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Original Article

Correlation of Demographic Characteristics to Bone Calcium and Vitamin D in Patient taking Proton Pump Inhibitor (PPI)

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ABSTRACT

Proton pump inhibitor (PPI) works by blocking the hydrogen-potassium ATPase inhibitor H/K ATPase inhibitor located on gastric parietal cells. It blocks the last step of acid production that is why it is more potent and effective than other acid suppressants like H2 blockers, 99% of gastric acid secretion is reduced by using it. **Objective:** To evaluate Demographic characteristics of individuals using proton pump inhibitor (PPI) all over Sindh. **Methods:** The Quasi experimental study contained 227 young individuals of age 20-45years having acid peptic disease, dyspepsia. Study was taken place in Medicine OPDs of Jamshoro and Hyderabad at Civil Hospital and duration of study was from 15th March 2020 to 15th September 2020. All individuals taking proton pump inhibitor were excluded from study. Sampling technique was non-probability convenient sampling. SPSS version 21.0 software was used to analyze the data. The student paired t test was used at the confidence interval of 95%, apart from it the P-value is observed ≤ 0.05. **Results:** There was no effect on demographic characteristics of individuals using proton pump inhibitor (PPI) all over Sindh on serum calcium and vitamin D levels. Therefore, p-value was seen 0.7 for the serum calcium and 0.1 for Serum Vitamin D. **Conclusions:** In any group of age, gender, residential status there is no effect on serum calcium and vitamin D with use of proton pump inhibitor (PPI) for less than 6 months.

INTRODUCTION

The first drug amongst Proton pump inhibitor (PPI) which came in market was Omeprazole in 1988, which is the most effective, safest drug used and is in list of World Health Organization (WHO) for essential medicine [1]. PPIs became one of the most important acid blocking agents used. The second drug used amongst PPIs was Lansoprazole, which came in market for first time in 1991 [2]. With time, other drugs came in market like Pantoprazole, Rabeprazole, Esomeprazole and Dex lansoprazole. They are amongst the most sold and used agents. PPI is the only acid blocking agent used for treating the disease known as gastroesophageal reflux (non-erosive), erosive esophagitis disease, dyspepsia disease and the peptic ulcer disease because of its efficacy and potency. However, overuse of it is examined as an immediate result of absence of determination of need for steady treatment in many outdoor subjects. Prolonged usage expands the rate of financial overburden and multiple minerals and deficiencies of vitamin [3]. The action procedure of proton pump inhibitor is to block hydrogen potassium ATPase enzyme that is present in parietal cells of mucosa in stomach, which behaves superintend for secretion of hydrogen ion in interchange of potassium ions in of stomach [4]. Proton pump inhibitor PPI, rational and irrational uses are yet increasing. Proton pump inhibitor PPI therapy was received by 8% of patients admitted in London hospital, while in Vliet *et al.*, about 43% of the admitted patients were having it throughout the period hospitalization in 2008 [5, 6]. In 2011, Sadaf *et al.*, 51 % of patients were taking proton pump inhibitor PPI without any

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specific symptom [7]. One study at Karachi hospital showed 47.2% of the patients were prescribed this drug on their discharge card. In 2013, Haroon *et al.*, 79% of the patients were prescribed proton pump inhibitor PPI that shows climbing utilization of proton pump inhibitor PPI [8, 9]. Most of studies, had crucial limitations, that includes the retrospective plan, the inability to complete control the prime potential confounder, the small number of the sample size, independent groups at the risk (age older than eighteen years/the post-menopausal in females and males individuals), retrospective consequence (fracture) ascertainment and less description on proton pump inhibitor PPI exhibition [10-12]. The main objective of the study is to estimate different demographics characteristics in those discrete who are using proton-pump inhibitor.

METHODS

The study was conducted in out-patient departments (OPDs) of Jamshoro and Hyderabad, Liaquat University Hospital, Medicine department. Study design used was quasi-experimental study. The study had a total of 227 young individuals which was calculated by using Cochran's formula as represented in Equation 1, having ages of 20-45 years. The inclusion criteria were those having age 20-45 years, those who are not on PPI, and those having acid-peptic disease and dyspepsia. The exclusion criteria were those previously taking PPI. Non-probability convenience sampling technique was used. The Statistical Package of Social Sciences (SPPS) version 21.0 was used to analyze the data.

$$\text{Cochran's formula } [n_o = \frac{z^2\, p\, q}{e^2}]$$

RESULTS

During six months duration of study, a total of 227 individuals were studied for their consequences of Proton Pump Inhibitor (PPI). Age distribution of patients done, it showed that 17.6 % (n=40) were between 20-29 years, while 35.7% (n=81) were between 30-39 years, 46.7 % (n=106) were between 40-45 years. Gender distribution showed that 31.7 % (n=72) were males and 68.3 % (n=155) were females. Residential status of patients was recorded which shows that 47.1 % (n=107) were urban and 52.8 % (n=120) belongs to rural area. Mean BMI was 21.6 ± 0.38 as shown in table 1.

Table 1: Demographic Characteristics before of PPI

Variables		Percentage
Age of Individuals in Study	20 – 29 years	17.6 %
	30 – 39 years	35.7 %
	40 – 45 years	46.7 %
Gender of Individuals in Study	Male	31.7 %
	Female	68.5 %
Residential Status of Individuals	Urban	47.1 %
	Rural	52.8 %
BMI		21.6 + 0.38
Duration of PP		5.5 Months
Serum Calcium		9.0 ± 0.25
Serum Vitamin D		50 ± 3.15

The mean + SD of serum calcium after use of Proton Pump Inhibitor (PPI) is 8.9 + 0.26 and 48.2 + 4.16 was for serum vitamin D as shown in table 2.

Table 2: Demographic Characteristics after Use of PPI

Variables		Percentage
Age of Individuals in Study	20 – 29 years	17.6 %
	30 – 39 years	35.7 %
	40 – 45 years	46.7 %
Gender of Individuals in Study	Male	31.7 %
	Female	68.5 %
Residential Status of Individuals	Urban	47.1 %
	Rural	52.8 %
BMI		21.6 + 0.38
Duration of PP		5.5 Months
Serum Calcium		8.9 ± 0.26
Serum Vitamin D		48.2 ± 4.16

The p-value of the chi square test is 0.7 for serum calcium and 0.1 for serum vitamin D. Therefore, study showed no effect on demographic characteristics having PPI as shown in table 3.

Table 3: P-value Before and After Use of PPI

Variables	p-value
Serum Calcium	0.7
Serum Vitamin D	0.1

DISCUSSION

Proton pump inhibitor PPI is the only acid blocking agent used for treatment of gastroesophageal reflux disease (non-erosive), erosive esophagitis, dyspepsia and the peptic ulcer disease because of its efficacy and potency [13]. In a survey, frequent use of proton pump inhibitor leads to failure of proper use of it in numerous outdoor patients. Prolonging the usage of it raises the rate of burden in terms of finance and multiple minerals and the deficiencies of vitamin [14, 15]. Our s6tudy focused on evaluate Demographic characteristics of individuals using proton pump inhibitor (PPI) all over Sindh. And find the association of these characteristics with the use of Proton Pump Inhibitor (PPI). We found the level of serum Calcium and Serum Vitamin D levels and compared the results before and after the use of PPI. All subjects selected in our study in age were young so, there was no significant possibility of fractures by diminishing levels of serum calcium and serum vitamin D levels following use of Proton Pump Inhibitor (PPI), although the risk rises in elder individuals as seen in study of Elaine *et al.*, which showed

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that Proton pump inhibitor PPI use in elderly individuals for longer duration and reduce intake of calcium, causes significant fractures other than spine [16, 17]. In our study, Proton Pump Inhibitor (PPI) did not have influence on serum calcium and serum vitamin D levels where, p-value was calculated 0.7 for calcium before and after use of Proton Pump Inhibitor (PPI) while, the p-value 0.1 that is calculated for serum vitamin D. Wright *et al.*, exhibit that there is no crucial variation in absorption and excretion of calcium regardless of utilization of Proton Pump Inhibitor (PPI) or not, a study conducted over serum calcium and urinary calcium excretion [18]. In our study, the results are aided by a study that manifests hypochlorhydria leads to Proton pump inhibitor PPI decline calcium absorption [19, 20].

CONCLUSIONS

In any group of age, gender, residential status there is no effect on serum calcium and vitamin D with use of Proton Pump Inhibitor (PPI) for less than 6 months.

Authors Contribution

Conceptualization: YM
Methodology: TZS
Formal analysis: IK
Writing, review and editing: IAS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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