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OPTIMIZING VITAMIN D3 MANAGEMENT: INSIGHTS FROM A RETROSPECTIVE ANALYSIS AT KING HUSSEIN MILITARY HOSPITAL IN THE JORDANIAN ROYAL MEDICAL SERVICES

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ABSTRACT

Introduction: Vitamin D3 is vital for skeletal health as it regulates calcium and phosphorus metabolism, essential for bone development and maintenance. Beyond its skeletal role, Vitamin D3 has been associated with various non-skeletal health outcomes including its involvement in immune system modulation, cardiovascular health, and reducing the risk of chronic diseases such as certain cancers and autoimmune disorders. Recognizing the broader implications of Vitamin D3 deficiency is crucial for developing effective healthcare strategies to promote overall well-being.

Objective: This study aims to provide a comprehensive analysis of Vitamin D3 status among patients at King Hussein Military Hospital in the Jordanian Royal Medical Services (JRMS) in 2021, with a specific focus on treatment modalities.

Methodology: A retrospective analysis of Vitamin D3 lab results from 1275 patients obtained from the medical records on Hakeem Health System used in JRMS will be conducted, classifying individuals into deficiency, insufficiency, sufficiency, or inconclusive categories based on laboratory findings. Subsequently, the prescription patterns of Vitamin D3-related medications will be examined among those patients and simple statistical analyses will be used to identify the prevalent treatments patterns for those patients.

KEYWORDS: Vitamin D3, Retrospective Analysis, Alfacalcidol, Cholecalciferol, Treatment Patterns.

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1. INTRODUCTION:

Vitamin D3, a vital hormone plays a crucial role in regulating calcium homeostasis and bone health, has gained significant recognition for its diverse functions in promoting general health. The incidence of vitamin D deficiency or insufficiency among patients is a major cause for concern because of its linkage to a variety of medical diseases, including immune system regulation and bone disorders. In light of this, it is critical to comprehend the complex terrain of vitamin D3 therapy[1].

This study focuses on King Hussein Military Hospital, which is part of the Jordanian Royal Medical Services (JRMS). The chance to explore the complexities of vitamin D3 management in great detail is made possible by the distinct demographic and clinical profile of the patients in this particular healthcare setting. By removing the veil from the vitamin D3 treatment protocols at King Hussein Military Hospital, this research hopes to clarify the frequency of vitamin D3 deficiency and the effectiveness of recommended drugs.

Understanding the wider effects of vitamin D3 deficiency is crucial. Beyond its traditional function in bone metabolism, new research points to connections between vitamin D3 and a number of health outcomes, including as immune system performance, cardiovascular health, and mental wellbeing. Consequently, a thorough investigation of vitamin D3 therapy procedures entails a voyage into the complexities of comprehensive patient care rather than just a study of a single clinical facet[2].

The importance of this research goes beyond scholarly interest since it directly tackles the clinical necessity of improving patient outcomes and customizing interventions to the particular healthcare environment at King Hussein Military Hospital. This study aims to improve the quality of healthcare delivery within the JRMS by identifying patterns in vitamin D3 status and treatment responses. Ultimately, we hope to contribute to the improvement of clinical protocols and evidence-based practices.

2. METHOD:

2.1 Study Design: The Hakeem Health System electronic medical records of patients treated in 2021 at King Hussein Military Hospital under the Jordanian Royal Medical Services (JRMS) are the rich source of data used in this retrospective investigation. The utilization of a retrospective approach facilitates an in-depth examination of past patient information, offering a comprehensive perspective on vitamin D3 treatment trends throughout the research duration. The purpose of this study is to identify patterns, trends, and variances in the way that the hospital manages vitamin D3 deficiencies in the various patient populations it serves.

2.2 Participants: This study guarantees a representative sample of the wide range of clinical and demographic features seen at King Hussein Military Hospital with 1275 patients in the cohort. Inclusion criteria encompassed patients across various medical conditions, emphasizing the comprehensive nature of this investigation.

2.3 Data Collection: Data retrieval from electronic medical records spanned a defined timeframe (the year 2021). We carefully examined patient records to identify specific information like vitamin D3 levels and recommended drug types.

2.4 Data Analysis: To extract valuable information from the collected data, statistical analyses were carried out. Descriptive statistics facilitated the creation of Table 1, which shows the distribution of patients based on vitamin D3 status. Additionally, Table 2 also provides information on the medications prescribed to patients with low vitamin D3 levels.

Table 1: The distribution of patients based on vitamin D3 status

Vit.d3 Result	Number of Patients
Deficiency	478
Insufficiency	195
Sufficiency	250
Inconclusive	352
Total	1275

Table 2:The information on the medications prescribed to patients with low vitamin D3 levels

Prescribed Medication	Number of Patients
Alfacalcidol	42
Cholecalciferol	498
No Medications	133
Total Patients with Low Vit.D3	673

3. RESULTS:

3.1 Vitamin D3 Status (Table 1): The analysis of vitamin D3 status among the 1275 patients at King Hussein Military Hospital unveils a nuanced picture of the prevalence of deficiencies and insufficiencies. Of the total patient cohort, 478 (37.49%) exhibited a deficiency, while 195 (15.29%) showed insufficiency. Furthermore, 250 patients (19.61%) demonstrated sufficient vitamin D3 levels, and 352 (27.61%) yielded inconclusive results (Figure 1, Table 1). These figures lay the foundation for a comprehensive understanding of the extent and distribution of vitamin D3 issues within the patient population at King Hussein Military Hospital.

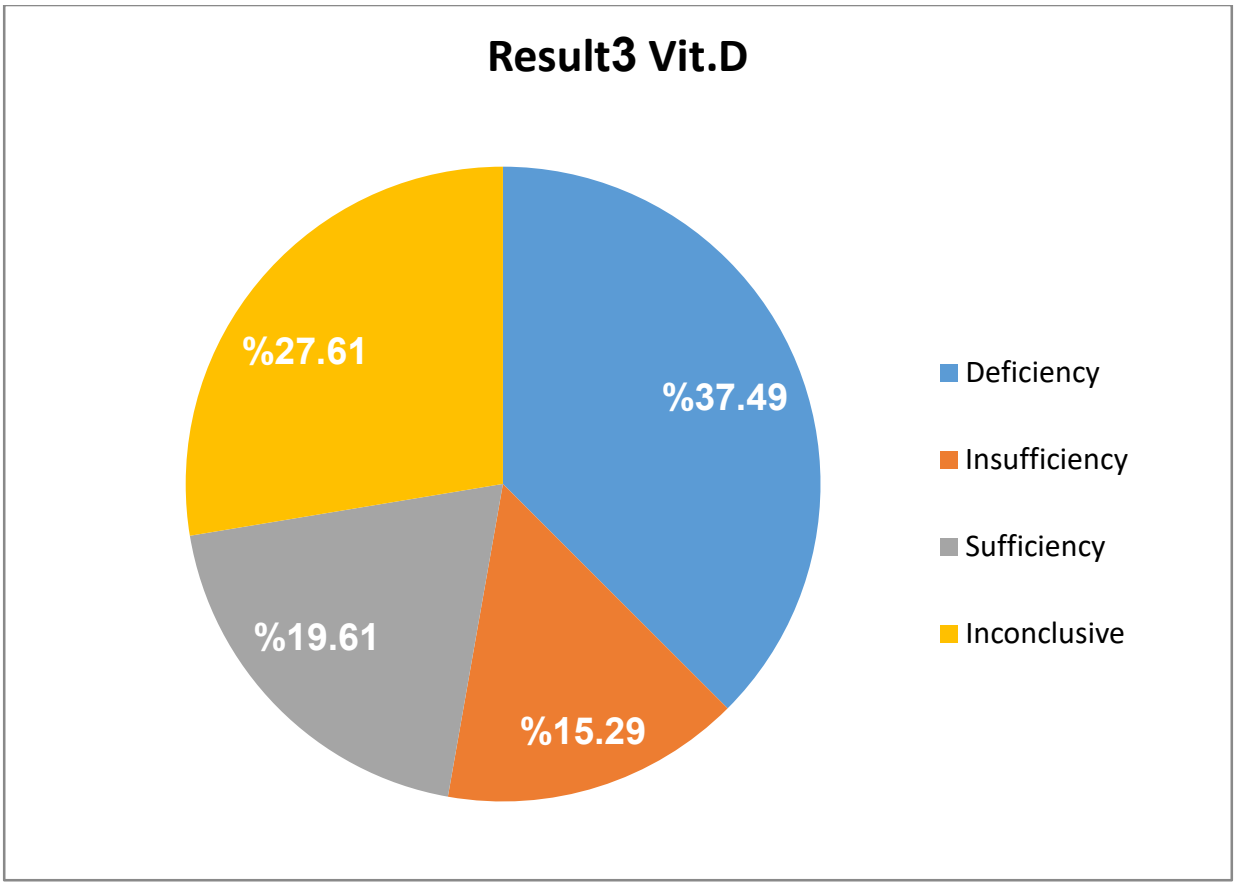

Fig 1: The distribution of Vitamin D3 among study participants according to its status

3.2 Medications Prescribed (Table 2): Focusing on patients with low vitamin D3 levels (673 individuals), the analysis of prescribed medications reveals intriguing patterns. Among this subset, 42 patients (6.24%) were prescribed Alfacalcidol, 498 patients (74.00%) received Cholecalciferol, and 133 patients (19.76%) were not prescribed any medications (Figure 2, Table 4). These percentages elucidate the prescribing practices within the context of vitamin D3 management at King Hussein Military Hospital.

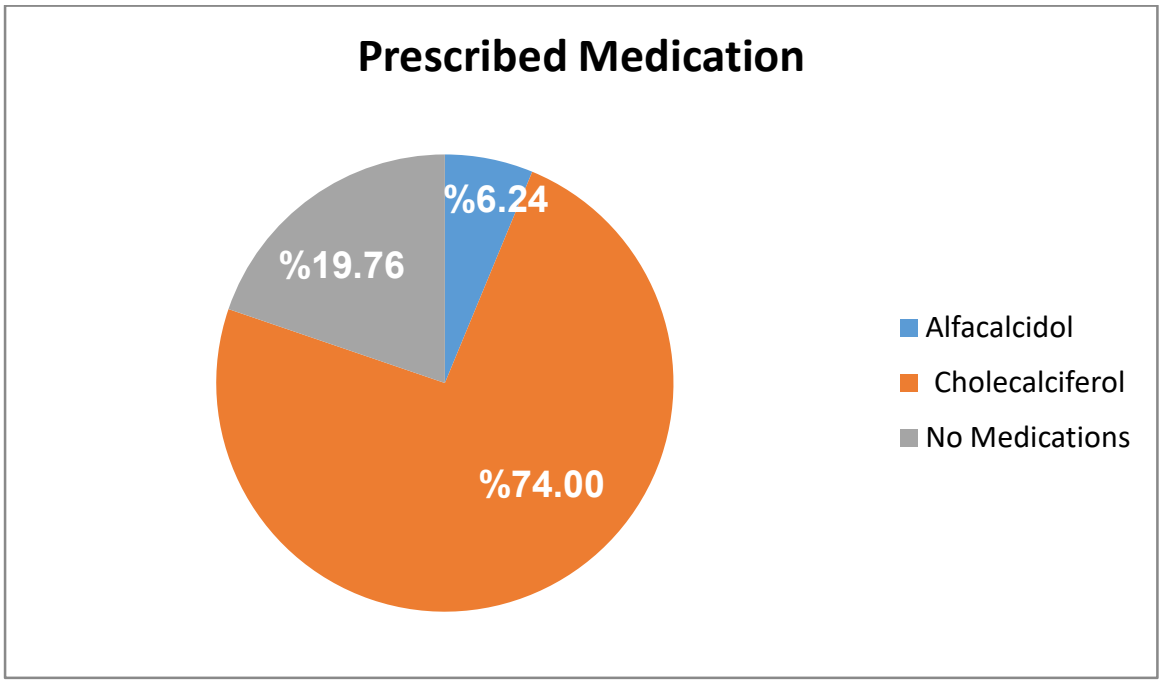

Fig 2: the frequency of prescribed medications for patients with Vitamin D3 deficiency

In addition to highlighting the frequency of vitamin D3 issues the thorough examination of Tables 1 and 2 enables a comprehensive investigation of the therapeutic approaches used. A more thoughtful discussion of the implications of these findings will be possible thanks to the calculated percentages, which offer a mathematical foundation for comprehending the distribution of vitamin D3 status and treatment approaches.

4. DISCUSSION:

4.1 Vitamin D3 Status: The prevalence of vitamin D3 insufficiencies and deficiencies, as shown by our findings, highlights a significant health issue that King Hussein Military Hospital patients deal with. The significant proportion of individuals experiencing both deficiency (37.49%) and insufficiency (15.29%) is consistent with worldwide concerns regarding inadequate levels of vitamin D3, underscoring the necessity of focused interventions. The patterns that have been found may be explained by dietary habits and lifestyle factors, as well as geographic considerations like inadequate sun exposure. In order to design region-specific strategies for addressing vitamin D3 shortages, it is imperative to investigate these aspects within the local context[3,4].

A particular difficulty is presented by the inconclusive results for 27.61% of patients. To increase the precision of diagnostic processes and optimize treatment regimens, further research is necessary to determine the causes of those ambiguous results, such as assay variability or patient-specific characteristics.

4.2 Medications Prescribed: Notable trends in clinical practice are evident in the prescribed drugs for individuals with low vitamin D3 levels. The most common treatment option is cholecalciferol, which is recommended for 74.00% of patients with insufficient vitamin D3. This is consistent with cholecalciferol's well-known function as an effective and popular vitamin D supplement[5]. However, a closer look is warranted given that Alfacalcidol is used in only 6.24% of instances.

Alfacalcidol, as an active vitamin D3 analog, is often employed in situations where rapid correction of vitamin D3 deficiency is imperative. Alfacalcidol's restricted use may indicate the necessity for a more patient-specific treatment plan that takes the urgency of vitamin D replenishment into account[6,7]. The significant proportion (19.76%) of patients with low vitamin D3 who are not on any medication raises concerns about how well-informed healthcare professionals are about the significance of treating vitamin D3 deficits. Targeted education initiatives to improve healthcare personnel knowledge of the therapeutic importance of vitamin D3 and its effect on patient outcomes may prove beneficial for future interventions[8,9].

4.3 Clinical Implications: Our findings have far-reaching consequences that go beyond statistical subtleties and touch on the core of clinical

decision-making. Due to the high frequency of vitamin D3 deficiencies, a multimodal strategy is required, involving regular monitoring of at-risk groups, dietary supplementation, and public health campaigns to increase awareness. Optimizing treatment outcomes necessitates customizing therapies according to patient demographics, lifestyle factors, and the severity of insufficiency[10].

In summary, this discussion attempts to place the numerical results in the larger context of healthcare delivery in addition to providing an interpretation of the data. This debate seeks to contribute to the continuing conversation about the best patient care within the JRMS, guide future clinical initiatives, and educate policy decisions by examining the implications of vitamin D3 deficits and treatment approaches.

5. CONCLUSIONS:

The findings of our study underscore the importance of including vitamin D3 evaluation in standard clinical practice, particularly for patients who have health problems that increase their risk of deficiency. An effective clinical approach must include the implementation of targeted strategies for prompt correction in cases of severe deficiency and the assurance of proper follow-up[11].

This study lays the foundation for future investigations. Studies that follow patients over an extended period of time may offer valuable insights into the dynamic nature of vitamin D3 levels and the efficacy of continuous therapies. Additionally, to fully address the complex variables causing vitamin D3 deficits, cooperation between healthcare professionals, policymakers, and the community is crucial.

LIMITATIONS OF THE STUDY:

While our study offers insightful information, there are certain drawbacks. The single-center approach might not adequately represent the diversity of the Jordanian population, and the retrospective nature restricts our ability to demonstrate causation. The generalizability of our findings would be improved by additional research using a prospective, multicenter design and a more thorough investigation of patient-specific factors impacting treatment outcomes.

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