

Vitamin D Status in Acute Admissions to a Major Teaching Hospital

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Introduction

Vitamin D deficiency has been implicated in adverse health outcomes with some epidemiological studies suggesting a link between vitamin D status and falls. However controversy still exists with regard to its role in muscle function. Hence comprehensive pan-hospital assessments are required to characterise vitamin D status in the acutely unwell

Results

There were 547 female patients and 389 male. Median age was 69 years(IQR:50-82). 400 patients were vitamin D deficient (<30nmol/L). 232 were insufficient (30-50nmol/L) in vitamin D whilst 304 had sufficient (>50nmol) serum vitamin D concentrations. Median serum 25OH-vitamin D was 31 nmol/L (IQR:14-58).

Vitamin D concentrations were lower in patients admitted under vascular (median 7nmol/L,IQR:14-22), colorectal (17nmol/L,IQR:8-21) and nephrology (21nmol/L, IQR:14-45), Higher vitamin D concentrations were seen in rheumatology (median 52nmol/L,IQR:39.5-71)and stroke patients(54nmol/L,IQR:46-79).

Methods

A retrospective electronic case review of all emergency admissions (N=936) where vitamin D status was assessed at a tertiary care centre in Birmingham (QEHB) over 1 year (1/4/2017-1/4/2018) using local IT systems (Clinical Portal)

Aim

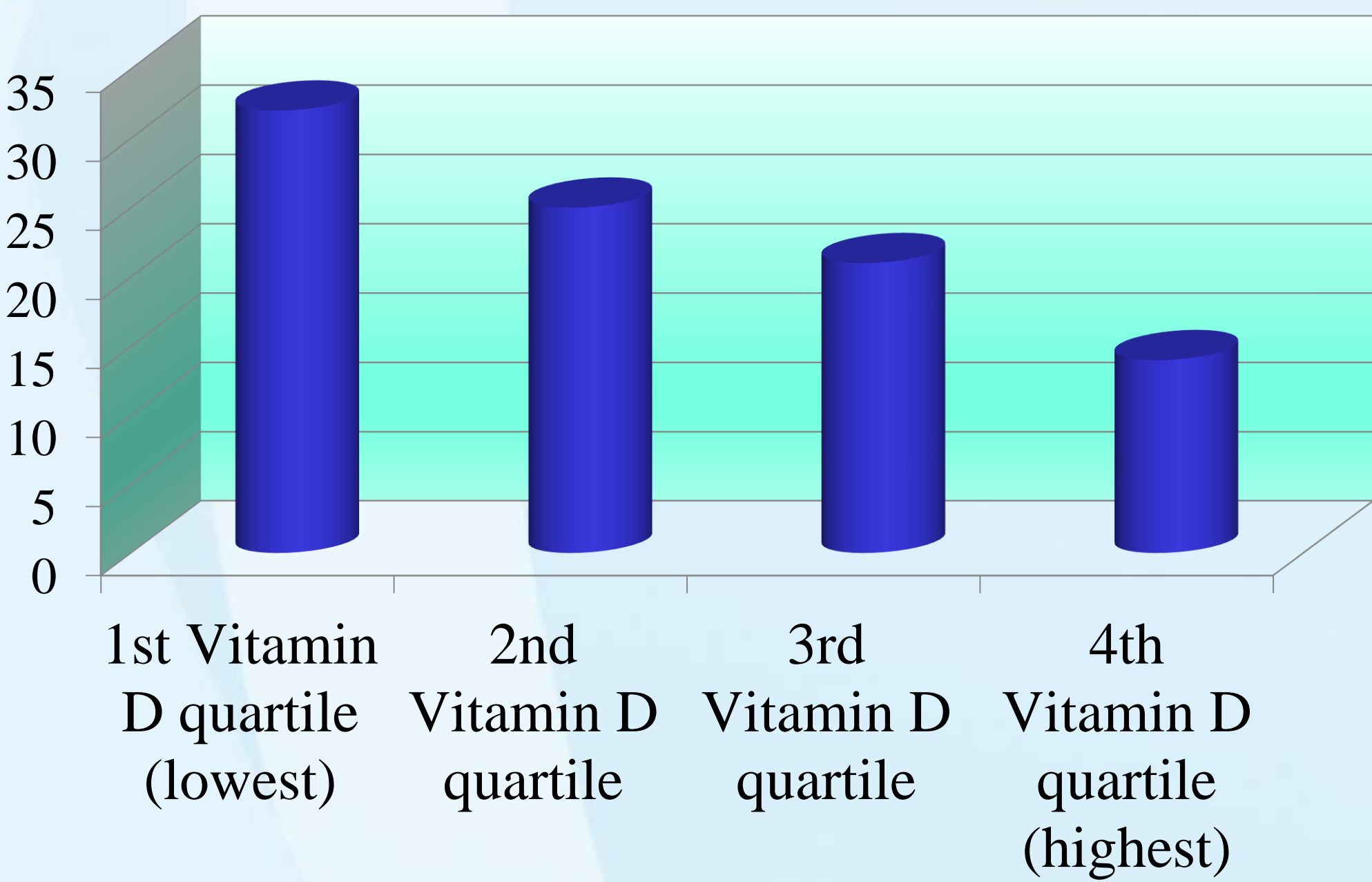
To assess vitamin D and bone metabolism parameters for all patients admitted acutely to hospital where vitamin D levels were measured To investigate whether there are associations between vitamin D status and adverse physical and clinical outcomes in acutely unwell patients

Table 1: Demographics, observational data and biochemistry levels

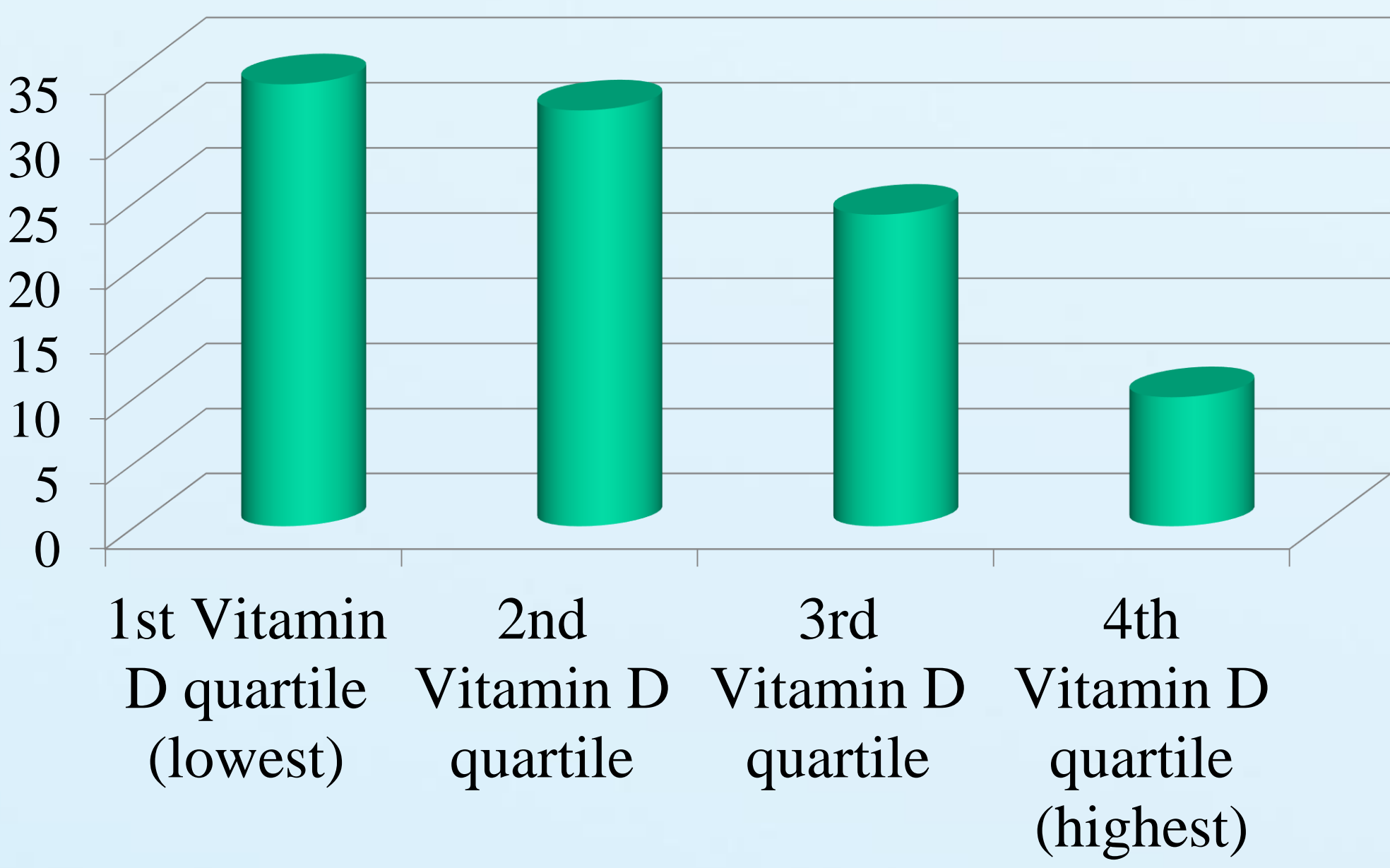
Demographics	Median (IQR)	
Age (years)	84 (77-90)	
Length of stay (days)	6 (2-16)	
Vitamin D	49 (24-72)	
Observational data	First Median (IQR)	Last Median (IQR)
BMI (kg/m ²)	25 (21- 29)	25 (21-29)
Biochemistry	First Median (IQR)	Last Median (IQR)
ALB	41 (36-44)	39 (35-42)
ALP	90 (73-117)	91 (72-117)
CA	2.30 (2.23-2.42)	2.29 (2.2-2.38)
TP	69 (65-74)	68 (63-72)
CCA	2.23 (2.24-2.39)	2.32 (2.25-2.39)
AMT-10	4 (1-7)	4 (1.75-7)
Falls score	3 (2-3)	3 (2-3)
PHAF score	4 (3-5)	4 (3-5)
Manchester mobility	6 (5-6)	6 (5-6)
Mid arm circumference	25 (17-29)	24 (0-29)
Waterlow score	15 (12-19)	16 (12-20)

- Patients in the lowest quartile for vitamin D had:
- significantly longer length of stay compared to those in the highest quartile (median 34 days, IQR 21-56 vs. 10 days, IQR 4-18, p<0.05)
- lower abbreviated mental test scores (AMT10) (5/10, IQR 3-6 vs 8/10, IQR 5-9 p<0.05)
- higher Waterlow scores (19, IQR 14-22 vs. 13, IQR 13-17)
- a trend towards higher falls scores (2, IQR 1-3 vs 1, IQR 0-3) and lower Manchester mobility scores (5, IQR 2-6 vs 6, IQR 5-6)
- 32% of patients died in the lowest vitamin D quartile vs. 14% in the highest quartile.

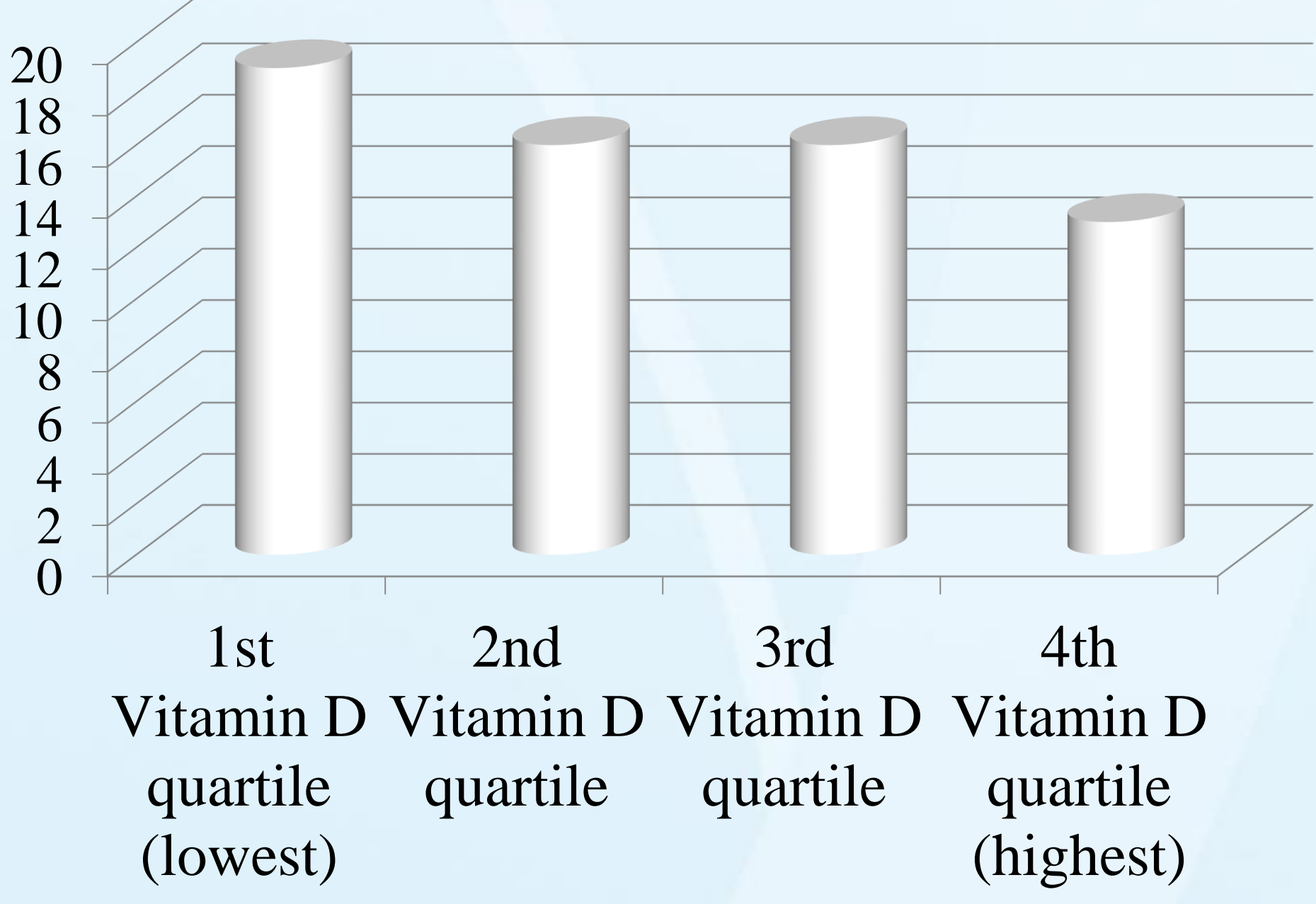
Vitamin D Quartile Stratification with Mortality (%)



Vitamin D Quartile Stratification with Length of Stay (days)



Vitamin D Quartile Stratification with Waterlow score



Conclusion

- These findings are speculative and suggest that vitamin D status is associated with measures of physical function in this group
- The majority of acutely unwell patients in hospital are vitamin D deficient/insufficient with all age groups affected.
- Patients admitted to general surgical specialities tended to have lower vitamin D concentrations.
- There was a trend towards increased mortality, LOS and lower Waterlow scores with low vitamin D status.
- All patients with length of stay >150 days were vitamin D deficient at baseline. Patients who are outliers with adverse outcomes should be further characterised to understand predictive factors.
- We aim to identify potential interventions and therapeutic targets, especially vitamin D supplementation, for further evaluation in prospective randomised control trials and translational studies.
- We aim to refine supplementation strategies in the acutely ill with future studies needed in order to establish causality, investigate mechanisms and assess impact on rehabilitation potential and clinical outcomes. We envisage that work in this area will inform implementation of the local sustainable acute care pathway for the frail elderly