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Quality Improvement Report

Overview of proper co-ordering of vitamin D injection for a vitamin D deficient patients who were prescribed vitamin D injection in Al Thumama Health Centre July -September 2021 Doha/Qatar

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Abstract
Reviewing the vitamin D deficiency prevalence in Qatar and main gate for treating patient is primary care health centers we noticed a deficiency in co ordering D to be executed by nurses after prescribing it and its dispense through the pharmacy, such a need complaint from physician was at the time of data collections in Al Thumama Health center % and after implementing certain changes this compliance improved to above the aim of 80% precisely 100% on post trial PDSA cycle 2.

Problem
Discrepancy between the treating doctors prescribing vitamin b12 injection in vitamin D deficient patient and co-ordering of the injection so the treatment room staff will have the green light for pursuance to vitamin injection to the patient taking in consideration highly prevalence deficiency among various patients demographics and diagnoses knowing that having a prescription order is not enough to be administered to the patient by the staff.

Background

Overt vitamin D deficiency, characterized by hypocalcemia and/or hypophosphatemia and rickets and osteomalacia in children and osteomalacia in adults, is now uncommon in most developed countries However, subclinical vitamin D deficiency occurs even in developed countries and is associated with osteoporosis and possibly fractures. Vitamin D stores decline with age, especially in the winter[1-3].

In temperate areas such as Boston and Edmonton, for example, cutaneous production of vitamin D virtually ceases in winter[4].

Thus, identification and treatment of vitamin D deficiency is important for musculoskeletal health and possibly even extra skeletal health, including the immune and cardiovascular systems.

Giving the long hours of sunlight in Qatar and other regions of the Middle East, vitamin D deficiency has been rising. In parallel, the prevalence of metabolic syndrome has also been increasing in Qatar. Vitamin D levels have been associated with metabolic syndrome but the data are inconsistent and no studies have addressed these inter-relationships in a Middle Eastern population where the prevalence of these conditions is high. The objective is to investigate

the prevalence of vitamin D deficiency and its association with metabolic syndrome and its components in the Qatar Biobank population. A cross-sectional study of 1205 participants (702 women and 503 men) from the Qatar Biobank, comprising Qataris and non-Qataris between the ages of 18 and 80 years, was used to perform multivariate linear regression analyses to examine the association between metabolic syndrome and prevalence of vitamin D deficiency (defined as <20 ng ml^{-1} serum vitamin D levels) adjusting for age, sex, ethnicity, season of blood collection, physical activity and education. Odds ratios and 95% confidence intervals were calculated for all analyses.

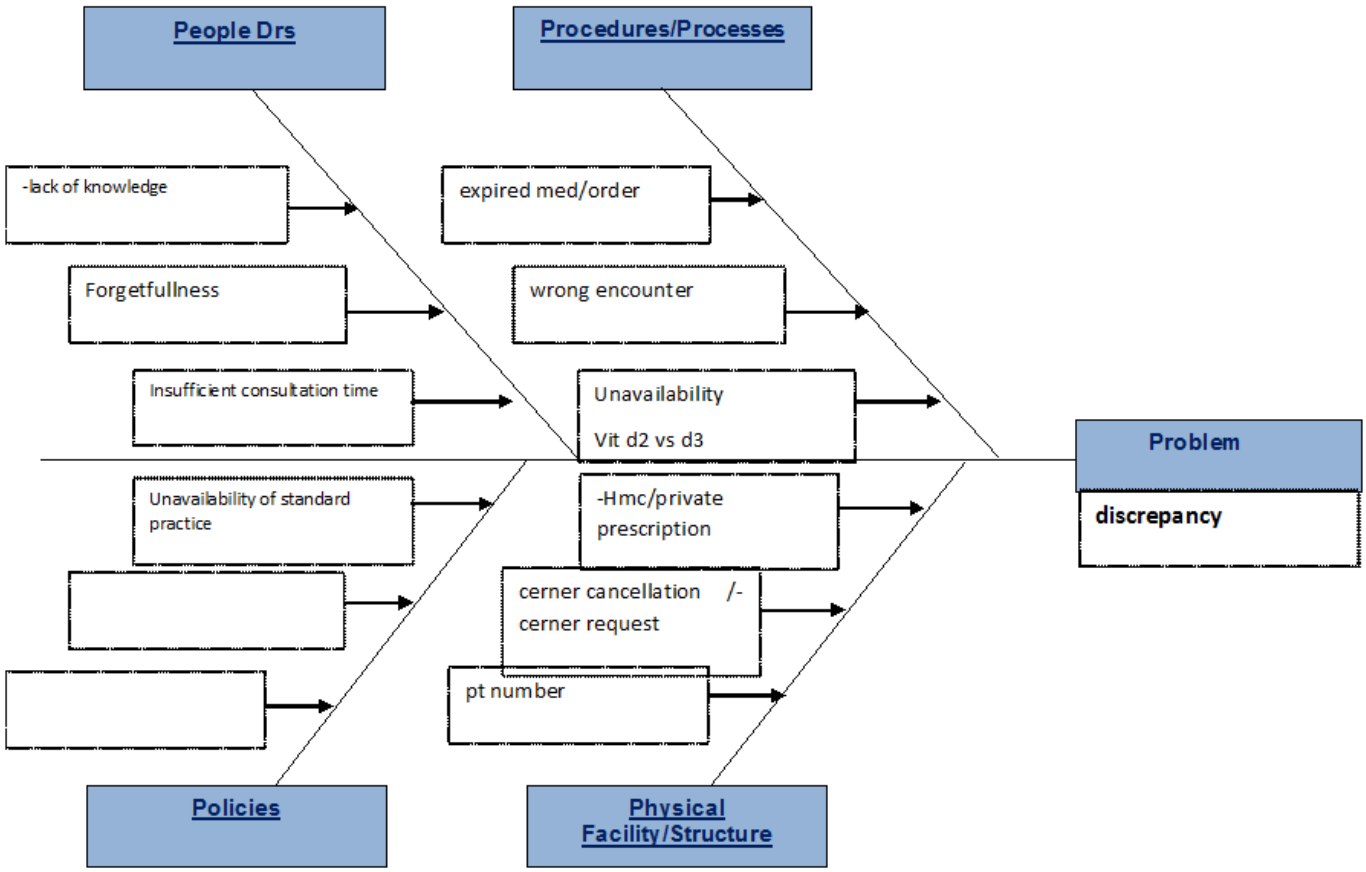
The results**:** showed Approximately 64% of participants were vitamin D deficient (<20 ng ml^{-1}) with more men being deficient (68.6%) than women (61.3%). Serum vitamin D was 8% lower in individuals with metabolic syndrome (RR: 0.92, 95%CI: 0.87-0.98, P-value: 0.01) compared to individuals without metabolic syndrome. Waist circumference and HDL as well as high triglyceride levels were also significantly positively associated with vitamin D deficiency. No association was found between the other components of metabolic syndrome or diabetes and the presence of vitamin D deficiency.[5]

Principle Considerations

Challenges that stakeholders faced in current workflow

Prior to commencement of the project, we interviewed stakeholders to identify challenges faced workflow (Below is a summary of the key concerns from each stakeholder group).

1. Doctors —
2. Nurses —
3. Pharmacist —
4. Cerner System —



Measurement

This quality improvement project was performed with an aim to optimise

Prescription-adminstration of D injection orders by drs in al thumama health centre

Two data collection forms were created for both phases of the project:

Pretrial phase and trial phase. The pretrial phase involved collecting available data of prescribed vitamin on cerner medical records July-sep 2021 Al Thumama H.C. The post-trial phase was used to evaluate the 'dual prescription/in office order after changes implemented on December 2021 same in the health centre).

All individual stakeholders were asked to keep a log book for missing order cases-nurses, pharmacist- and regular reminders for physicians were done, Cerner team proposal of automatic in office order request to be signed by prescribing physician with every injection prescribed .

Design

The 'new' workflow was designed with the aim to minimize missing orders and to maximise patient care with proper prescriptions less wasted time consumed doing the missing orders by triage doctors less frustaration for patients waiting for orders less time and effort wasted from treatment room staff trying to excute the injection.

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Initial data was done on thumamapt 3 months with below mentioned values.

Figure 1

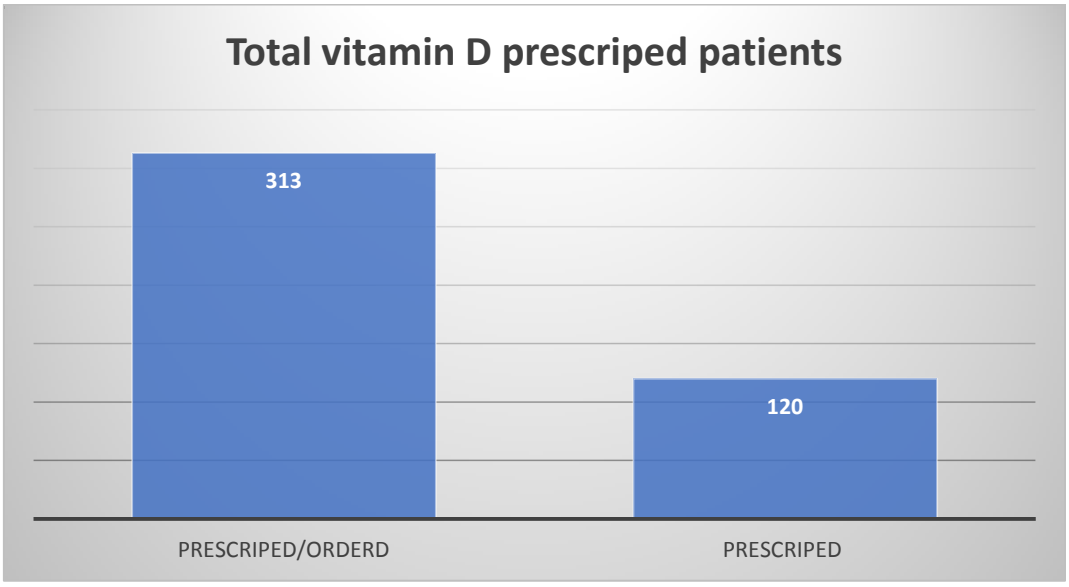
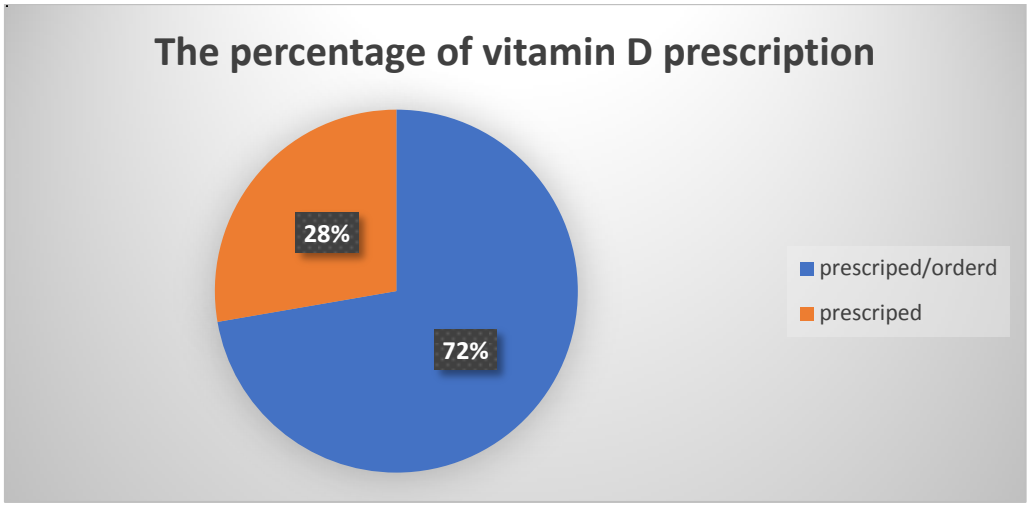


Figure 2



New data /post trial:

Figure 3

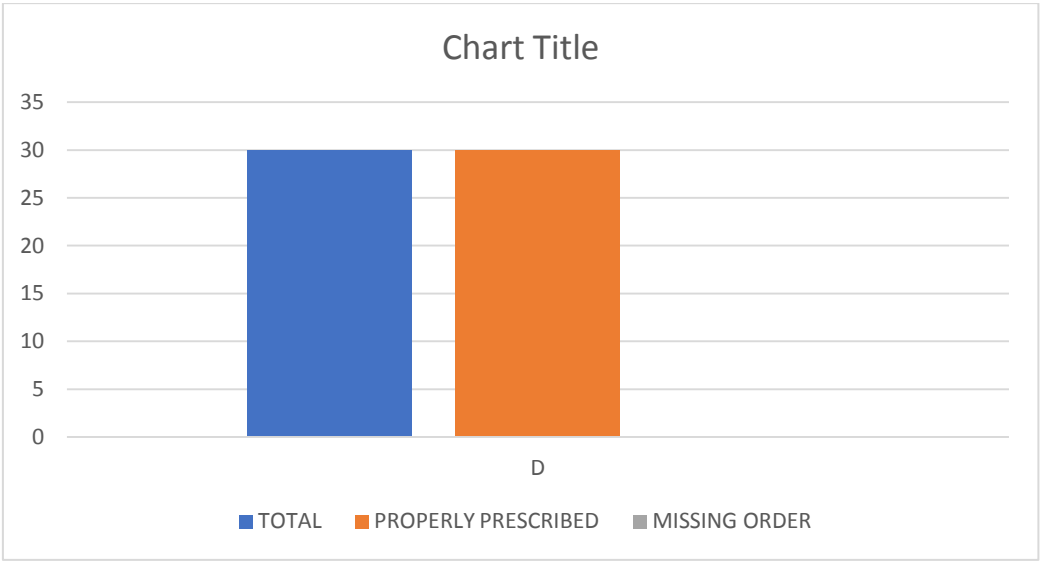
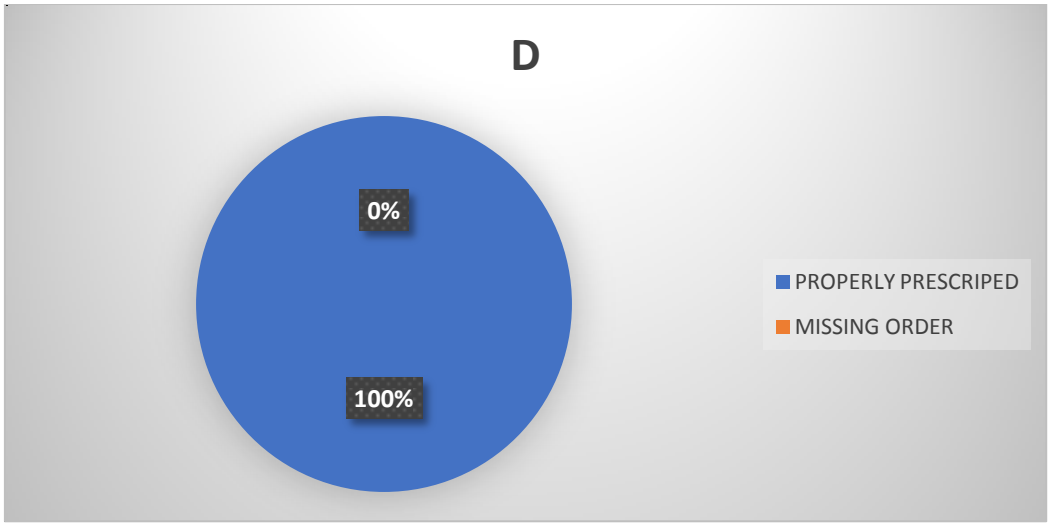


Figure 4



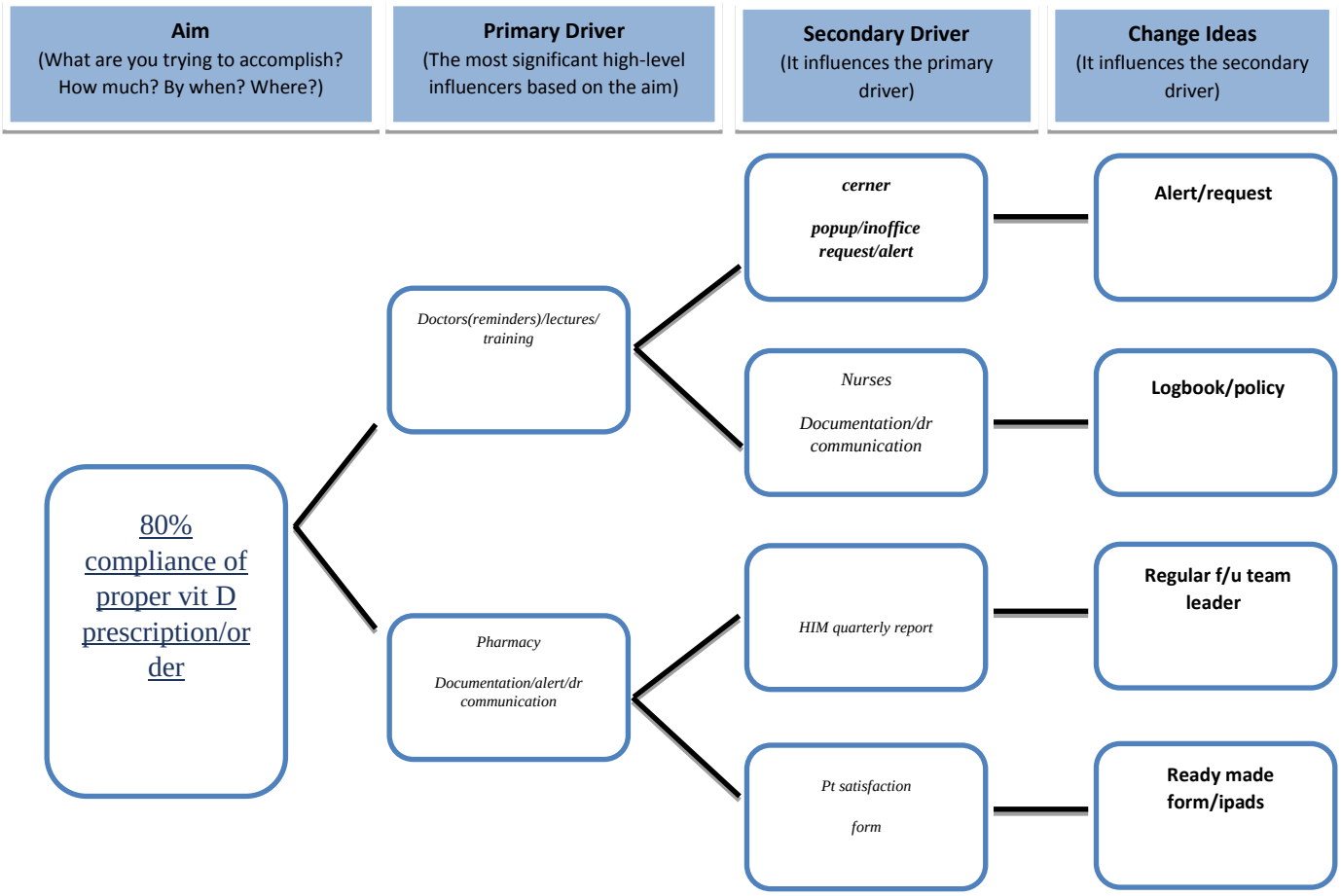
Assumptions and reasons (why we expected the 'new' changes implementation to work)
A similar workflow to the one being designed has been known to be successfully employed

Consultation and Engagement

During the planning phase, the various stakeholders who would be involved in the execution of this workflow were identified. Each stakeholder was called individually to meet with the study team to discuss the proposal and any concerns they may have. Limitations of each stakeholder were assessed and compiled.

Inputs were obtained from doctors, nurses, and managers of the general services team who is involved in prescription this vitamin.

List the possible changes using the driver diagram and select the possible Changes.



Project team

The project team was consisted of members from each of the stakeholder groups. Before the implementation of the project, a meeting was called to discuss the concept, plan, limitations and the proposed workflow. Team leads were assigned per stakeholder group. They were tasked with briefing team members on updates and the longitudinal changes to the workflow. They also attended weekly meetings to coordinate and explore various issues and areas for improvement.

Problems anticipated

- More effort from pharmacy/nurses/doctors more time needed
- Opportunity patient care willingness of team

Sustainability plan

The plan for this project was to be scaled up as a permanent workflow in our health centre. The approval of this workflow would involve presenting the results of the project to the lead physician/ doctors of the health centre for further evaluation. On approval from leads, the change

implementation will be instituted as a new protocol within the health centre.

Strategy

Before the start of the project, all stakeholders were briefed on the action plan and were delegated to brief their respective staff. Doctors were informed 1 month prior and on the day of commencement of the trial phase to prescribe-order vitamin d2-3 injection also nurses from the treatment rooms both male/female and pharmacy staff were briefed at the start of the project and though out the period.

Pretrial Phase

PDSA cycle 1:

July -Sep 2021

Retrospective health record data collection was made reflecting a period of three months to ensure enough viable data was collected.

Trial phase Dec 2021

PDSA cycle 2: Follow-up from the pretrial phase, all new protocols were kept

Our initial aims were to ensure enough compliance

What data will be collected? (Structure, Process, or *Outcome* Measures)	**How will you collect the data?** (Method) *ex. Surveys, Audits, Observations*	**Who will collect?** (Name)	**When to collect?** (Date & Time)	**Where to collect?** (Source of data)
Measure: 1_pt data missing the in office order and treating dr name 2_ pt data missing the in office order and treating dr name	1-Logbook 2-log book	1-Nurse 2-pharmasist	Oct/dec	1-Treatment room 2-pharmacy

Results

As was described in charts the target was assigned to be met at the start of the project (not less than 80%) compliance for proper description to vitamin D injections in patients requiring IM medication formula in al thumama health centre. initially compliance was 28% as reflected by data collected for 3 months to 100% compliance following the implemented changes

Lessons and Limitations

One of the biggest limitations of the study projects was the coordination of the various staff and new recruitments of staff. Along with heavy patient numbers per the clinics.

The subjective feedback we had received after implementing the new changes reinforces its efficacy and its effect on optimising resources and time. It has greatly changed normal satisfaction also nurses time and effort and extra burden on the triage doctors making in office orders for the missed ones period dates 1st July to 30thsep 2021

End part is at least 80% effective treatment orders in althumama health centre including most patients who were diagnosed as b12 deficiency who needed injectable treatment regimen in althumama health centre between the dates start of Oct-end of Dec 2021

Conclusion

The start point is the discrepancy between (prescription and in office orders) which is a highly prevalent issue affecting patient time ,

Data availability statement

All data relevant to the study are included in the article.

Ethics statements

Patient consent for publication

Not required.

Ethics approval

In accordance with policy guidelines in PHCC, the study presented is intended to improve the care of patients and expedite recovery. It focused on properly prescribing vitamin b12 injection in patients with deficiencies.

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4. Webb AR, Kline L, Holick MF. Influence of season and latitude on the cutaneous synthesis of vitamin D3: exposure to winter sunlight in Boston and Edmonton will not promote vitamin D3 synthesis in human skin. J Clin Endocrinol Metab 1988; 67:373.
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