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Opinion Article

Comparison on Bioavailability of Four Different Ciprofloxacin Tablet Brands

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DESCRIPTION

Recent government economic policies in Nigeria are intended to increase the production and consumption of locally produced goods, including medicines and drug products. As a result, a small number of imported brands are used alongside locally produced generic medicines in the country's clinical practice. One of these government initiatives is a significant cut in domestic drug tariffs relative to all import tariffs, along with a decrease in the overall cost of production for locally produced medications. As a result, there have been many more brands of these medications available, especially for the antibacterial pharmaceuticals like ciprofloxacin, which is a popular antibiotic in the nation. Even though these generic brands are less expensive than name-brand products, it is crucial to determine their bioequivalence with standardized products because this will determine how interchangeable the various brands will be in real-world situations. The growth of fake and inadequate goods in Nigeria, in addition to the aforementioned causes, and the proportionate rise in resistance to the majority of anti-infective drugs highlight the importance of evaluating the bioavailability and bioequivalence of unbranded goods. Nigeria was ranked third in the world for counterfeit and inadequate antibacterial agents, after India and Burma, however numerous studies have found a large rise in anti-infective agent resistance, posing a serious threat to public health.

Resistance to antibacterial drugs, particularly quinolones, is one of the anti-infective agents that have been the subject of in-depth research. For instance, a study found that the use of quinolones, like in most previous investigations, significantly increased the resistance of isolated *E.coli* acquired from individuals with Urinary Tract Infections (UTI). One of the most widely used quinolones is ciprofloxacin, which is a member of the second generation fluoroquinolones. It has a wide range of anti-infective activity and is well absorbed from the gastrointestinal tract, with an absolute bioavailability of between 70% and 85% after oral administration. Given that it is widely distributed throughout the body and that tissue concentrations are frequently higher than serum concentrations, it is an alternative for treating gastrointestinal, skin, and bone infections, complicated urinary tract infections, sexually transmitted infections, lower respiratory tract infections, among other infections. Ciprofloxacin, a quinolone antibiotic drug, was reported to be ineffective in treating enteric fever caused by *Salmonella enterica* serotype Paratyphi A in Kuwait. In medical practise, choosing the best ciprofloxacin brand from the other brands is important for obtaining the most cost-effectiveness benefit. Although a few studies have been undertaken in Nigeria employing specific ciprofloxacins available on the Nigerian market to address this issue, practically all of this study used an *in vitro* assessment technique, which might not be a process that occurs *in vivo*. Therefore, the objective of this study was to compare the relative bioavailability of various brands of ciprofloxacin pills sold in Southeast Nigeria. Bioavailability is the term used to describe the rate and extent of a drug's systemic availability. Its evaluation is based on the Tmax, which represents the time needed to reach the systemic circulation (rate), the Cmax, and the AUC, which represent the amount of drug reaching the systemic circulation. Therefore, Cmax, AUC, and Tmax of the reference or standard sample are compared to those of the test samples in bioequivalence investigations. The two analytical techniques used in this study's analysis of the tested brands revealed statistically negligible differences for the necessary pharmacokinetic parameters.

The peak plasma concentration (Cmax) and AUC parameter analysis of variance revealed no discernible differences between the reference brand and the three test brands, leading to the conclusion that the four formulations were bioequivalent. At the prescribed dose, the tablet formulations were well tolerated by rabbits, and no negative effects were noted during the trial. The analytical techniques (UV-Vis spectroscopy and microbiological assay) were simple, affordable, and produced results that were comparable. The three evaluated regional brands can take the place of the standard ciprofloxacin tablet.

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