Assessment of the Infections and Use of Antibiotics in Pregnancy among the Pregnant Women Reported at Gynae Opd Civil Hospital Khairpur Mirs Pakistan

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Authors’ contributions

This work was carried out in collaboration among all authors. Author NFP designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors BR, BNK, AAJ, FS, QUA and AA managed the analyses of the study and managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i1631298
Editor(s):
(1) Dr. Rafik Karaman, Al-Quds University, Palestine.
Reviewers:
(1) Mimoune Nora, National High School of Veterinary Medicine, Algeria.
(2) Ali Abdel-Hadi Mahoud Alsudani, University of Al-Qadisiyah, Iraq.
Complete Peer review History: http://www.sdiarticle4.com/review-history/67104

Received 05 February 2021
Accepted 22 March 2021
Published 25 March 2021

ABSTRACT

Introduction: Pregnancy presents uncommon issues regarding anti-infection treatment. A significant concern is the conceivable teratogenic or harmful impact on the fetus.

Objectives: The objectives of this study are to assess the infections and use of antibiotics in pregnancy among the pregnant women reported at Gynae OPD Civil Hospital Khairpur Mirs Pakistan.

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Methodology: This was an observational cross-section study conducted at Gynae OPD Civil Hospital Khairpur Mirs Pakistan from July 2020 to January 2021. A total of 400 sample size was calculated by using Slovin's Formula. Data were collected by purposive sampling technique. Finally, collected data were analyzed by using a statistical package for social science (SPSS) software version 24.

Results: Results reported commonly prescribed antibiotics during the pregnancy in which Phenoxymethylpenicillin was most commonly prescribed i.e. 31% and it was indicated for Maxillary sinusitis 40% and Acute tonsillitis 74%. The infections which were diagnosed during pregnancy among which vaginal candidiasis was high 117 (29.2%). Common antibiotics duration of treatment was observed in which penicillin frequency for 8-10 days was high 39 (9.7%). Common prescribed antibiotic dosages during pregnancy were observed in which the frequency of penicillin's recommended dose was high at 80 (20%). Antibiotics timing during pregnancy was observed in which Metronidazole+Tinidazole were mostly used during II trimester.

Conclusion: The antibiotics use in Khairpur Mirs is very high. The dosage regimen should be properly monitored, according to the pharmacokinetic data of particular antibiotics during the pregnancy.

Keywords: Antibiotics; infections; pregnancy; treatment.

1. INTRODUCTION

Pregnancy presents uncommon issues regarding anti-infection treatment. A significant concern is the conceivable teratogenic or harmful impact on the fetus. Then again, the danger of treating with dosages of sub-therapeutic or less effective drugs when attempting to secure the fetus, ought to be dodged. A persevering disease, with veiled manifestations or symptoms, can prompt a fruitless result of pregnancy [1].

Antibiotics are among the most habitually utilized medications during pregnancy. In any case, doctors have been hesitant to endorse antibiotics for pregnant ladies because a couple of antimicrobials were on the rundown of human teratogens (e.g., tetracyclines), others have been teratogenic in experiments of animal (e.g., gentamycin), also a couple may have a poisonous or toxic impact postnatally (e.g., streptomycin) [2].

Information on the anti-infection viability and security during pregnancy are scant because of legitimate and moral issues, which preclude learns about the activity of these medications during pregnancy or in infants. Typically, the clinical and epidemiological investigations about drug wellbeing are performed on non-pregnant ladies and the outcomes are extrapolated to pregnant ones. Numerous physiological changes saw in pregnancy could meddle straightforwardly with the pharmacokinetics of the anti-microbials, prompting expanding plasmatic focus and poisonous impacts or, in the inverse, to sub-inhibitory levels, which lessen the antimicrobial impact, cause remedial disappointment and the choice of safe strains [3].

To improve safe endorsing in pregnancy, various frameworks have been utilized to group fetal danger. These incorporate the Swedish, the Australian, just as the Food and Drug Administration (FDA) of the United States classification system of risk. The FDA system of classification comprises of Five principle classifications: (A, B, C, D, and X), where classes D and X are marked as risky in pregnancy [4-6].

This study aims to assess the infections and use of antibiotics in pregnancy among the pregnant women reported at Gynae OPD Civil Hospital Khairpur Mirs Pakistan.

2. METHODOLOGY

This was an observational cross-section study conducted at Gynae OPD Civil Hospital Khairpur Mirs Pakistan from July 2020 to January 2021. A total of 400 sample size was calculated by using Slovin's Formula [7]. Data were collected by purposive sampling technique from all the participants by introducing a well-structured questionnaire consist of three sections i.e. socio-demographic section, infections related section, and regarding use of antibiotics section. Finally, collected data were analyzed by using a statistical package for social science (SPSS) software version 24.

3. RESULTS

Table 1 shows the socio-demographic status of the participants in which age group of 21-30 was
Table 1. Socio-demographic status of the participants

| Variables                  | Frequency | Percentage (%) |
|----------------------------|-----------|----------------|
| Age                        |           |                |
| 15-20                      | 52        | 13             |
| 21-30                      | 201       | 50.2           |
| 31-40                      | 144       | 36             |
| 41-50                      | 3         | 0.7            |
| Area of residence          |           |                |
| Rural                      | 259       | 64.7           |
| Urban                      | 141       | 35.2           |
| Marital status             |           |                |
| Married                    | 391       | 97.7           |
| Widowed                    | 7         | 1.7            |
| Divorced                   | 2         | 0.5            |
| Education                  |           |                |
| Illiterate                 | 91        | 22.7           |
| Primary Level              | 50        | 12.5           |
| Matric Level               | 70        | 17.5           |
| Intermediate Level         | 114       | 28.5           |
| Graduate Level             | 50        | 12.5           |
| Masters Level              | 25        | 6.2            |
| Occupation                 |           |                |
| Housewife                  | 280       | 70             |
| Business                   | 81        | 20.2           |
| Job (Outdoor/indoor)       | 39        | 9.7            |
| Monthly income             |           |                |
| < 10000                    | 18        | 4.5            |
| 11000 – 25000              | 14        | 3.5            |
| 26000 – 50000              | 48        | 12             |
| 51000 – 75000              | 29        | 7.2            |
| 76000 – 100000             | 11        | 2.7            |
| Dependent on Guardian      | 280       | 70             |

high (201) 50.2%, participants belonging to rural area were high (259) 64.7%, 391 (97.7%) were married, education with intermediate level was high 114 (28.5%), 280 (70%) were housewives and 280 (70%) were dependent on guardian for financial support.

Table 2 shows the commonly prescribed antibiotics during the pregnancy in which Phenoxymethylpenicillin was most commonly prescribed i.e. 31% and it was indicated for Maxillary sinusitis at 40% and Acute tonsillitis at 74%.

Table 3 shows the infections which were diagnosed during pregnancy among which vaginal candidiasis was high 117 (29.2%).

Table 4 shows common antibiotics duration of treatment in which penicillin frequency for 8-10 days was high 39 (9.7%).

Table 5 shows common prescribed antibiotic dosages during pregnancy in which the frequency of penicillin recommended dose was high 80 (20%).

Table 6 shows antibiotics timing during pregnancy in which Metronidazole+Tinidazole were mostly used during II trimester.

4. DISCUSSION

In a prospective research on maternal openness to possible teratogens, which noticed 240 mothers till childbirth, 12% of the pregnant ladies took anti-microbials during the 1st trimester and 42% during pregnancy [8]. A large portion of the antibiotics were taken for respiratory infections, as was likewise the case in this examination. In prospective examination by Kullander on the general utilization of anti-microbials during pregnancy of 6376 ladies [9], the pinnacle rate of anti-biotic use was discovered to be during the 2nd month; this doesn't thoroughly match with the findings of our investigation, in which the most noteworthy frequency of anti-biotic use was
Table 2. Commonly prescribed antibiotics during the pregnancy and primary indications of these antibiotics

| Antimicrobial drug       | Antibiotic use Percentage (%) | Primary indications       | Percentage (%) of cases |
|--------------------------|-------------------------------|---------------------------|--------------------------|
| Phenoxymethylpenicillin  | 31                            | Maxillary sinusitis       | 40                       |
|                          |                               | Acute tonsillitis         | 74                       |
| Erythromycin             | 19                            | Maxillary sinusitis       | 22                       |
|                          |                               | Acute bronchitis          | 32                       |
| Pivmecillinam            | 15                            | Acute UTI                 | 55                       |
|                          |                               | Recurring UTI             | 12                       |
| Nitrofurantoin           | 5                             | Acute UTI                 | 22                       |
|                          |                               | Recurring UTI             | 41                       |
| Amoxicillin              | 7                             | Maxillary sinusitis       | 18                       |
|                          |                               | Acute bronchitis          | 9                        |
| Cephalexin               | 5                             | Acute UTI                 | 11                       |
| Metronidazole            | 6                             | Acute urinary tract infection | 22              |
|                          |                               | Bacterial vaginosis       | 81                       |
| Ampicillin               | 5                             | Maxillary sinusitis       | 6                        |
|                          |                               | Acute UTI                 | 3                        |
| Cefadroxil               | 5                             | Acute UTI                 | 5                        |
| Methenaminehippurate     | 2                             | Maxillary sinusitis       | 3                        |
|                          |                               | Recurring or chronic UTI | 27                       |
| Total                    | 100                           |                           |                          |

Table 3. Infections diagnosed during pregnancy

| Variables                      | Frequency | Percentage (%) |
|--------------------------------|-----------|----------------|
| Vaginal candidiasis            | 117       | 29.2           |
| Acute urinary tract infection  | 88        | 22             |
| Acute sinusitis                | 73        | 18.2           |
| Acute respiratory tract infection | 44    | 11             |
| Acute bronchitis               | 23        | 5.7            |
| Bacterial vaginosis            | 21        | 5.2            |
| Acute tonsillitis              | 13        | 3.2            |
| Acute rhinitis                 | 12        | 3              |
| Acute suppurative otitis media | 5         | 1.2            |
| Acute gingivitis               | 4         | 1              |
### Table 4. Common antibiotics duration of treatment

| Antibiotics | ≤ 2 Days | 3 Days | 4-5 Days | 6-7 Days | 8-10 Days | 11-14 Days | 15-29 Days | ≥ 30 Days |
|-------------|----------|--------|----------|----------|-----------|------------|------------|----------|
| Penicillin  | 2.5%     | 3.7%   | 5%       | 8%       | 9.7%      | 3%         | 2%         | 2%       |
| n           | 10       | 15     | 20       | 32       | 39        | 12         | 8          | 8        |
| Erythromycin| 2.2%     | 2.5%   | 2.7%     | 6.2%     | 8.2%      | 1.7%       | 1.2%       | 1.7%     |
| n           | 9        | 10     | 11       | 25       | 33        | 7          | 5          | 7        |
| Pivmecillinam| 0.7%    | 1.7%   | 3%       | 5.5%     | 6%        | 0.5%       | 1%         | 0.5%     |
| n           | 3        | 7      | 12       | 22       | 24        | 2          | 4          | 2        |
| Nitrofurantoin| 0.5% | 0.2%   | 2.5%     | 3.7%     | 3.2%      | 1.5%       | 0.5%       | 0.2%     |
| n           | 2        | 1      | 10       | 15       | 13        | 6          | 2          | 1        |
| Amoxicillin | 0.2%     | 0%     | 0.5%     | 1.5%     | 1.7%      | 0.5%       | 0.5%       | 0.7%     |
| n           | 1        | 0      | 2        | 6        | 7         | 2          | 2          | 3        |

### Table 5. Common prescribed antibiotics dosages during pregnancy (Dosage is in parentheses)

| Antibiotics  | Recommended normal dosage | Increased dosages and/or shortened interval | Reduced dosages and/or lengthened interval |
|--------------|---------------------------|--------------------------------------------|------------------------------------------|
| Penicillin N | 20%(1x106 IU x 3-4) 80    | 18.5%(2x106 IU x 3) 74                      | None                                     |
| Erythromycin N | 13.7 % (500 mg x 3-4) 55 | None                                       | 10.5% (250 mg x 3-4) 42                  |
| Pivmecillinam N | 13.7 % (200 mg x 3) 55 | 1.7% (400 mg x 3) 7                        | 0.7 % (200 mg x 2) 3                     |
| Nitrofurantoin N | 11.2 % (50 mg x 2-4) 45 | 4.5 % (75 mg x 3) 18                       | 3.7 % (50 mg x 1) 15                     |
| Amoxicillin N | 9.5 % (375-750 mg x 3) 38 | None                                       | 5.7 % (375 mg x 2) 23                    |

### Table 6. Antibiotics timing during pregnancy

| Antibiotics                  | I trimester | II trimester | III trimester |
|------------------------------|-------------|--------------|---------------|
| Metronidazole+ Tinidazole    | 27          | 31           | 15            |
| Doxycyclin+ Tetracycline     | 14          | 0            | 0             |
| Trimethoprim                 | 8           | 0            | 0             |
| Co-trirnoxazole              | 5           | 0            | 0             |
| Sulphonamide                 | 5           | 8            | 0             |

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a little while weeks later. In a later report on 474 ladies in mid-pregnancy by similar researchers [10] practically no distinction was found in the utilization of anti-biotics contrasted with their previous examination. In Norway, systemic antibacterials prevalence (2004–2006) was 42.5% and intravaginally administered antimicrobials prevalence was 4.1%; while, these discoveries covered a period from three months before the pregnancy until three months after childbirth [11]. Different investigations from Germany, UK, and USA, because of chosen populaces, insufficient data on pregnancy length or just justified antibiotics at the 2nd ATC level [12-14]. In this study socio-demographic status of the participants was reported in which age group of 21-30 was high (201) 50.2%, participants belonging to rural area were high (259) 64.7%, 391 (97.7%) were married, educated with intermediate level was high 114 (28.5%), 280 (70%) were housewives and 280 (70%) were dependent on guardian for financial support. Commonly prescribed antibiotics during the pregnancy in which Phenoxymethylpenicillin was most commonly prescribed i.e. 31% and it was indicated for Maxillary sinusitis 40% and Acute tonsillitis 74%. The infections which were diagnosed during pregnancy among which vaginal candidiasis was high 117 (29.2%). Common antibiotics duration of treatment was observed in which penicillin frequency for 8-10 days was high 39 (9.7%). Common prescribed antibiotic dosages during pregnancy were observed in which the frequency of penicillin recommended dose was high 80 (20%). Antibiotics timing during pregnancy was observed in which Metronidazole+Tinidazole were mostly used during II trimester.

5. CONCLUSION

The antibiotics use in Khairpur Mirs is very high. The dosage regimen should be properly monitored, according to the pharmacokinetic data of particular antibiotics during the pregnancy. It also should be monitor to optimize the duration of infection treated with antibiotics. Further studies should be conducted on antibiotic prescription during hospitalization for better findings.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by the personal efforts of the authors.

CONSENT

As per international standard or university standard, patients’ written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The study was approved by an ethical review committee of the Civil Hospital Khairpur Mirs.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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