Effects of parathyroid hormone and Vitamin –D level on incidence of bacterial vaginosis during first trimester of pregnancy

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Abstact

Vitamin D and parathyroid hormone (PTH)play essential role to maintarn homeostasis of calcium and phosphate .The present study was designed to investigate the effects of PTH and Vit-D on incidence of bacterial vaginosis(BV) during first trimester of pregnancy.
A total number of women that recruited in this study was ninety (90) women, of those, 50 women were affected with BV and forty (40) were healthy women and used as control group .
All ages of tested women (patient and healthy were ranged between 16 to 45 years old , and they divided in to three groups (16 -25 , 26 -35 , and 36 -45 years old)
Data obtained from the present study indicated That women with B.V and their ages ranged between 16 -25 recorded high percentage ratio (50%) compared to other ageg group of concerning levels of vit-D, it is well documented that women who have B.V pointed out a significant decrease ($p<0.01$)in the levels of vit-D when they compared with their counterparts of control groups.
Inversly, a significant increase ($p<0.05$) in the levels of PTH of women affected with B.V compared to those with out B.V, as well as, it was found a significant ($p<0.01$) negative correlation between levels of vit-D and PTH in women infected with B.V.
From data confirmed a bove, one can be concluded that a drop of Vit-D during pregnancy triggers the activity of a opportunistic bacteria causing BV .

Key words : Vit-D, PTH, bacterial vaginosis
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Introduction

Vitamin D's most well-known function is to maintain calcium and phosphate balance, which is necessary for bone production and resorption. Vitamin D aids in the absorption of phosphate and calcium in the intestine, stimulates the development of progenitor cells into osteoclasts, and aids in the recovery of calcium from bones and the mineralization of the bone matrix [1].Parathyroid hormone (PTH) measurement in serum or plasma is a necessary tool forthe exploration of

period of four months from December 2021 until February 2022. Ethical permissionwas taken through a formal consent fromhospital and from each pregnant womanduring working.Blood and vaginal swabfrom 90 pregnant women who wereparticipated in the study were taken.

Measurements ofParathyroid hormone

Parathyroid hormone was estimated accordingto competitive-ELISA kit prepared by Monobind (USA).And also by Sandwich Equilibrium Method (TYPE 2),

Measurements of Vitamin D level

Vitamin D level was estimated according to competitive-ELISA kit prepared by Monobind (USA). And also by Sequential Competitive Method

Isolation and identification of bacterial isolates

All vaginal swabs were cultured on MRS agar and MRS broth under anaerobic conditions at 37 °C for 24- 48 hours.. If colony appear, it was identified depending on its morphology (colony shape, size , color , borders, nature of pigments , elevation and texture) and then it was examined by light microscope after being stained with Gram's stain, Isolates with growth of Lactobacillus spp. Stored in glycerol 40% [10,11].

VITEK 2 assay

Isolated lactobacillus spp. were identified using VITEK2 ANC card.

Antibiotic susceptibility test

The in vitro susceptibility of lactobacillus isolates to 5 antimicrobial agents commonly given by gynecologist to pregnant women were determined via disk diffusion method according to clinical and laboratory standards institute instructions .

Statistical Analysis

Rustle of the present study were illustrated as means + standard deviation (SD).

calcium/phosphorus disorders, and is widely used as a surrogatemarker to assess skeletal and mineral disorders [2]

During pregnancy, parathyroid hormone (PTH) is required to promote maternal calcium absorption. PTH concentrations rise throughout pregnancy, reaching a mid-normal range by the third trimester. PTH secretion is principally controlled by extracellular calcium concentrations; lower levels of circulating calcium cause an increase in PTH secretion [3].

Bacterial vaginosis (BV) is the most common vaginal infections among women in reproductive age. It is a condition of vaginal flora imbalance, in which the typically plentiful H2O2 producing lactobacilli are scarce and other bacteria such as Gardnerellavaginalis, Mycoplasma hominis, Ureaplasmaurealyticum, Escherichia coli and anaerobes (e.g. Prevotella, Mobiluncus, Bacteroides) are abundant [4].Vitamin D may reduce the risk ofbacterial infections throughinduction ofcathelicidin and defensins [5].Vitamin D may be important for BV, because it influences a number of aspects of the immune system [6]. Vitamin D deficiency has been associated with a wide range of immune disorders and chronic infections such as those due to mycobacteria [7,8].

Lactobacilli spp. are the most common type of bacteria. in the vaginal tracts of healthy women, and an imbalance in the local microbiota can make women more susceptible to diseases like bacterial vaginosis (BV) and vulvovaginal candidiasis (VVC). Despite the fact that antimicrobial therapy is often effective, repeated use of antimicrobials leads to a high rate of recurrence and a rise in microbial resistance [9].

Material & Methods

Data were obtained from the present study of pregnant women in first trimester at Imam Ali Hospital during a

Results

1. Distribution of age data according to study groups

Table (1): show that about two fifth 20 (40%) of BV group age were between (26-35) year, while more than half 21 (52.5%) of non-BV group age were between (16-25).

Age	Groups of study	
	BV	Non-BV
No.	50	40
Mean	27.34	25.50
S.D	6.886	6.312
Minimum	17	16
Maximum	45	40
16-25 F(%)	25 (50%)	21 (52.5%)
26-35 F(%)	20 (40%)	15 (37.5%)
36-45 F(%)	5 (10%)	4 (10%)
Total F(%)	50 (100%)	40 (100%)

F=Frequency

during first trimester of pregnant women and non-BV. Table (2) showed that Vitamin D deficiency in women with Vaginitis.

2.Distribution of Vitamin D level according to study groups

Statistical analysis reveals a highly significant differences P<0.05 in the level of Vitamin D between bacterial vaginosis

Table (2) shows that a highly significant differences between BV and non-BV groups in relation to vitamin D level.

Vit.D ng\mL	Groups of study		p-value
	BV	Non-BV	
N	50	40	**0.001 H.S**
Mean	19.91	33.71	
S.D	11.202	14.89	
Minimum	6.50	7.50	
Maximum	44.50	63.80	

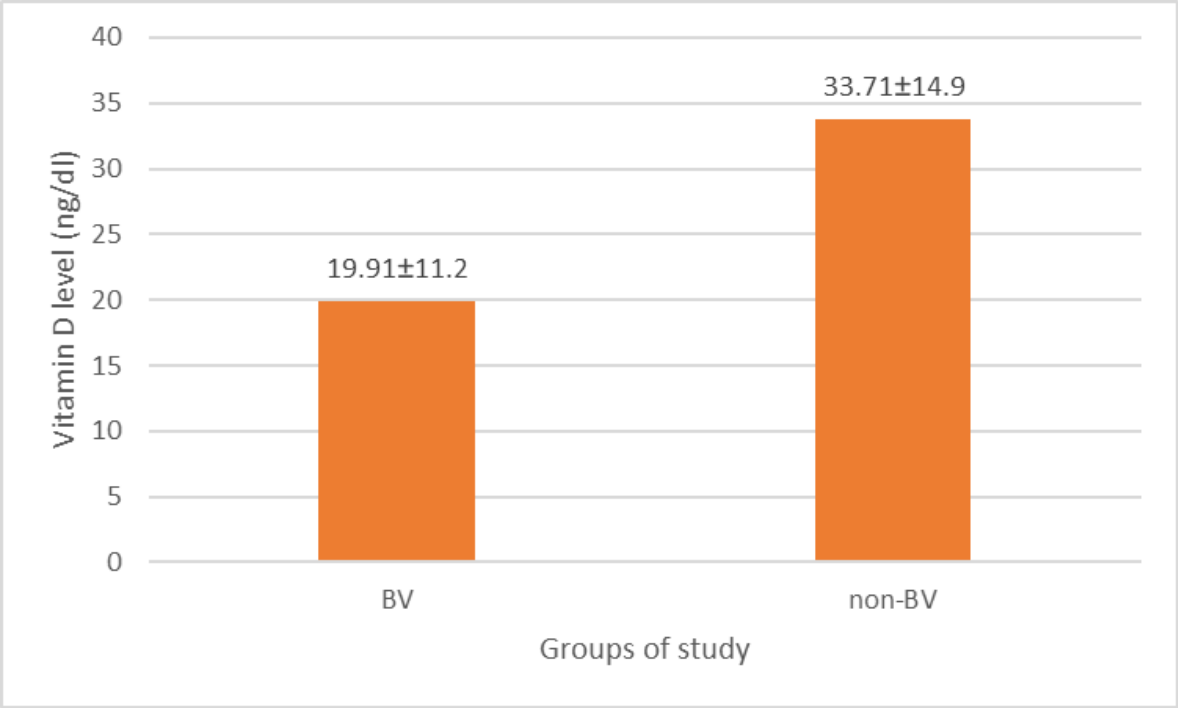

Figure (1): shows Relationship between vitamin D and Bacterial vagnosis

3.Distribution of parathyroid hormone level according to study groups

The table below shows the rise and significant P<0.021 of parathyroid hormone in pregnant women in the first trimester with bacterial vaginosis.

Table(3) show that a significant differences between BV and non-BV groups in relation to parathyroid hormone level.

PTHpg\mL	Groups of study		p-value
	BV	Non-BV	
N	50	40	0.021 Sig
Mean	32.7240	26.5025	
S.D	13.58816	10.89355	
Minimum	6.20	5.40	
Maximum	62.80	53.10	

4.correlation between vitamin D and parathyroid hormone

Figure (1) :- it had been shown there was a significant negativet correlation (r=0.519,sig=0.001) between vitamin D and parathyriod hormone.

r= -0.519

sig.= 0.001

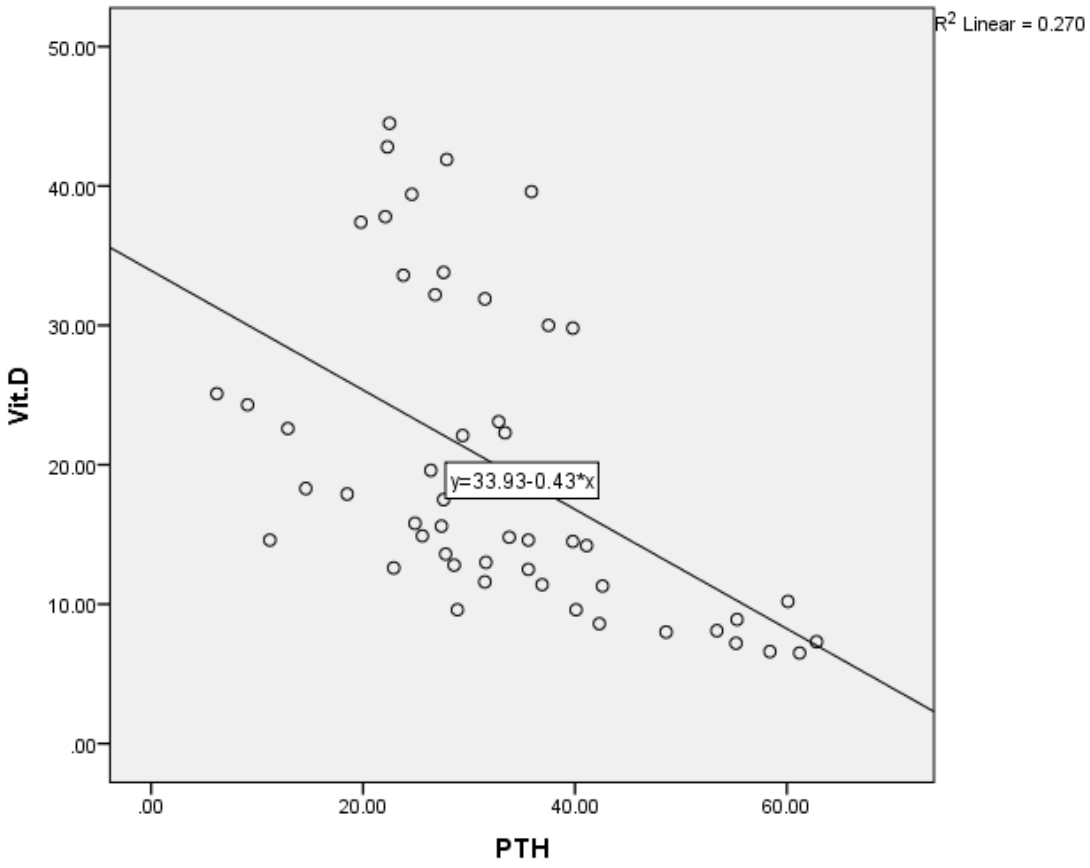

Figure (2).Relationship between Vitamin D and Parathyroid hormone

5-Result of VITEK

The table (3) shows Highly significant and the appearance of two types of *Lactobacillus, L.gasseri, L.casei.*

Table (4): Distribution of VITEK2 results according to study groups

Vitek2		Groups of study				P-value
		BV		Non-BV		
		F	%	F	%	
Valid	*L. casei*	3	6.0	11	27.5	**0.001 H.S**
	L. gasseri	4	8.0	19	47.5	
	No growth	43	86.0	10	25.0	
	Total	50	100.0	40	100.0	

Table (4) show that a highly significant differences between BV and non-BV groups in relation to vitamin D level so that more than three quarters 43 (86%) of BV group wereno growth, while 19 (47.5%) of non-BV group were *L. gasseri.*

6-Antibiotics susceptibility of Lactobacillus

The figures (3) some antibiotics was used shows their effects on *Lactobacillus* species in healthy women

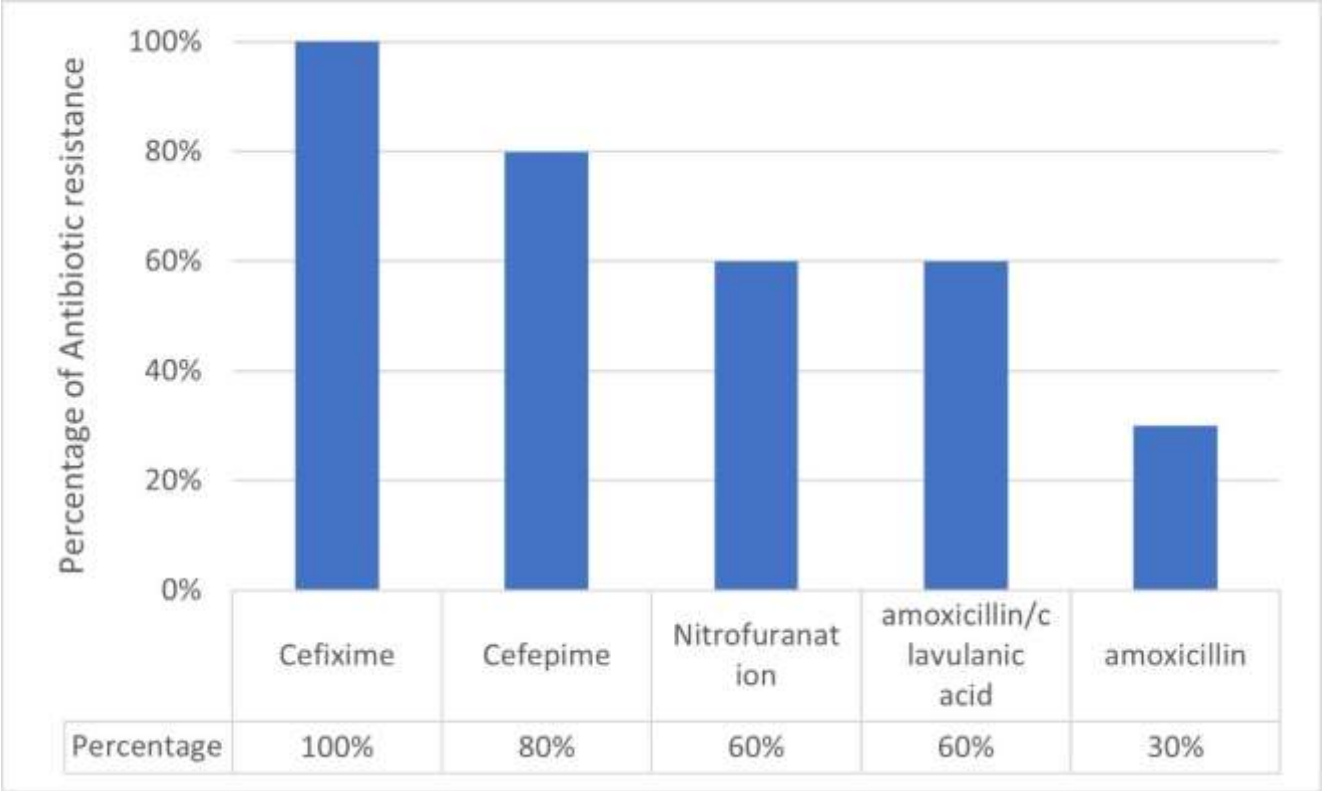

Figure (3):Percentage of Antibiotic Resistant among *Lactobacillus* spp. Isolates in healthy pregnant women

significant determinant of PTH levels in both early and late pregnancy. Education of the partner,multiparty, season, and outdoor activity were also statistically significant in early pregnancy, whereas country of origin was a statistically significant determinant of PTH in late pregnancy. Studies in the general population and in pregnant women have demonstrated an association between education and vitamin D levels, such that better education is associated with higher levels of vitamin D [12,13] .they observed a negative correlation between PTH and vitamin D concentrations, which is in agreement with findings of previous studies [14,15].

The effect of vitamin D on BV elimination can be explained by the impact of vitamin D on the immune system, especially in the localimmunity of the vagina. Cytokines were considered the main factor linking BV and vitamin D [16,17] .BV is most

Discussion

The present study sample age were among 16-45 years from pregnant women in Frist trimester .50 patient with bacterial vaganosis (BV) and 40 healthy women (non-BV). This study showed that a highly significant differences between BV and non-BV groups in relation to vitamin D level. P<0.001, BV 19.9±11.2, non-BV 33.7±14.8,and significant differences between BV and non-BV groups in relation to parathyroid hormone level, P<0.021,BV 32.7±13.5 ,non-BV 26.5±10.8

elevated PTH concentrations are an indicator of vitamin D deficiency; nevertheless, there are other factors that are involved in the physiological changes in PTH. Herein, we investigated other potential factors determining PTH concentrations using multiple regression models. These models indicated that 25(OH)D concentrations are a statistically

source of contention. These findings could be explained by one of two ways. To begin, BV-associated bacteria and multispecies BV biofilms may be implicated in the disease's possible pathogenic process [21].

In conclusion,highly significant of BV and vitamin Ddeficiency was found among firsttrimester pregnant women.We recommended that pregnant women monitor and control their vitamin D and BV levels.Early on in pregnancy, in health care centers due to the fact that both vitamin D and BV have a negative impact on the pregnancy outcome both mothers and children; additionally They cannot rely solely on vitamin D.for the treatment of BV

Ethical Clearance "All experimental protocols were approved by the Biology department, and they were carried out according to accepted parameters."

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common cause of vaginitis inreproductive age women with prevalence 16-16% 69BV has been suggested to associatewith Vitamin D deficiency 17. Many studiesconcluded that vitamin D has no effect onBV [18] .

This study is similar to ours [19] Lactobacillus casei was shown to be the most common Lactobacillus species in healthy women's vaginal samples. The ability to produce bacteriocin appears to be rare among Lb.casei isolated from vagina, and the agar well diffusion assay and disc method were considered sufficient for detecting bacteriocin production, indicating that bacteriocin production was best in broth medium compared to solid medium. The highest activity was observed against C.urealyticum and S.aureus, with no activity observed against E.coli and Ps.aeruginosa. Lb.casei was the greatest producer isolate, producing it in the broth media [MRS] used in this study. Other researchers discovered Lactobacillus spp. in vaginal samples [20]. Lactobacillus acidophilus, L. crispatus, L. gasseri, and L. iners were the vaginal Lactobacillus species studied in this study. Candida albicans, Gardenellavaginalis, Staphylococcus aureus, and Escherichia coli were among the urogenital pathogens isolated from vagina.

In healthy women and women with vaginosis, antibiotics were given to see how they affected Lactobacillus species. In this study, five antibiotics (Cefixime CFM(5), Cefepime FEP(10), Nitrofuranation F(100), AmoxicillinClavulanic acid AMC(30), Amoxillin AX(25) were used to investigate the effects of antibiotics on Lactobacillus isolates that gave positive pure cultures from women suffering from vaginitis and healthy women figure (3) The results showed that all Lactobacillus (10 isolates).The high rates of recurrence of BV after treatment with currently approved antibiotics has always been a

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