

Survey of Hypocalcaemia Frequency in District Lahore, Pakistan

Anam Javed^{*a}, Hafiz Imran Hashmi^b, Aiman Shahid^c, Sidra Mehmood^d, Saba
Khurshid^e

^aAssistant Professor of Zoology, School of Zoology, Minhaj University, Lahore, Pakistan

^{b,c,d}BS Researcher, School of Zoology, Minhaj University, Lahore, Pakistan

^aEmail: dranam.zoology@mul.edu.pk

^bEmail: hashmihafizimran@gmail.com

^cEmail: aimanshahidfts@gmail.com

^dEmail: sidramehmood80@gmail.com

^eEmail: sabakhurshid80@gmail.com

Abstract

Calcium is important for regulation of various physiological functions like bones, teeth, different types of muscular movements, blood pressure, body growth and maintenance. But continuous calcium deficiency may cause hypocalcaemia in which major cause is insufficient intake of calcium along with other pathological states, financial constraints and lack of general public awareness about the significance and physiological role of calcium. Statistical analysis on the basis of current survey indicates that females remain malnourished and suffer from hypocalcaemia more than males. That's why; there is urgent need of organized efforts for general public awareness from government and private platforms. Moreover, future researchers should introduce better diagnosis techniques and economical dietary sources and treatments to reduce frequency of hypocalcaemia.

Keywords: Calcium; hypocalcaemia; public awareness; malnourished; economical dietary sources.

1. Introduction

Calcium is integral mineral for proper functioning of not only of bones, teeth, muscular movements, blood pressure regulation but also for normal cardiac, nervous and endocrine activities along with vitamin D [1]. That's why; for growth and maintenance, regular intake of calcium having diet is essential for infants to older ones [2,3].

* Corresponding author.

Moreover, dietary deficiencies may lead to depletion of stored calcium in the bones, which often results in osteoporosis [5]. Another cause of hypocalcaemia is in take of medications, such as diuretics, medical treatments e.g., renal failure and hypo-parathyroidism [2]. It is also common observation that due to aging, people of age 30 and above, gradually lose bone density due to hypocalcaemia which can be initially characterized by tetany, muscle cramps, numbness and tingling in the limbs. Whereas later signs of calcium deficiency can be seen as skin dryness, fragile nails and tooth decay, moreover, in females prominent signs of hypocalcaemia include disturbances in menstrual cycle like more cramping and a change in menstrual flow. In case of severe calcium deficiency, osteomalacia, rickets, minor and even sometimes major fractures occur [4-6]. Thus calcium deficiency is a worldwide problem and recent research more precisely highlights that initial stage of this deficiency may lead to metabolic alterations and potential pathological changes but accurate diagnosis of hypocalcaemia is difficult so far [7]. That’s why; this survey was conducted to investigate the frequency of hypocalcaemia and level of general public awareness in Lahore.

2. Methodology

Table 1: Survey Performa for estimation of hypocalcaemia frequency in Lahore, Pakistan

| Name | | | | |
|---|-------------|-------------|-------------|-------------|
| Age | 15-25 yrs | 26-35 yrs | >50 yrs | <50 yrs |
| Gender | | | Female | Male |
| Monthly Income | 15000-25000 | 26000-40000 | 41000-60000 | 60000-above |
| Already on medication for other health issues | | | Yes | No |
| Symptoms | | | Yes | No |
| Minor fracture of bones | | | | |
| Muscles cramps | | | | |
| Weak and brittle nails | | | | |
| Shrinking of hands | | | | |
| Dental problems | | | | |
| Weak tooth roots | | | | |
| Dry skin | | | | |
| Extreme Fatigue | | | | |
| Spots on skin | | | | |
| White spot on nails | | | | |
| Spots on teeth | | | | |
| Pain in limbs due to movement | | | | |
| Alopecia | | | | |

This study was a cross-sectional descriptive survey of 85 persons who were residents of various areas

(Township, Johar Town, Model Town, Mughal Pura, Ghazi Road, Thukar, Shahdra, Bhatta Chowk, Service Hospital, Chungi Amar Sidhu and Kotlakhpat) of Lahore, Pakistan. In sample of this design, patients of hypocalcaemia were observed and they were divided in of four age groups: group 1 (15-25yrs), group 2 (26-35yrs), group 3 (36-50) and group 4 (more than 50yrs). A questionnaire was designed to assess the knowledge, attitude, and practices of hypocalcaemia patients along with corresponding demographic variables (Table 1). ANOVA test was used for statistical analysis [15]. The study was approved by the ethical committee of Minhaj University Lahore. Informed verbal consent was taken from each eligible participant before administration of the questionnaire. Willing participants were informed in detail by the investigators about the research project and its consequences. The investigators asked the questions verbally in Urdu and filled out the form. Privacy of the patients was ensured during filling of questionnaires [8].

3. Results & Discussion

Though Lahore is one of the most populated cities of Pakistan but broad spectrum variations in living standers also exist. These variations also affect the health of people either directly or indirectly. That’s why; this survey was conducted to highlight etiology of an important general public health issue of calcium deficiency and to point out the need of general public awareness and introduction of low cost alternatives for poor people to avoid hypocalcaemic state which usually remains untreated due to financial crisis and lack of awareness. The obtained results showed that during walk and movement pain in arms and legs (55.29%) is the most frequently symptom of calcium deficiency in people. Similarly, the occurrence ratio of muscle cramps (47.05%), fatigue (47.05%) and skin dryness (42.35%) is also found much higher (Table 2).

Table 2: Frequency of hypocalcaemia symptoms in Lahore, Pakistan

| Symptoms | No. of affected persons | Percentage (%) |
|-------------------------|-------------------------|----------------|
| Minor fracture of bones | 14 | 16.47 |
| Muscles cramps | 40 | 47.05 |
| Weak and brittle nails | 23 | 27.05 |
| Shrinking of hands. | 23 | 27.05 |
| Dental problems | 31 | 36.47 |
| Weak tooth roots | 32 | 37.64 |
| Dry skin | 36 | 42.35 |
| Extreme Fatigue | 40 | 47.05 |
| Spots on skin | 26 | 30.58 |
| White spot on nails | 24 | 28.23 |
| Spots on teeth | 22 | 25.88 |
| Pain in limbs | 47 | 55.29 |
| Alopecia | 17 | 20.00 |

Whereas statistical analysis of gender based data presents much higher ration of calcium deficiency in females than males (Table 3) and reported data shows that females usually remain malnourished than males due to social

gender differences and norms though sunlight exposure is sufficient in Pakistan which is also a good source of vitamin D but still considerable percentage of people is suffering from calcium deficiency [9].

Table 3: Frequency of Hypocalcaemia according to gender

| Males | Females |
|----------------|------------------|
| 2.9091 ± 0.547 | *4.8182 ± 0.6441 |

*Values of means ± S.E.M. Data of respective columns were compared by employing ANOVA and significant difference was found at 0.05% probability level. According to age comparison, it was noticeable that out of 85 patients, 40 patients were falling in age group 1 whereas 31 patients in group 2, 06 patients in group 3 and 08 patients in group 4 (Figure 1). So it cannot be ignored that hypocalcaemia is more frequently reported among youngsters than older ones. It is again mainly due to intake of calcium deficient diet and lack of awareness [10]. In this regard, economic status was also potent cause of this disorder, hypocalcaemic patients were of monthly earning up to 25,000 pkr (43.53%), up to 40,000 pkr (34.12%), up to 60,000 pkr (15.3%) and more than 60,000 pkr (7.06%). It is clear that people with financial crisis are more prone to calcium deficiency based complications [11].

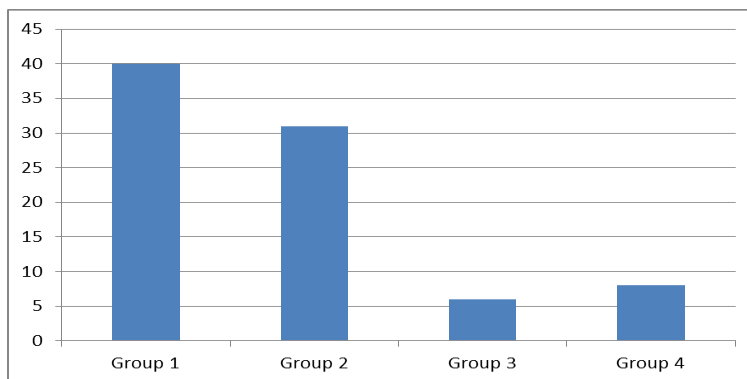


Figure 1: Graphical comparison of hypocalcaemia patients according to age

During etiological survey of calcium deficiency, another cause was noticed that patients who are already undergoing some other medical treatments may also face hypocalcaemia [12] and current survey showed such cases up to 46.7%. Furthermore, when public awareness level and trend of hypocalcaemia recovering medication intake was observed then only 26.5% patients told that they take proper medicine to recover calcium deficiency whereas rest of 73.5% were found still unaware that why this disorder should be resolved soon and what are the possible long lasting effects, if it is left untreated [13].

4. Conclusion

This etiological survey of hypocalcaemia indicated major two contributory factors: general public unawareness [14] and financial constraints, that’s why; people maximum ignore this serious health issue. But awareness campaigns from government and various NGOs are urgently required to control the frequency of hypocalcaemia. Similarly, organized efforts regarding provision of economical dietary sources to masses are

also required.

5. Future perspective

Further steps should be taken by the government/non-government organizations for personal health care public awareness by not ignoring the initial symptoms of hypocalcaemia and researchers [14] should introduce appropriate diagnosis tools and quick cures to control this disorder.

Acknowledgements

This collaborative scientific effort was solely performed by Dr. Anam Javed, Hafiz Imran Hashmi, Aiman Shahid, Sidra Mehmood and Saba Khurshid without funding support by any authority or organization.

References

- [1]. P. Yao, D. Bennett, M. Mafham, X. Lin, Z. Chen, J. Armitage and R. Clarke. "Vitamin D and calcium for the prevention of fracture: a systematic review and meta-analysis". JAMA network open, vol. 2(12), pp. e1917789-e1917789. 2019.
- [2]. A.C. Kawalkar. "A comprehensive review on osteoporosis". J Trauma, vol. 10, pp. 3-12. 2015
- [3]. V. Bhatia. "Dietary calcium intake-a critical reappraisal." Indian Journal of Medical Research, vol. 127(3), pp. 269. 2008.
- [4]. Pravina, Pieste, D. Sayaji, and M. Avinash. "Calcium and its role in human body." International Journal of Research in Pharmaceutical and Biomedical Sciences, vol. 4(2), pp. 659-668. 2013.
- [5]. M. Harrison and R. Fraser. "Bone structure and metabolism in calcium-deficient rats." J Endocrinol, vol. 21, pp. 197-205. 1960.
- [6]. B. E. C. Nordin. "Osteomalacia, osteoporosis and calcium deficiency." Clinical Orthopaedics and Related Research®, vol. 17, pp. 235-258. 1960.
- [7]. M. Wang, X. Yang, F. Wang R. Li, H. Ning, L. Na, Y. Huang, Y. Song, L. Liu, H. Pan and Q. Zhang. "Calcium-deficiency assessment and biomarker identification by an integrated urinary metabonomics analysis". BMC medicine, vol. 11(1), pp.1-18. 2013.
- [8]. K. M. Mirza, A. A. Khan, M. M. Ali and S. Chaudhary. "Oral health knowledge, attitude, and practices and sources of information for diabetic patients in Lahore, Pakistan". Diabetes care, vol. 30(12), pp. 3046-3047. 2007.
- [9]. R. Iqbal and A. H. Khan. "Possible causes of vitamin D deficiency (VDD) in Pakistani population residing in Pakistan". J Pak Med Assoc, vol. 60(1), pp. 1-2. 2010.
- [10]. M.Z. Mughal. "Bone Health in Immobile Adolescents". In: S. Pitts and C. Gordon (eds), A Practical Approach to Adolescent Bone Health. Springer, Cham. 2018. https://doi.org/10.1007/978-3-319-72880-3_12
- [11]. S. Puranik, J. Kam, P. P. Sahu, R. Yadav, R. K. Srivastava, H. Ojulong and R. Yadav. "Harnessing finger millet to combat calcium deficiency in humans: challenges and prospects". Frontiers in plant science, vol. 8, pp. 1311. 2017.
- [12]. K. M. H. Gallant and D. M. Spiegel. "Calcium balance in chronic kidney disease". Current

osteoporosis reports, vol. 15(3), pp. 214-221. 2017.

- [13]. A. Rouf, S. Clayton and M. Allman-Farinelli. "The barriers and enablers to achieving adequate calcium intake in young adults: a qualitative study using focus groups". *Journal of Human Nutrition and Dietetics*, vol. 32(4), pp. 443-454. 2019.
- [14]. A. Javed, S. M. Haider, N. Akram and M. Usman. "Epidemiology of onychomycosis in Gujranwala division-Pakistan". *American Scientific Research Journal for Engineering, Technology, and Sciences*, vol. 58(1), pp. 113-117. 2019.
- [15]. M. Kozak and H. P. Piepho. "What's normal anyway? Residual plots are more telling than significance tests when checking ANOVA assumptions". *Journal of Agronomy and Crop Science*, vol. 204(1), pp. 86-98. 2018