Al-Mukhtar Journal of Sciences 37 (2): 127-137, 2022
ISSIN: online 2617-2186 print 2617-2178
Journal Homepage https://omu.edu.ly/journals/index.php/mjsc/index

Determining the Prevalence of Bacterial Vaginosis and their Patterns of Susceptibility to Antibiotics among Benghazi Women, Libya

Noor alhooda M. Al-awkally[1*], Hamza K. Ibrahim[2], Nessren F. Mousa [3], Mareei. A. Ali [1], Abdlmanam S. Fakron [4], Nesrine M. Al-awkally [5], Muftah A. Nasib [4], Alreda M. Al-Awkally [6] & Fathia M. SenossI [7]

[1]*Department of Medical laboratory, Higher Institute of Science and Technology, Suluq, Libya*
[2]*Department of pharmacy, Higher Institute of medical Technology, Bani Waleed, Libya*
[3]*Department of Statistics, Faculty of arts and sciences, University of Benghazi, Libya*
[4] *Department of Microbiology, Faculty of Science, Omar Al Mukhtar University, Libya*
[5]*Department of Surgery, Alhaowari hospital, Benghazi, Libya*
[6] *Central Pharmacy, Ministry of health, Darna, Libya*
[7] *Department of Zoology, Faculty of Art and Science, Benghazi University, Libya*

Received: .07 December 2021/ Accepted: 16 March 2022
Doi: https://doi.org/10.54172/mjsc.v37i2.366

Abstract: Vaginal discharge in women is occasionally caused by aerobic bacterial organisms. The study aimed to determine the etiology of female vaginosis and their antibiotic sensitivity pattern. HV culture results, age, and sex of all female patients with suspected bacterial vaginosis were collected. High vaginal swabs were inoculated into MacConkey agar, 5% blood agar, and chocolate agar and then incubated at 37°C in the presence of 5% CO_2 for 24-48 h. The antimicrobial susceptibility testing was performed by the disk diffusion method. Ten different antibiotic discs were used: Amikacin, Augmentin, Ceftazidime, Ceftriaxone, Ciprofloxacin, Gentamicin, Levofloxacin, Meropenem, Septrin, and Clindamycin. After 24 hours, zones were measured in mm, and zone interpretations were in accordance with the National Committee for Clinical Laboratory Standards criteria guidelines. A total of 215 females were included in the study, the incidence of bacterial vaginosis was 18.6% (40/215). Females between 33 and 45 years old had a somewhat high prevalence (19/40:47.5%) of bacterial vaginosis. The most frequent isolates were 45% (18/40) *Escherichia coli* followed by 15% (6/40) *Strep pneumonia*. The in vitro susceptibility tests of the most common isolates showed high resistance levels to commonly used antibiotics such as Augmentin and Gentamycin. Whereas highly sensitive rates were observed for Ceftriaxone 70%, followed by Ciprofloxacin 57.5%. Ceftriaxone and Ciprofloxacin showed the best antibiotic sensitivity. Additional studies are necessary to recognize those bacterial species that cause vaginal infections and determine the susceptibility of those species to recently used antibiotics.

Keywords: Al saleem medical laboratory; Augmentin; Ceftriaxon; *E. coli*; *Strep pneumoniae.*

INTRODUCTION

The vagina is sterile at birth. After a few days, when maternal estrogen increases the glycogen levels of the epithelial cells, the baby's vagina is colonized by lactobacilli from the mother (Forsum *et al.*, 2005). Protection of the vaginal mucosa depends on the specif-

***Corresponding author:** Noor alhooda M. Al-awkally: *noornooor1973@gmail.com* , Department of Medical laboratory, Higher Institute of Science and Technology, Suluq, Libya.

ic recognition of structures on the lactobacilli surface (adhesions) and the vaginal epithelium (receptors). This adhesion-receptor interaction results in forming a biofilm that exerts a local protective action against colonization by undesirable microorganisms (Boris et al., 1998; Szöke *et al.,* 1996). The physiologic pH of the vagina ranges from 3.8 to 4.5 (Watts *et al*., 2005). By using glycogen from the vaginal epithelium as substrate, lactobacilli produce organic acids, thus keeping the vaginal pH below 4.5. This acid environment partially or fully inhibits the development of most bacteria from both the digestive tract and the environment. This is considered a very efficient mechanism of mucosal protection (Martin *et al*., 2008)**.**

Besides *Lactobacillus* spp., other bacteria are frequently found in the vaginal microbiota of healthy women such as Streptococcus, Corynebacterium, Staphylococcus, Escherichia, Klebsiella, Proteus, Mycoplasma, Ureaplasma, Atopobium, Peptococcus, Peptostreptococcus, Clostridium, Bifidobacterium, Propionibacterium, Eubacterium, Bacteroides, Prevotella and Gardnerella vaginalis (Martin *et al*., 2008). Bacterial vaginosis (BV) is caused by an imbalance of the organisms (flora) that naturally exist in the vagina. BV is among the diseases most frequently associated with vaginitis. The other diseases are vulvovaginal candidiasis, and trichomoniasis. Vaginitis is usually characterized by vaginal discharge, vulvar itching, irritation, or odor (Prospero. 2014).

Vaginitis is the infection and inflammation of the vagina and is commonly encountered in clinical medicine (polat *et al*., 2021). Vaginal infections with bacterial vaginosis are a worldwide health problem for women (Go *et al*., 2006). Infections of the reproductive tract or genitourinary tract infections are a common problem of female sexual health and a significant risk of morbidity. Sexually transmitted diseases in women occur when there is an introduction of sexually transmitted organisms into the vagina, mostly through sexual activity. (Workowski & Berman, 2010) Aerobic vaginitis, like bacterial vaginosis, causes depletion of normal bacteria flora *Lactobacillus*. It is clinically characterized by the red and inflamed vagina, yellowish vaginal discharge with burning sensation and dyspareunia (Mumtaz l*et al*., 2008). Bacterial vaginosis and candidiasis are responsible for most vaginal infections in women of reproductive age. (polat *et al*., 2021 and Spinillo *et al*., 1997).

They are commonly seen in females of reproductive age and typically present with vaginal discharge (Mylonas & Friese, 2007). Vaginal discharges are biological fluids contained within or expelled from the vagina (Ullah and Sana. 2014). Sometimes certain enteric bacteria like *Proteus* spp and *E. coli* may be found there. A vagina is an existing place for certain microbes. It is colonized with *E. coli,* Staphylococci, and Streptococci after delivery (Alawkally *et al*., 2022; Tripathi. 2003). Therefore, this study aimed to determine the etiology of female vaginosis and their antibiotic sensitivity pattern in Al Saleem Medical Laboratory, Benghazi, Libya.

MATERIALS AND METHODS

Specimen Collection and Processing: The study population included was 215 females, ranging in age from 20 to 58 years. Patients vaginal swabs were collected as each physician ordered. High vaginal (HV) culture results and age of all female patients with supposed bacterial vaginosis between February 2020 and November 2021 were retrieved. The information obtained comprises the presence of vaginal irritation, itching, and abnormal vaginal discharge. Vaginal swab samples were obtained from patients attending the Microbiology Laboratory of Al Saleem Medical Laboratory to diagnose bacterial vaginosis.

Culture and Sensitivity: High vaginal swab specimens were inoculated into MacConkey agar, 5% blood agar, and chocolate agar**.** The inoculated media were incubated at 37 °C aerobically for 24–72 hours. Conventional phenotypic and biochemical methods made identification of the cultured isolate. (Fakron *et al*., 2022). McFarland's Standards are used as the reference to adjust the turbidity of the liquid/ bacterial suspension in the vial or tube in the microbiology laboratory before swab on Muller Hinton Agar media. It helps maintain and/or ensure that the number of bacteria will be within a given range to standardize microbial testing. The most commonly used concentration for antimicrobial susceptibility testing and the culture media performance testing is usually done by 0.5 McFarland standards in the microbiological laboratories (Fakron *et al*., 2022).

However, the used concentration for the antimicrobial susceptibility testing and the culture media performance testing is done by 0.5 McFarland standards in the microbiological laboratory (Jan. 2016). According to the manufacturer's instructions, the results were considered resistant (R) and susceptible (S), with intermediately resistant strains collected together as drug-resistant (Noor-alhooda *et al*., 2019**)**.

The following antimicrobial agents were employed: Amikacin-AK (30µg), Augmentin-AUG (30ug), Ceftazidime-CAZ (30mcg), Ceftriaxone-CRO (30µg), Ciprofloxacin-CIP (5µg), Gentamicin-GN (10µg), Levofloxacin-LEV, Meropenem-MER (30µg), Septrin-SXT (25ug) and Clindamycin (2µg) (Oxoid, England). Antimicrobial susceptibility testing was performed by the disc diffusion method.

Methodology: Entire data from the investigation were entered and analyzed using SPSS version 20.

RESULTS

Distribution of the growth of positive cases: A total of 215 females were included in the study. The incidence of bacterial vaginosis was 18.6% (40/215).

Table: (1). Distribution of the growth of positive cases.

High Vaginal Swab	Growth	No growth
Growth	40	18.6%
No growth	175	81.3%
Total	215	100%

Distribution of the growth of positive cases by age group: Bacterial vaginosis (BV) and its association with age are presented in Table 2. Females between 33 and 45 years old had a somewhat high prevalence (19/40: 47.5%) of bacterial vaginosis. In the age group 46-58 years (n=13), the incidence of BV is somewhat reduced to (32.5%).

Table: (2). Distribution of the growth of positive cases by age group

Age	Frequency	Percent
20-32	8	20
33-45	19	47.5
46-58	13	32.5
Total	40	100.0

Distribution of organisms from HVS samples: The most commonly isolated were gram-negative organisms. The most frequent isolates were 45% (18/40) *Escherichia coli* followed by 15% (6/40) *Strep pneumonia*, *Staph aureus* and *Strep agalactia* 12.5% (5/40) equally, *Klebsiella pneumonia* 7.5% (3/4), *Klebsiella* spp 5% (2/40) *and Pseudomonas aeruginosa* 2.5 % (1/40).

Table: (3). Types of Organisms isolated in Blood Culture

Bacteria	Frequency	%
E. coli	18	45.0
Klebsiella pneumonia	3	7.5
Klebsiella spp	2	5.0
Pseudomonas aeruginosa	1	2.5
Staph aureus	5	12.5
Strep agalactia	5	12.5
Strep pneumonia	6	15.0
Total	40	100.0

Prevalence of Bacterial infection in women age groups: A significant role in the etiology of vaginosis in female patients in this study was played by *E. coli* (45%). Vaginosis in the present study was relatively higher among age groups of 33-45years compared to others.

Table:(4). Types of bacteria isolated according to the age group

Bacteria	Age			Total
	20-32	33-45	46-58	
E. coli	3	10	5	18
Klebsiella pneumonia	0	2	1	3
Klebsiella spp	1	1	0	2
Pseudomonas aeruginosa	0	1	0	1
Staph aureus	1	2	2	5
Strep agalactia	0	4	1	5
Strep pneumonia	0	4	2	6
Total	5	24	11	40

Antibiotic sensitivity, resistance and intermediate sensitivity of bacteria isolated from blood cultures: The in vitro susceptibility tests of the most common isolates showed high levels of resistance to commonly used antibiotics such as Augmentin, Gentamycin, and Septrin. All isolates were highly sensitive to Ceftriaxone 70%, followed by Ciprofloxacin 57.5%.

Antimicrobial susceptibility profiles of bacterial isolates from vaginal specimen: The antibiotic resistance patterns of *E. coli* showed higher resistance towards Augmentin, and *E. coli* strains were more sensitive to Ceftriaxone, Levofloxacin, and Ciprofloxacin. The antibiotic sensitivity patterns of *Strep pneumonia* showed higher resistance towards Levofloxacin and Gentamycin, and *Strep pneumonia* showed sensitivity to Augmentin and Ceftriaxone.

Note: I; Intermediate, R; Resistant, S; Sensitive, AUG; Augmentin, MER; Merapenem, CRO; Ceftriaxone, CAZ; Ceftazidime, LEV; Levofloxacin, CN; Gentamycin, CIP, Ciprofloxacin, AK; Amikacin, SXT; Septrin, DA, Clindamycin.

Table: (5). Antibiotic sensitivity, resistance, and intermediate sensitivity of bacteria isolated from blood culture.

Drug	Susceptibility pattern	Frequency	%
Augmentin	Miss	1	2.5
	I	5	12.5
	R	14	35.0
	S	20	50.0
	Total	40	100.0
Merapenem	Miss	25	62.5
	R	2	5.0
	S	13	32.5
	Total	40	100.0
Ceftriaxone	Miss	5	12.5
	I	1	2.5
	R	6	15.0
	S	28	70.0
	Total	40	100.0
Ceftazidime	Miss	25	62.5
	I	2	5.0
	R	5	12.5
	S	8	20.0
	Total	40	100.0
Levofloxacin	Miss	8	20.0
	I	4	10.0
	R	8	20.0
	S	20	50.0
	Total	40	100.0
Gentamycin	Miss	6	15.0
	I	2	5.0
	R	18	45.0
	S	14	35.0
	Total	40	100.0
Ciprofloxacin	Miss	3	7.5
	I	8	20.0
	R	6	15.0
	S	23	57.5
	Total	40	100.0
Amikacin	Miss	16	40.0
	I	5	12.5
	R	8	20.0
	S	11	27.5
	Total	40	100.0
Ssptrin	Miss	17	42.5
	R	15	37.5
	S	8	20.0
	Total	40	100.0
Clindamycin	Miss	25	62.5
	R	5	12.5
	S	10	25.0
	Total	40	100.0

Table: (6). Antimicrobial susceptibility profiles of bacterial isolates from vaginal specimen Augmentin

Bacteria	Not available (NA)	I	R	S	Total
E. coli	0	3	10	5	18
Klebsiella pneumonia	0	1	0	2	3
Klebsiella spp	1	0	1	0	2
Pseudomonas aeruginosa	0	0	1	0	1
Staph aureus	0	0	0	5	5
Strep agalatia	0	0	2	3	5
Strep pneumonia	0	1	0	5	6
merapenem					
E. coli	11	0	0	7	18
Klebsiella pneumonia	3	0	0	0	3
Klebsiella spp	0	0	0	2	2
Pseudomonas aeruginosa	1	0	0	0	1
Staph aureus	3	0	1	1	5
Strep agalactia	3	0	1	1	5
Strep pneumonia	4	0	0	2	6
Ceftriaxone					
E. coli	0	1	2	15	18
Klebsiella pneumonia	1	0	0	2	3
Klebsiella spp	0	0	2	0	2
Pseudomonas aeruginosa	0	0	1	0	1
Staph. aureus	1	0	0	4	5
Strep agalactia	1	0	1	3	5
Strep pneumonia	2	0	0	4	6
Ceftazidime					
E. coli	10	1	1	6	18
Klebsiella pneumonia	2	0	0	1	3
Klebsiella spp	1	0	1	0	2
Pseudomonas aeruginosa	0	0	1	0	1
Staph aureus	5	0	0	0	5
Strep agalactia	2	0	2	1	5
Strep pneumonia	5	1	0	0	6
Levofloxacin					
E. coli	3	1	2	12	18
Klebsiella pneumonia	0	1	2	0	3
Klebsiella spp	0	0	0	2	2
Pseudomonas aeruginosa	0	1	0	0	1
Staph. aureus	4	0	0	1	5
Strep agalactia	1	0	1	3	5
Strep pneumonia	0	1	3	2	6
Gentamycin					
E. coli	4	1	6	7	18
Klebsiella pneumonia	0	1	1	1	3
Klebsiella spp	0	0	2	0	2
Pseudomonas aeruginosa	0	0	1	0	1
Staph. aureus	1	0	3	1	5
Strep agalactia	1	0	2	2	5
Strep pneumonia	0	0	3	3	6
Ciprofloxacin					
E. coli	0	2	3	13	18
Klebsiella pneumonia	1	1	1	0	3
Klebsiella spp	1	0	0	1	2
Pseudomonas aeruginosa	0	0	0	1	1
Staph aureus	0	1	1	3	5
Strep agalactia	1	1	0	3	5
Strep pneumonia	0	3	1	2	6

Amikacin					
E. coli	3	4	5	6	18
Klebsiella pneumonia	2	1	0	0	0
Klebsiella spp	1	0	0	1	1
Pseudomonas aeruginosa	0	0	0	1	1
Staph. aureus	3	0	1	1	1
Strep agalactia	4	0	0	1	1
Strep pneumonia	3	0	2	1	1
Septrin					
E. coli	6	0	5	7	18
Klebsiella pneumonia	1	0	2	0	3
Klebsiella spp	2	0	0	0	2
Pseudomonas aeruginosa	1	0	0	0	1
Staph. aureus	3	0	2	0	5
Strep agalactia	1	0	4	0	5
Strep pneumonia	3	0	2	1	6
Total	17	0	15	5	40
Clindamycin					
E. coli	9	0	4	5	18
Klebsiella pneumonia	2	0	0	1	3
Klebsiella spp	2	0	0	0	2
Pseudomonas. aeruginosa	1	0	0	0	1
Staph aureus	3	0	0	2	5
Strep agalactia	5	0	0	0	5
Strep pneumonia	3	0	1	2	6
Total	25	0	5	10	40

Distribution of growth positive cases by years: 60% of positive cases were recorded in 2021.

Table: (7). Distribution of growth of positive cases by years.

Year	Frequency	%
2020	16	40.0
2021	24	60.0
Total	40	100.0

Distribution of the growth of positive cases by seasons: 30% of the cases were recorded in the winter and 22.5% in summer.

Table: (8). Distribution of the growth of positive cases by seasons.

Season	Frequency	%
12-2	12	30.0
3-5	7	17.5
6-8	9	22.5
9-11	12	30.0
Total	40	100.0

Distribution of isolates by years: According to table 9, 32.5% incidence of *E. coli* was recorded in 2021.

Table: (9). Distribution of isolates by years

Bacteria/year	2020	2021	Total
E. coli	5	13	18
Klebsiella pneumonia	1	2	3
Klebsiella spp	0	2	2
Pseudomonas aeruginosa	1	0	1
Staph aureus	2	3	5
Strep agalactia	3	2	5
Strep pneumonia	4	2	6
Total	16	24	40

Distribution of isolates by months: The rate of isolation of *E. coli* was highest in months 2-12, followed by months 3-5.

Table: (10). Distribution of isolates by months

Months					
Bacteria	2-12	3-5	6-8	9-11	Total
E. coli	9	6	1	2	18
Klebsiella pneumonia	0	1	0	2	3
Klebsiella spp	0	0	2	0	2
Pseudomonas aeruginosa	0	0	0	1	1
Staph aureus	2	0	1	2	5
Strep agalactia	0	0	2	3	5
Strep pneumonia	1	0	3	2	6
Total	12	7	9	12	40

DISCUSSION

In bacterial vaginosis (BV), a condition characterized by an increased vaginal pH and milky discharge, the normal vaginal flora is substituted by a diverse flora of aerobic, anaerobic, and microaerophilic species (Mumtaz et al., 2008). In the current study, the overall prevalence rate of bacterial vaginosis was 18.6%. An earlier study done by (Mohammed et al., 2016) reported prevalence rates of bacterial vaginosis in 15.4%–19.4%. Lower prevalence rates of bacterial vaginosis than those in this study were reported from Botswana (38%) (Das et al., 1996).

In the present study, the most common BV was *E. coli,* with 34%, according to Table 10. The incidence of *E. coli* is the highest among all cases. Similar studies were conducted in India by (Donders et al., 2009; Orish et al., 2016; Ravishankar & Prakash, 2017) also imply that the cause of vaginitis is *E. coli*. It is mentioned as one of the most common causes of vaginitis and is sometimes isolated alone. In the studies prepared by Ravishankar and Das et al., 1996; Ravishankar & Prakash, 2017) (44%) *E. coli* was the most common isolated organism.

Strep pneumoniae, however, is not a part of the normal vaginal flora. It is presumed that Pneumococci cannot persist at normal vaginal pH. But during pregnancy and puerperium, changes in vaginal pH may temporarily permit it to occur as a vaginal commensal (Galea et al., 2014). Primary pneumococcal infection of the female genital tract may occur through the insertion of an intrauterine device such as the use of tampons or the postpartum period (Hutchison et al., 1984), or as a normal respiratory commensal during orogenital sexual practices. Infection transmittable via gastrointestinal tract Pneumococci has rarely been isolated as an intestinal pathogen (Petti et al., 2002). But it may colonize the perineum and introitus vaginae giving rise to bartholinitis, colonization of vagina and cervix leading to infection or infection via lymphatics, or infections via the bloodstream (Adnan et al., 2008).

The second most common isolates in the current study are *strep pneumonia* 15%. The isolation rate was highest among 33-45-year-olds (19/40:47.5%), followed by 46-58 years of age (13/40:32.5%). The maximum number of infections was found in the 31–40 year age group 101/258). Because of the prevalent use of antibiotics, especially in developing countries, the resistance profile of microorganisms is changing, as evidenced by the increasing rate of antibiotic resistance among bacterial populations (Farrar, 1985).

The in vitro sensitivity tests of the most common isolates showed high resistance levels to commonly used antibiotics such as Augmentin, Gentamycina, and Septrin. Ceftriaxone is a third-generation cephalosporin that was more effective. This high antibacterial susceptibility by the cephalosporin was found to be in accordance with the works of Ravishankar and Mumtaz and his colleagues (Ravishankar & Prakash, 2017). All isolates were highly sensitive to Ceftriaxone followed by Ciprofloxacin. This high antibacterial sensitivity by the Ceftriaxone is in accordance with the work of (Mumtaz *et al.,* 2008) 32.5% and Levofloxacin 30%.

In the antibiogram study, isolates belonging to *E. coli* are highly sensitive to Ciprofloxacin. As similar to a study done by Bibi Ayesha *et al*., 2014), (Abera & Kibret, 2011; Mumtaz *et al*., 2008) showing that *E. coli* is highly sensitive to Ciprofloxacin 21%. In this study, *E.coli* showed high levels of resistance (25 %) to Augmentin 25%. This study establishes that *E. coli* was more resistant to Augmentin 30% (Singh *et al.,* 2016). High-risk groups could be targeted more efficiently. This study is a step in familiarizing sensitivity and resistance patterns to used antibiotics, preventing resistance and thus preventing chronic sequelae. Thus, the present study raises the question of changing the syndromic protocol to treatment based on culture sensitivity. Substantial health gains with a reduction of the disease burden among women should be the long-term goal of treatment which should be intended with knowledge of cultural sensitivity.

CONCLUSION

Comprehensive healthcare education aimed at reducing bacterial vaginosis is favorable. The most common bacterial vaginosis were *Escherichia coli* and *Streptococcus pneumonia*. Infection should be screened and vaccinated, especially if the women were infected with *Streptococcus pneumonia*. Ceftriaxone and Ciprofloxacin showed the best antibiotic sensitivity. Females with vaginitis should frequently be cultured with vaginal samples, and the drug sensitivity pattern of each isolate should be recognized. Further studies are encouraged to identify other bacterial species involved in vaginal infections and determine the susceptibility of these species to newly introduced antibiotics.

REFERENCES

Abera, B., & Kibret, M. (2011). Bacteriology and antimicrobial susceptibility of otitis media at dessie regional health research laboratory, Ethiopia. *Ethiopian Journal of Health Development, 25*(2), 161-167 .

Adnan, E. K., Aymen H, E. E., & Nasser Yehia A, A. (2008). *Streptococcus pneumoniae* as a cause of early onset neonatal sepsis: first report from Kuwait .

Agarwal, S K et al. (2900). "Antifungal activity of anthraquinone derivatives from Rheum emodi." *Journal of ethnopharmacology* vol. 72,1-2 43-6. doi:10.1016/s0378-8741(00)00195-1

Alawkally, Noor Alhooda & Nag, Miftah & Ali, Maree & Al-Awkally, Nesrine & Al-Awkally, Abeer & Al-Awkally, Alreda. (2022). Antibiotic sensitivity of *Escherichia coli* isolated from different clinical specimens of patient human in Al-jala hospital-Benghazi Libya. International Journal of Current Research in Science Engineering & Technology. 8. Pages: 509-517

Bibi Ayesha.، Sana Jabeen., Muhammad Ismail., Sayyed Salman., Sana Ullah, Zeeshan Niaz., Tauseef Ahmad. (2014). Isolation, Identification And Antibiotic Susceptibility Testing Of Microorganisms From Female Patients Of Ayub Medical Complex Through High Vaginal Swab. Sci.Int.(Lahore),26(4),1581-1586, ISSN 1013-5316; Coden: Sinte 8

Boris, S., Suárez, J. E., Vázquez, F., & Barbés, C. (1998). Adherence of human vaginal lactobacilli to vaginal epithelial cells and interaction with uropathogens. *Infection and immunity, 66*(5), 1985-1989 .

Das, C., Pattnaik, P., & Sahoo, P. (1996). Prevalence of vaginal infection in preterm labour. *Antiseptic, 93*(4), 140-143 .

Donders, G., Van Calsteren, K., Bellen, G., Reybrouck, R., Van den Bosch, T., Riphagen, I., & Van Lierde, S. (2009). Predictive value for preterm birth of abnormal vaginal flora, bacterial vaginosis and aerobic vaginitis during the first trimester of pregnancy. *BJOG: An International Journal of Obstetrics & Gynaecology, 11* .1324-1315 ،(10)6

Farrar, W. E. (1985). Antibiotic resistance in developing countries. *The Journal of infectious diseases, 152*(6), 1103-1106 .

Fakron, A., Alawkally, N., El- warred, S., Aldouakali Ali , M., El-amari , M., Awkally, A., Soutiyah, M., Suliman, N. and Ibrahim, H. (2022). Risk Factors for Ciprofloxacin and Gentamycin

Resistance among Gram Positive and Gram Negative Bacteria Isolated from Community-Acquired Urinary Tract Infections in Benghazi city. *Scientific Journal for the Faculty of Science-Sirte University*. 2, 1 (Apr. 2022), 76-87. DOI:https://doi.org/10.37375/sjfssu.v2i1.204.

Forsum, U., Holst, E., Larsson, P.-G., Vasquez, A., Jakobsson, T., & Mattsby-Baltzer, I. (2005). Bacterial vaginosis–a microbiological and immunological enigma. *Apmis, 113*(2), 81-90 .

Galea, G., Abela, R., Deguara, C., Cuschieri, P., & Brincat, M. P. (2014). Puerperal Streptococcus *pneumoniae endometritis*: a case report and literature review .

Go, V. F., Quan ،V. M., Celentano, D. D., Moulton, L. H., & Zenilman, J. M. (2006). Prevalence and risk factors for reproductive tract infections among women in rural Vietnam. *Southeast Asian Journal of Tropical Medicine and Public Health, 37*(1), 185 .

Hutchison, C., Kenney, A., & Eykyn, S. (1984). Maternal and neonatal death due to pneumococcal infection. *Obstetrics and gynecology, 63*(1), 130-131 .

Noor-alhooda Milood Al-awkally, Maree DokallyAli, ReedaMiloud Al-awkally, Abeer Miloud AL-awkally, Fowziya M. Ali and Ahmed Abouserwel. (2019). Antibiotic Susceptibility and Resistant Pattern of Isolates of Pseudomonas aeruginosa recovered from Infected Swabs, Abscess, Burn, Medical Tips and Blood from Patients at 4 Geographical Locations in Libya (Al-Bayda, Shahat, Derna and Benghazi). Int.J.Curr.Microbiol.App.Sci. 8(10): 143-149. doi:https://doi.org/10.20546/ijcmas.2019.810.015

Martin, R., Soberon, N., Vazquez, F., & Suárez, J. E. (2008). Vaginal microbiota: composition, protective role, associated pathologies, and therapeutic perspectives. *Enfermedades Infecciosas y Microbiología Clínica, 26*(3), 160-167 .

Mohammed, M. A., Alnour, T. M., Shakurfo, O. M., & Aburass, M. M. (2016). Prevalence and antimicrobial resistance pattern of bacterial strains isolated from patients with urinary tract infection in Messalata Central Hospital, Libya. *Asian Pacific journal of tropical medicine, 9*(8), 771-776 .

Mumtaz, S., Ahmad, M., Aftab, I., Akhtar, N., ul Hassan, M., & Hamid, A. (2008). Aerobic vaginal pathogens and their sensitivity pattern. *J Ayub Med Coll Abbottabad, 20*(1), 113-117 .

Mylonas, I., & Friese, K. (2007). Genital discharge in women. *MMW Fortschritte der Medizin, 149*(35-36), 42-46; quiz 47 .

Orish, V. N., Ofori-Amoah, J., François, M., Silverius, B. K & ،.Mensah, E. K. (2016). Microbial and antibiotic sensitivity pattern of high vaginal swab culture results in sekondi-takoradi metropolis of the western region of ghana: retrospective study. *European Journal of Clinical and Biomedical Sciences, 2*(5), 45.50-

Polat IH, Marin S, Ríos J, et al. (2021). Exploratory and confirmatory analysis to investigate the presence of vaginal metabolome expression of microbial invasion of the amniotic cavity in women with preterm labor using high-performance liquid chromatography. Am J Obstet Gynecol ;224:90.e1-9.

Petti, C. A., Ignatius Ou, S.-H., & Sexton, D. J. (2002). Acute terminal ileitis associated with *pneumococcal bacteremia*: case report and review of pneumococcal gastrointestinal diseases. *Clinical Infectious Diseases, 34*(10), e50-e53 .

Ravishankar, N., & Prakash, M. (2017). Antibiogram of bacterial isolates from high vaginal swabs of pregnant women from tertiary care hospital in Puducherry. *India IJCMAS, 6*, 964-972 .

Singh ‹S., Swain, S., Das, L., Das, P. C., & Sahoo, S. (2016). Isolation and characterization of organisms in high vaginal swab culture in preterm pregnancy (28-37 week). *International Journal of Reproduction, Contraception, Obstetrics and Gynecology, 5*(11), 385 .3859-3

Spinillo, A., Bernuzzi, A. M., Cevini, C., Gulminetti, R., Luzi, S., & De Santolo, A. (1997). The relationship of bacterial vaginosis, Candida and Trichomonas infection to symptomatic vaginitis in postmenopausal women attending a vaginitis clinic. *Maturitas, 27*(3), 253-260 .

Szöke, I., Pascu, C., Nagy, E., LJUNG, A., & Wadstrom, T. (1996). Binding of extracellular matrix proteins to the surface of anaerobic bacteria. *Journal of medical microbiology, 45*(5), 338-343 .

Tripathi, G. (2003). *Potentials Of Living Resources*. Discovery Publishing House

Ullah, Sana. (2014). Isolation, Identification and Antibiotic Susceptibility Testing of Microorganisms from Female Patients of Ayub Medical Complex Through High Vaginal Swab. Science International. 26. 1581-1587.

Watts DH, Fazzari M, Minkoff H, Hillier SL, Sha B, Glesby M, Levine AM, Burk R, Palefsky JM, Moxley M, Ahdieh-Grant L, Strickler HD. (2005). Effects of bacterial vaginosis and other genital infections on the natural history of human papillomavirus infection in HIV-1-infected and high-risk HIV-1-uninfected women. J Infect Dis. 2005 Apr 1;191(7):1129-39. doi: 10.1086/427777. Epub 2005 Feb 21. Erratum in: J Infect Dis. Sep 1;192(5):943. Fazarri, Melissa [corrected to Fazzari, Melissa]. PMID: 15747249.

Workowski, K. A., & Berman, S. M. (2010). Sexually transmitted diseases treatment guidelines .

تحديد مدى انتشار التهاب المهبل البكتيري وأنماط تحسسها للمضادات الحيوية بين نساء بنغازي ، ليبيا

نور الهدى ميلود العوكلي[1]، حمزة خليفة أبراهيم[2]، نسرين فرج موسى[3]،مرعي الدوكالي علي[1] ،عبد المنعم سعد فكرون[4]، نسرين ميلود العوكلي[5]، مفتاح عبدالواحد نصيب[4]، الرضا ميلود العوكلي[6]، وفتحيه مسعود السنوسي[7]

[1] قسم المختبرات الطبية، المعهد العالي للعلوم والتكنولوجيا، سلوق، ليبيا

[2] قسم الصيدلة، المعهد العالي للعلوم والتكنولوجيا، بني وليد، ليبيا

[3] قسم الإحصاء، كلية الآداب والعلوم، جامعة بنغازي، ليبيا

[4] قسم الأحياء الدقيقة، كلية العلوم، جامعة عمر المختار، ليبيا

[5] قسم الجراحة، مستشفى الهواري، بنغازي، ليبيا

[6] الصيدلية المركزية، وزارة الصحة، درنة . ليبيا

[7] قسم علم الحيوان، كلية الآداب والعلوم، جامعة بنغازي، ليبيا

تاريخ الاستلام: 07 ديسمبر 2021/ تاريخ القبول: 16 مارس 2022

Doi:https://doi.org/10.54172/mjsc.v37i2.366

المستخلص : تحدث الإفرازات المهبلية عند النساء أحيانًا بسبب الكائنات البكتيرية الهوائية. هدفت الدراسة إلى تحديد مسببات التهاب المهبل الأنثوي، ونمط حساسيتها للمضادات الحيوية. تم جمع نتائج مزارع أعلى عنق المهبل، وعمر، وجنس جميع المرضى الإناث المصابات بالتهاب المهبل الجرثومي المفترض. تم زرع مسحات أعلى المهبل في وسط أجار ماكونكي، و 5 ٪ أجار الدم، وأجار الشوكوليت ثم تم تحضينها عند 37 درجة مئوية في وجود 5 ٪ من ثاني أكسيد الكربون لمدة 24–48 ساعة. تم إجراء اختبار الحساسية لمضادات الميكروبات عن طريق طريقة انتشار القرص. تم استخدام عشرة أقراص مضادات حيوية مختلفة: أميكاسين ، أوجمنتين ، سيفتازيديم ، سيفترياكسون ، سيبروفلوكساسين ، جنتاميسين ، ليفوفلوكساسين ، ميروبينيم ، سبترين وكليندامايسين. بعد 24 ساعة ، تم قياس المناطق بالمليمتر ، وكانت تفسيرات المناطق من قبل اللجنة الوطنية لمعايير معايير المختبرات السريرية. تم اشتمال إجمالي 215 أنثى في الدراسة، وبلغت نسبة الإصابة بالتهاب المهبل الجرثومي 18.6٪ (215/40). كان معدل انتشار التهاب المهبل البكتيري بين الإناث بين 33، و 45 عامًا مرتفعًا إلى حد ما (40/19: 47.5٪). كانت العزلات الأكثر شيوعاً 45٪ (40/18) الإشريكية القولونية تليها 15٪ (40/6) بكتيريا الالتهاب الرئوي العقدي. أظهرت اختبارات الحساسية في المختبر للعزلات الأكثر شيوعًا مستويات مقاومة عالية للمضادات الحيوية الشائعة الاستخدام مثل أجومنتين، و جنتامايسين. في حين لوحظت معدلات حساسية عالية لسيفترياكسون 70٪، يليه سيبروفلوكساسين 57.5٪. أظهر سيفترياكسون، وسيبروفلوكساسين أفضل تحسس في المضادات الحيوية. من الضروري إجراء دراسات إضافية للتعرف على تلك الأنواع البكتيرية التي تسبب الالتهابات المهبلية، وتحديد مدى تحسس هذه الأنواع للمضادات الحيوية المستخدمة مؤخرًا.

الكلمات المفتاحية : مختبر السليم الطبي، أجومنتين، سفترياكسون، الإشريكية القولونية، بكتيريا الالتهاب الرئوي العقدي.

[1*] نور الهدى ميلود العوكلي: *noornooor1973@gmail.com* قسم المختبرات الطبية ، المعهد العالي للعلوم والتكنولوجيا ، سلوق ، ليبيا.