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Research Article

**ANTIMICROBIAL SUSCEPTIBILITY PATTERNS AMONG
ISOLATES OF HELICOBACTER PYLORI**¹Dr Atta-U-Rehman, ²Dr Abdul Sahban Shad, ³Dr Salma Aziz¹Gomal Medical College, D.I Khan, ²DHQ Teaching Hospital, D.I Khan,³House Officer, Mayo Hospital Lahore

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Abstract:

Objective: The aim of this research work is to assess the occurrence and antibiotic resistance among clinical isolates of *H. pylori* from Mayo Hospital Lahore.

Methodology: We carried out the testing of anti-microbial susceptibility for one hundred and thirty-seven isolates of *H. pylori* gathered from three hundred and sixty-eight patients who were undergoing examination through endoscopy. We used four antibiotics amoxicillin, metronidazole, tetracycline & clarithromycin.

Results: We observed a high rate of the resistance against the antibiotic of metronidazole as 48.20% followed by resistance against clarithromycin as 27.70%, amoxicillin as 14.60% & tetracycline as 9.50%. There were total 8.80% (n: 12) patients were as multidrug-resistant for the isolates of *H. pylori* as examined by this research work. We also noted the alarming sign for the development of the resistance to the antibiotics of amoxicillin, clarithromycin & tetracycline.

Conclusion: This is very important requirement for the patients to know about the pattern of the resistance prevailing in their area during the selection of the antibiotics against the infections of *H. pylori*.

Key Words: *H. Pylori*, Antibiotics, Clarithromycin, Antibiotics, Susceptibility, Metronidazole, Resistance, Amoxicillin, Endoscopy.

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INTRODUCTION:

Helicobacter pylori is the main reason of peptic ulcer & gastritis in humans as well as it is very important factor of risk behind gastric cancer. The indication of extermination of this very microbe is present in all the patients available with active or recurring peptic ulceration [1]. The most common treatment to exterminate the H. pylori is combined therapy with combination of 2 or 3 drugs [2]. In current years, various research works have reported the failure in mitigation of H. pylori due to the high development of antibiotic resistance in these organisms [2, 3]. Different research studies on international basis described that the high rate of resistance among the clinical isolates of the H. pylori particularly metronidazole has appeared as the most important factor behind the failure of the treatment [3, 4]. Though, there are very small or now resistance to some antibiotics as amoxicillin [4].

Truly, no regimen of therapy has obtained the hundred percent results which makes it very vital to assess the pattern of anti-microbial susceptibility of isolates of H. pylori in every region of geography to check the results of various antibiotics [5]. The most recent pattern of anti-microbial susceptibility of the isolates of H. pylori in Pakistan especially in the upper region of Punjab, the main province of Pakistan. Current research work carried out to evaluate the occurrence of the resistance in the main four antibiotics recently in utilization for the extermination of the infection because of H. pylori.

MATERIALS AND METHODS:

In the duration from November 2018 to June 2019, a sum of total one thousand, one hundred and four gastric biopsies of antrum collected from three hundred and sixty-eight patients (three biopsies from every patient). These patients appeared with the symptoms of having gastritis or PUD (Peptic Ulcer Disease). Allama Iqbal Medical Hospital, Lahore was the center of this research work. Total 77.20% (n: 284) patients were the victims of different gastric

pathologies, 71.70% (n: 264) patients were suffering from gastritis, 4.90% (n: 18) patients were suffering from gastric ulcer & 0.50% (n: 2) patients were available with tumor whereas remaining 22.80% (n: 84) patients were available with normal results of endoscopy. The patients present with the past history of the H. pylori treatment got exclusion from this research study. The transportation of the gastric biopsies carried out in 0.50 milliliter brucella-broth media [6]. We obtained these gastric biopsies from every patient; 1 biopsy was in use for fast CLO test and remaining 2 collected biopsies cultured on helicobacter pylori selective agar and their incubation carried out at thirty-seven centigrade for complete seven days in a special equipment.

The confirmation of the identity of the isolates of H. pylori carried out with the help of colonial morphology, strong reaction for oxidase, gram-stain, and positive reactions for urease and catalase tests [6-8]. The examination of the antibiotic susceptibility performed with the help of disk diffusion procedure, in accordance with the standard instruction of the inventor [9]. For a short time, the adjustment of the bacterial suspensions carried out to 0.50 McFarl and utilized for the inoculation of the Muller-Hinton agar plates. We applied the anti-microbial disks containing the all four antibiotics and then incubated the plates in microaerophilic conditions at thirty-five centigrade from sixteen to eighteen hours. Then the measurement of the zones of the development of inhibition created by every antibiotic carried out and we performed its interpretation with the standard method for the determination of the resistance.

RESULTS:

There were 368 patients in this research work, in which 46.70% were male patients and 53.30% were female patients. The range of the age of patients was from 16 to 90 years. Most of the patients (34.30%) were available between 31 to 45 years of age as described in Figure-1.

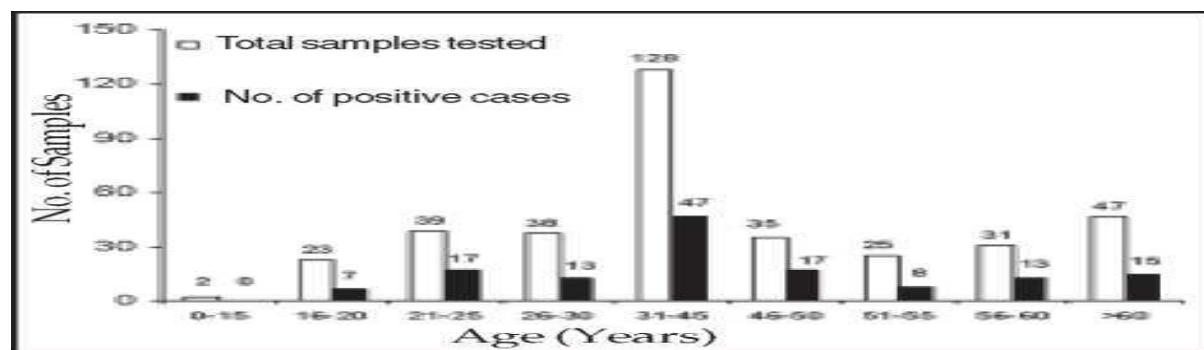


Figure 1

With the technique of culture, 37.20% (n: 137) participants were available as positive. As compared to the culture method the direct CLO method displayed less positive results in only 34.70% (n: 128) specimens as presented in Figure-1. In accordance with the findings of endoscopy, the availability of the H. pylori in normal, gastric ulcer, gastritis & malignant patients were 22.60% (31/137), 6.60% (9/137), 70.80% (97/137) and 0% correspondingly as presented in Figure-2. The pattern of the anti-microbial resistance of the isolates of H. pylori are available in Table-1.

Table-I: Distribution of Antibiotics Resistance of H. Pylori According to the Endoscopic Findings

Endoscopic Findings	Rate of Resistance							
	Amoxicillin		Clarithromycin		Tetracycline		Metronidazole	
	No	Percent	No	Percent	No	Percent	No	Percent
Gastritis (n=97)	11	11.3	24	24.7	8	8.2	40	41.2
Ulcer (n=9)	2	22.2	2	22.2	1	11.1	7	77.8
Normal (n=31)	7	22.6	12	38.7	4	12.9	19	61.3
Total (137)	20	14.6	38	27.7	13	9.5	66	48.2

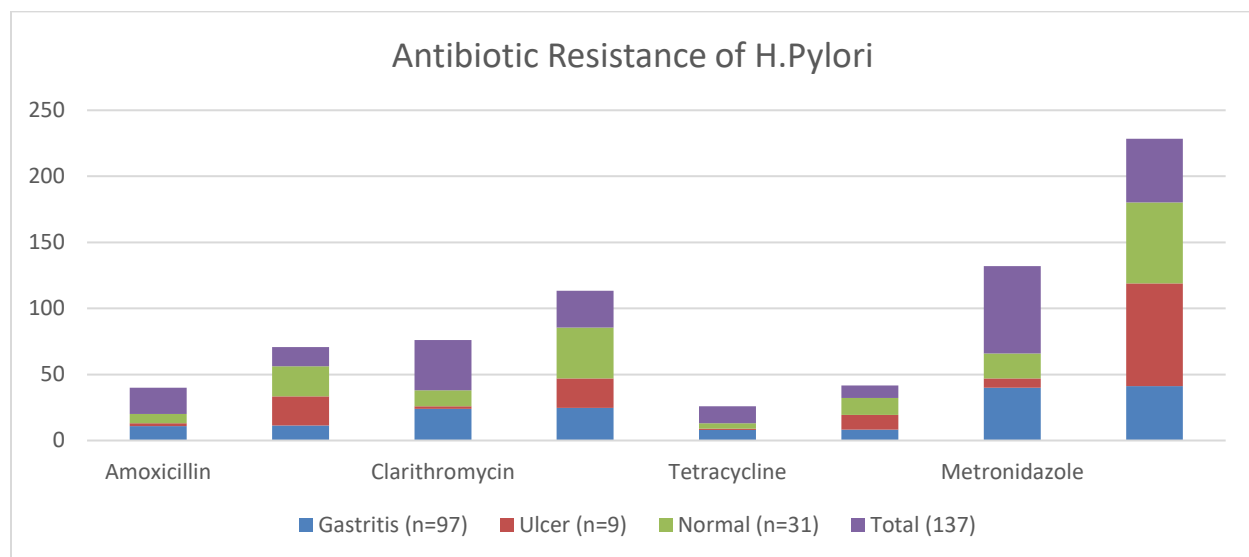
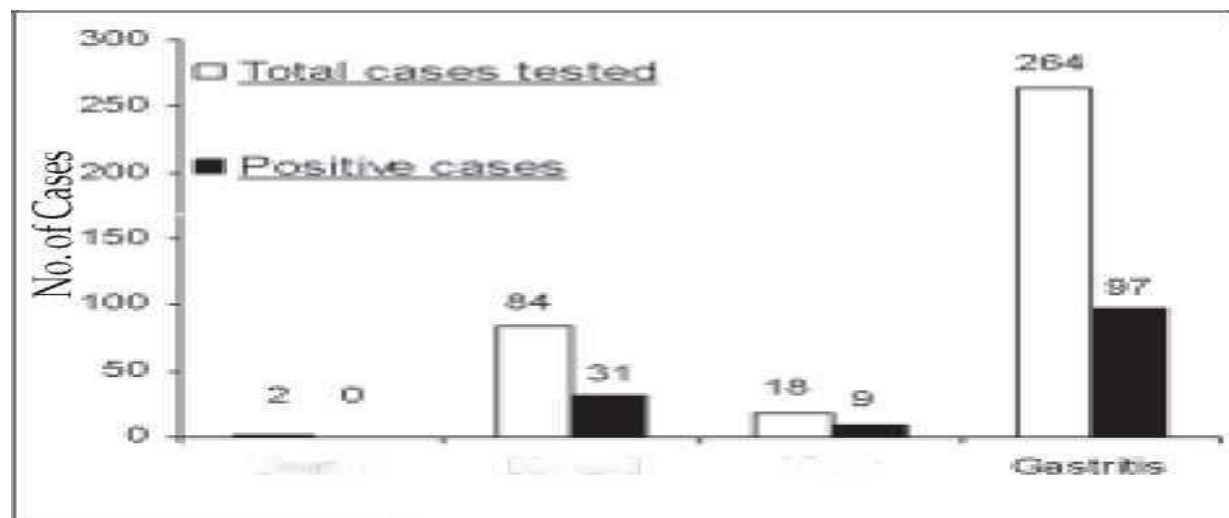


Figure 2



The findings described that among the verified isolates, 9.50% (n: 13), 27.70% (n: 38), 14.60% (n: 20) & 48.20% (n: 66) were available with high resistance to tetracycline, clarithromycin, amoxicillin & metronidazole correspondingly. The findings have discovered that a sum of total 8.80% (n: 12) isolates of *H. pylori* were available as multi-drug resistant.

DISCUSSION:

Current research study described 37.20% rate of prevalence of *H. pylori* in the tested population. The findings of this research work were much lower in [comparison with the other parts of the country with rates of prevalence as 54.90% & 63.0% in south and east regions of the province Punjab, correspondingly [10, 11]. This disparity in the rate of prevalence is because of various diagnostic tools in every research work, various demographic division of the microbes in different regions and use of the antibiotics in the past [2, 12-14]. In current study, the rate of occurrence *H. pylori* in the patients suffering from gastritis was 70.80% which is very high in comparison with the outcomes observed by Ayoola in his research work reporting 55.0% [10]. The occurrence of the *H. pylori* in the patients of gastric ulcer & controls in this current research work were 50.0% & 22.60% correspondingly, which can be compare with the findings of Ayoola who stated 53.60% & 43.60% in the patients of gastric ulcer & controls respectively [10]. Two initial research works in the country discovered the microbe in only 9.0% & 13.0% respectively in comparison with the 22.60% observed in this current research work, showing a high elevation in the carrier rate of *h. pylori* [15, 16]. The condition of resistance to metronidazole (48.20%) as observed in current research work is much lower as compared to the findings of Al-Qurashi in other parts of the country who stated a high increase in the resistance to metronidazole in the isolated of the *H. pylori* from 35.20% to 78.50% in the duration of 8 years from 1989 to 1997 [17]. Though the rate of resistance to metronidazole in this research work is very high as compared to some previous research works in which the percentage of the resistance was from 16.0% to 90.0% [2, 3, 18-21]. The difference in the rates of resistance observed in this current research works in comparison with the other research studies may show the variations in the misuse of the metronidazole in various parts of the country. The resistance to clarithromycin was much high in this current research work (27.70%) in comparison to the current research works from USA (13.0%) & Italy (23.40%) [19, 20].

This research work displayed that thirteen isolates showed resistance to tetracycline as compared to only single one isolate in some other part of the country in research work conducted in the duration of 2000 to 2007 and no research in the duration of 1989-1992 showing a gradual rise of the emerging resistance to tetracycline in the isolates of the *helicobacter pylori* [17]. In the same manner, the rate of resistance to the antibiotic of amoxicillin in current research work was very high (14.60%) in comparison with the rate of resistance observed by the research works conducted in past which also shows a gradual increase in the rate of resistance [12, 18, 22].

CONCLUSION:

The findings of the research study concluded that professionals require to get knowledge about the pattern of antibiotic in their particular region to prescribe the best antibiotic to prevent the infections because of *H. pylori*.

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