC/BCH/23/03-16/01/2023) was obtained from the NSUK Animal care and use research ethics Committee, Nasarawa State University, Keffi, Nasarawa State.

2.7. Statistical Analysis

Data were presented as mean ± standard deviation (SD) and the data were analysed using Statistical Package for Social Sciences (SPSS 20.0). The level of significance used was p less than 0.05.

3. Result

3.1. Effects of Oral Administration of Clomid, Mi Jian Fen and Tsumi on Liver Function Parameters

Data in figure 1 showed a significant increase in ALP and AST levels in animals that were given treatment (Clomid, MJFH, MJFL, TH and TL) compared to the control. There was statistically slight increase (P>0.05) in the mean values of ALT for the treatment when compared to the control.

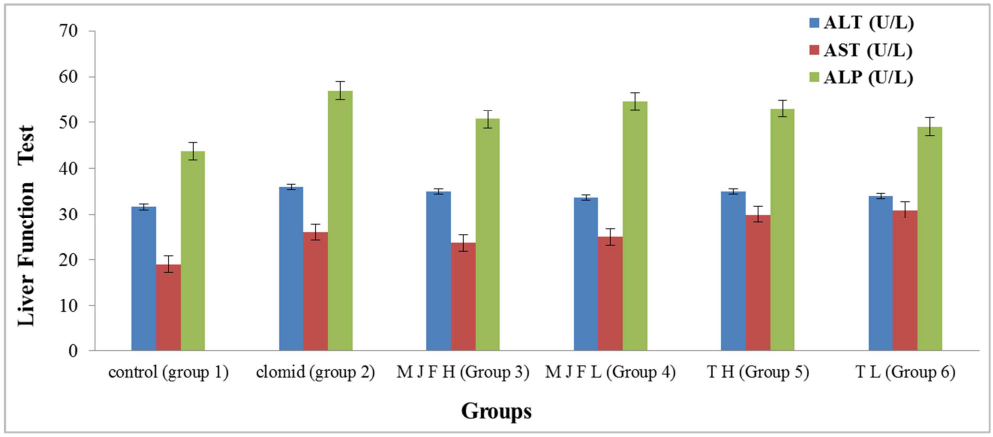


Figure 1. *Effect of oral administration of Clomid, Mi jian fen and Tsumi on Liver Function Parameters (ALT, AST and ALP).*

Results are expressed as Mean ± SD, and are significantly different at p<0.05. Key: MJFH = Mi jian fen high dose, MJFL = Mi jian fen low dose, T H = Tsumi high dose, T L = Tsumi low dose.

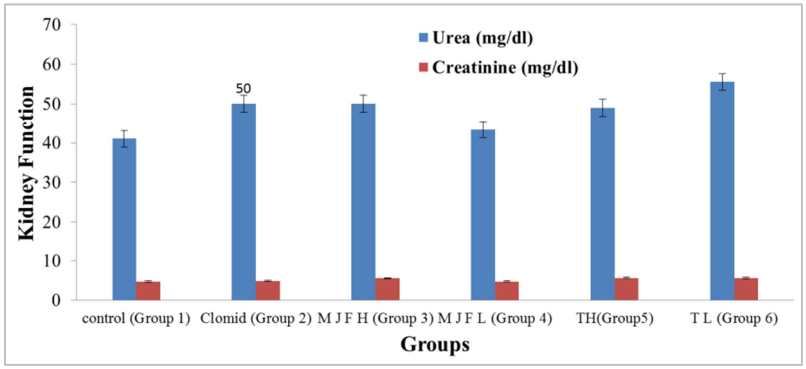


Figure 2. *Effect of oral administration of Clomid, Mi jian fen and Tsumi on kidney Function Parameters (Urea and Creatinine).*

Results are expressed as Mean ± SD, and are significantly different at p<0.05.. Key: MJFH = Mi jian fen high dose, MJFL = Mi jian fen low dose, T H = Tsumi high dose, T L = Tsumi low dose.

3.2. Effects of Oral Administration of Clomid, Mi Jian Fen and Tsumi on Kidney Function Parameters

Figure 2 showed the mean values of Urea and Creatinine for Clomid (standard), Foreign aphrodisiac MJF, TC and control. Significant increase (P<0.05) was observed in the Urea level of the animals that were given treatments when compared to the control. Creatinine level slightly increases (P<0.05) in the treatment groups compared to the control.

3.3. Effects of Oral Administration of Clomid, Mi Jian Fen and Tsumi on Hormonal Parameters

Figure 3 showed a significant increase (P<0.05) in Oestrogen and FSH levels in animals that were given treatment (Clomid, MJFH, MJFL, TH and TL). In contrast, animals given treatment showed a slight increase in LH levels compared to control.

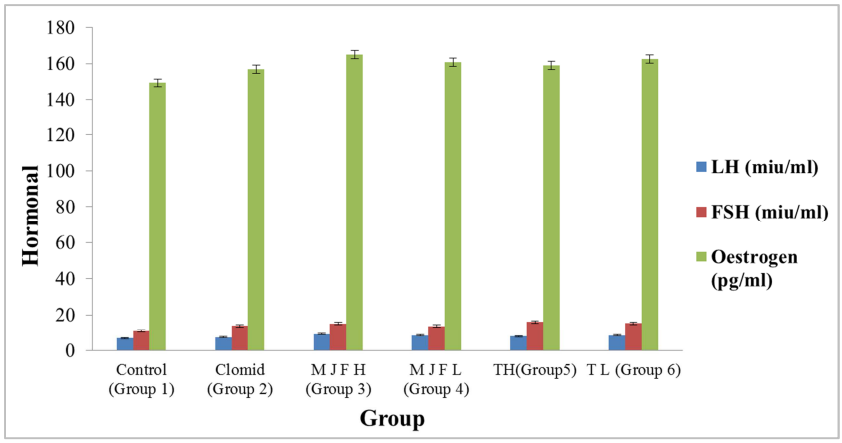


Figure 3. *Effect of oral administration of Clomid, Mi jian fen and Tsumi on Hormonal Parameters.*

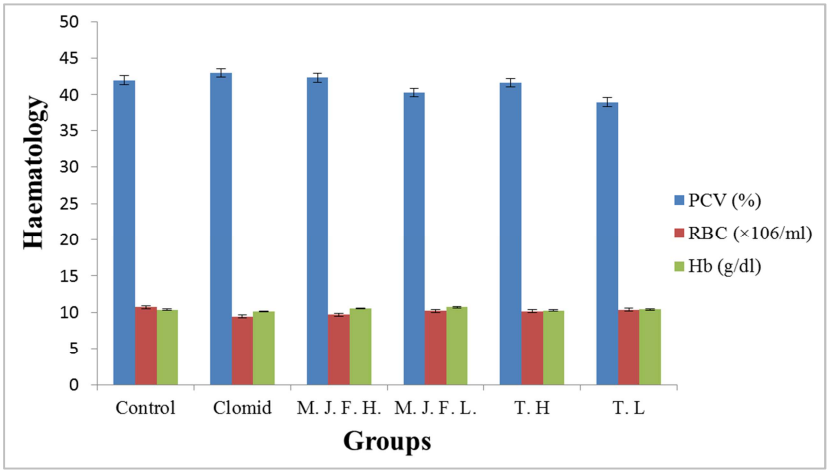
Results are expressed as Mean ± SD, and are significantly different at p<0.05. Key: MJFH = Mi jian fen high dose, MJFL = Mi jian fen low dose, T H = Tsumi high dose, T L = Tsumi low dose, LH = Luteinizing Hormone, FSH = Follice Stimulating Hormone

3.4. Effects of Oral Administration of Clomid, Mi Jian Fen and Tsumi on Haematologigal Parameters

Figure 4 presented the results of PCV, RBC and Hb. A slight decrease (P<0.05) in the mean value of PCV in the treatment groups (MJFL, TH and TL) and a slight increase in the group given Clomid and MJFH was observed compared with the control.

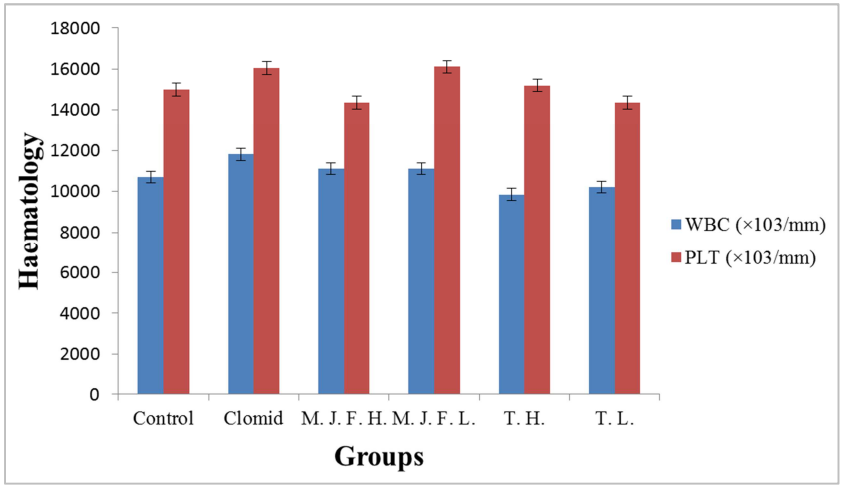
Figure 5 showed a significant increase (P<0.05) in PLT levels in the groups given Clomid, MJFL and TH and a slight decrease in the groups given MJFH and TL. Similalarly, there were significant increase (P<0.05) in the WBC level in the groups given Clomid, MJFH and MJFL and a slight decrease in the groups given TH and TL compared with the control.

Figure 6 showed result of Monocyte, Eosinophil and Basophil, there is no significant change in the treated groups when compared with the control. Also, there was a slight increase (P<0.05) in Neutrophil and Lymphocyte levels in the treatment groups.



Results are expressed as Mean ± SD, and are significantly different at p<0.05. Key: PCV = Packed cell volume, RBC = Red blood cell and Hb = Hemoglobin

Figure 4. *Effect of oral administration of Clomid, Mi jian fen and Tsumi on haematological parameters.*



Results are expressed as Mean ± SD, and are significantly different at p<0.05. Key: WBC = White blood cell and PLT = Platelets

Figure 5. *Effect of oral administration of Clomid, Mi jian fen and Tsumi on haematological parameters.*

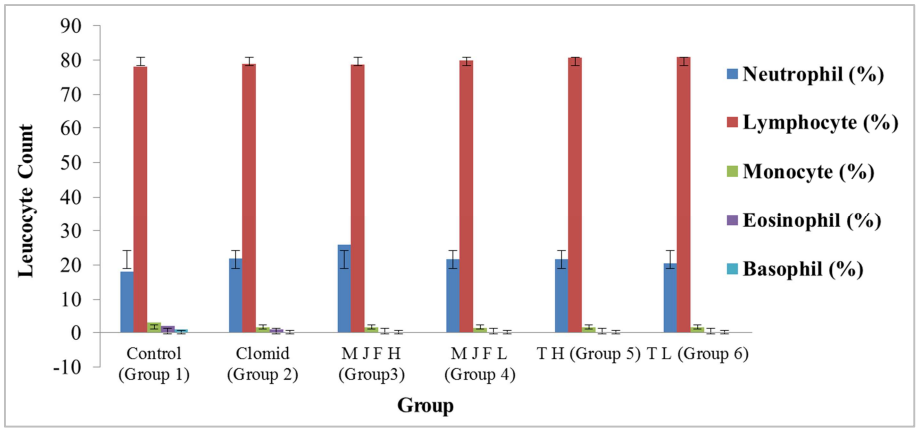


Figure 6. *Effect of oral administration of Clomid, Mi jian fen and Tsumi on Leucocyte count.*

Results are expressed as Mean ± SD, and are significantly different at p<0.05. Key: MJFH = Mi jian fen high dose, MJFL = Mi jian fen low dose, T H = Tsumi high dose, T L = Tsumi low dose

4. Discussion

This study was carried out in keffi LGA and for the first time, studied to bring to limelight the issues concerning the use and abuse of local and foreign aphrodisiacs among the population. The study investigated the effect of TC, MJF and Clomid at different concentrations on some biochemical (AST, ALP, ALT, Urea, Creatinine, FSH, LH and Oestrogen) and haematological parameters in female Wistar albino rats.

This study showed a significant increase in the level of FSH and Oestrogen in all the treated groups and a slight increase in the level of LH in all the treated groups when compared to the control. An effective, well regulated hormonal balance between the hypothalamic Gonadotropin-Releasing Hormone (GnRH), pituitary gonadotropins (FSH & LH) and ovarian steroids (Estrogen and progesterone) is required for female optimal sexual drive [15]. Also, the normal female reproductive functions depend on secretion of luteinizing hormone (LH) and follicle stimulating hormone (FSH) by the pituitary gland under the hypothalamic gonadotropin-releasing hormone (GnRH) influence. In females, LH triggers theca cells of the ovaries to secrete testosterone while FSH induces the granulosa cells of the growing follicles to produce Estradiol (E) and aromatase; it is an enzyme that converts testosterone to E. The testosterone produced is then converted to E by the aromatase [16]. Increased in the levels of FSH and LH as seen in this study may indicates the potency of TC, MJF and Clomid on the pituitary and also the hypothalamus leading to reduced follicle attrition and increased in the levels of E. FSH is responsible for the follicle growth, from the primary to the antral stage which leads to the release of E from the antral follicles. LH is important in folliculogenesis, ovulation of the dominant follicle and also plays a role in the synthesis of progesterone and E. A higher level of Oestrogen in the female body promotes vaginal lubrication and increases sexual desire. Also, Estrogen through a negative feedback mechanism influences the production of FSH. An increase in LH levels indicates the ability of TC and MJF to stimulate ovulation and probably ensures no anovulatory cycles, hence

increasing libido. An increase of FSH in this study indicates the ability of TC and MJF to enhance folliculogenesis and steroidogenesis leading to better libido outcomes. This study corroborates that of Joseph (2021) though in a different pro-fertility plant species extract where it reported an increase of FSH and LH leading to increased in folliculogenesis and ovulation hence enhancing fertility and then of course libido [17].

Estrogen is known to increase libido and also acts in a feedback mechanism, influencing the production of FSH from the pituitary gland. FSH in turn boosts the development of the immature ovarian follicles, which enhances the production of estrogen from the ovary [18]. These observations taken together showed that MJF and TC may possess estrogenic activity which enhances the libido.

Liver enzymes are well known biomarkers for the prediction of liver toxicity and for this reason, it have been used in scientific reports. Evidences available showed that damage to the liver cells is as a result in elevations of these enzymes in the serum and the measurement of enzyme activities is of clinical and toxicological significance in determining liver damage by toxicants or in diseased conditions. The levels of these enzymes in the blood are directly related to the extent of the tissue damage [19].

In this study, the administration of TC, MJF and Clomid increased ALP and AST level significantly in all the treated groups and slight increase in the ALT level was observed. The observed significant increase in AST levels in all the test groups compared to control signify liver injury as seen in liver disease, damage and liver dysfunction. Increase in the AST levels of the treated groups indicates that Clomid, MJF, and TC have the capacity to induce liver damage.

Also, ALP levels increased significantly in this experiment. ALP is most densely represented close to the canalicular membrane of the liver cells (hepatocyte). Bile duct obstruction, primary biliary cirrhosis and Obstructive diseases are some examples of diseases in which elevated ALP levels are often predominant over transaminase elevation [19]. Increased in the levels of ALP have been associated with bone diseases, it is also an indicator for intra-hepatic cholestasis and obstructive jaundice. This result is in agreement with findings of Wael (2012) who observed increased in the levels of transaminases (AST, ALT and ALP) in rats treated with clomiphene citrate for a month. The Transaminase levels are considered to be sensitive parameters in the evaluation of liver function and damage [20]. Hatoff and Hardison (1980) reported that increases in serum levels of these enzymes were primarily attributed to either acute hepatocellular damage or extrahepatic obstruction or both [21, 20].

This study showed significant increase in WBC levels in groups treated with Clomid, MJFH and MJFL and a slight decrease in groups treated with TH and TL. The decreased WBC in treated groups might indicate depressed immune-response. The significant increase in the WBC level might indicate the activation of the immune system, a normal cell-mediated immune response [22] and also the elevated WBC levels also means that the ingested substances are poisonous to some extent.

However, a significant increase in the platelet levels observed in groups treated with Clomid, MJFL and TH. White blood cells, platelet, neutrophil, and lymphocytes are used to provide valuable information for analysis in routine clinical evaluation of the state of health of a patient. Changes in the haematological system used to ascertain predicative value for human toxicity [23]. It showed that, the extracts are conclusively toxic to the human user both on short and long term basis.

The results obtained, showed a slight change in the erythrocyte levels (RBC, haemoglobin concentration, packed cell volume). This is an indication that damage to the RBC is minimal probably due to the fact that users (rats) are younger or middle aged. This result may not be the same for adult rats.

Although high ratios of creatinine and urea is said to be a factor of either pre-renal uremia superimposed or post-renal obstruction on renal disease, it is known however, that increased creatinine levels is associated with abnormal renal function, especially glomerular function [24]. Creatinine as a definitive marker for the kidney function, it was observed to increase slightly in all the treated groups. The result in figure 2 showed significant increase in level of urea among all the treated groups. Urea is a by-product of protein metabolism that is excreted in urine and retention of urea in the body may indicate damage to the kidney [24].

5. Conclusion

In conclusion, this study observed that *Tsumi* concoction, *Mi jian Fen* and Clomid having estrogenic and gonadotropic effect and to be potent libido enhancers. It can be deduced therefore that excessive utilization of MJF and TC may be toxic which in the case of the kidney and liver and can alter renal and hepatic functions. *Mi jian fen* and *Tsumi* concoction can be recommended to people with low sexual drive but at a low or minimal dose.

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