

The effects of oral vitamin D supplementation on cardiovascular disease risk in UK South Asian women

Submission date 25/06/2008	Recruitment status No longer recruiting	☒ Prospectively registered ☐ Protocol
Registration date 04/09/2008	Overall study status Completed	☐ Statistical analysis plan ☒ Results
Last Edited 20/11/2017	Condition category Circulatory System	☐ Individual participant data

Plain English summary of protocol

Background and study aims

South Asians living in the UK are at a particularly high risk of developing heart and blood vessel problems, as well as diabetes. One potential cause of this is a deficiency of vitamin D, which is a hormone produced by the skin in response to sunlight. Low levels of vitamin D are associated with intolerance to glucose (sugar), resistance to insulin and inflammatory chemicals in the blood, all of which can worsen the consequences of heart and blood vessel disease. Many people in the UK have reduced levels of vitamin D, but south Asians living in the UK have especially low levels of vitamin D. The aim of this study is to investigate whether giving supplementary vitamin D to UK south Asians improves their heart and blood vessel function.

Who can participate?

South Asian women aged 18 and over with low vitamin D levels

What does the study involve?

The study lasts for 8 weeks. Participants are randomly allocated to be given either a teaspoon of vitamin D oil or a placebo (dummy) oil once only at the start of the study. Participants are seen at the start and 4 and 8 weeks later. Each visit lasts two hours. At each visit, participants undergo some or all of the following tests depending on which visit it is. Blood pressure is measured and blood samples are taken. The function of the artery in the arm is tested by scanning it with an ultrasound machine before and after inflating a blood pressure cuff on the forearm for 5 minutes, which is then repeated after giving a medication (GTN) spray under their tongue. The stiffness of the arteries is tested using a probe like a pencil that rests on the forearm and neck. The skin blood flow responses to two chemicals called acetylcholine and sodium nitroprusside is measured. A small electric current is used to deliver very small quantities of the chemicals to a small area of skin on the forearm (about the size of a 50 pence coin). This may cause a slight prickling sensation and an area of redness on the skin (which fades after an hour or so), but no pain, and the two chemicals are harmless at these quantities. The blood flow response is measured by scanning a laser beam across the surface of the skin whilst a camera looks at the skin.

What are the possible benefits and risks of participating?

Although this dose of vitamin D has been used before and is known to be safe there is a small possibility of side effects. The researchers closely monitor for side effects caused by high calcium levels, such as sickness, diarrhoea, thirst or dizziness. To reduce the chance of vitamin D increasing the calcium level in the blood, participants are asked to not take any other vitamin D supplements or calcium supplements whilst they are taking part in this study. Having blood taken can cause some bruising. The blood pressure cuff causes mild discomfort to some people.

Where is the study run from?

University of Dundee (UK)

When is the study starting and how long is it expected to run for?

January 2009 to July 2010

Who is funding the study?

Heart Research UK

Who is the main contact?

Dr Faisal Khan

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Contact information

Type(s)

Scientific

Contact name

Dr Faisal Khan

Contact details

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Additional identifiers

Clinical Trials Information System (CTIS)

2008-003387-18

Protocol serial number

2007cv23; ; CTA: 21726/0254/001-0001

Study information

Scientific Title

The effects of oral vitamin D supplementation on cardiovascular disease risk in UK South Asian women: a randomised, placebo-controlled, parallel-group, double-blinded study

Study objectives

That oral supplementation of vitamin D will improve cardiovascular function and metabolic and inflammatory parameters in South Asian women.

Ethics approval required

Old ethics approval format

Ethics approval(s)

Tayside Research Ethics Committee NHS, 22/10/2008, ref: 08/S1402/55

Primary study design

Interventional

Study design

Randomised placebo-controlled parallel-group double-blinded study

Study type(s)

Treatment

Health condition(s) or problem(s) studied

Cardiovascular disease risk

Interventions

Subjects will be given a single dose of 100,000 units of oral vitamin D3 or matching placebo. This dose will be given after baseline assessments. Ingestion will occur in the presence of the research team to ensure 100% adherence to medication.

Intervention Type

Supplement

Phase

Not Applicable

Drug/device/biological/vaccine name(s)

Vitamin D supplementation

Primary outcome(s)

Macrovascular endothelial function, assessed by flow mediated dilation (FMD) according to standard guidelines at the start of the study (i.e., before the intervention) and at 4 and 8 weeks post-intervention

Key secondary outcome(s)

1. Microvascular endothelial function, tested using iontophoresis according to standard guidelines
2. Arterial stiffness, measured by pulse wave velocity using the validated SphygmoCor pulse waveform analysis system

3. Office blood pressure, measured by oscillometric automatic blood pressure device
4. Metabolic and inflammatory markers:
 - 4.1. Fasting serum lipid profiles, measured using COBAS Bio Autoanalyser
 - 4.2. Fasting glucose, glycosylated haemoglobin (HbA1c) and insulin levels: estimates of insulin resistance calculated using the Homeostasis Model (HOMA) (fasting glucose x fasting insulin/22.5)
 - 4.3. Adiponectin and leptin, measured using a commercially available enzyme-linked immunosorbent assay (ELISA) with good sensitivity and reproducibility
 - 4.4. Plasminogen activator inhibitor-1 and tissue plasminogen activator antigen, both measured by ELISA
 - 4.5. C-reactive protein, measured using a high sensitivity automated turbidimetric assay
 - 4.6. Tumour necrotising factor alpha (TNF-α) and interleukin-6, measured by high sensitivity ELISA
 - 4.7. E-selectin - an adhesion molecule expressed only on activated endothelial cells, measured by ELISA
5. Serum 25 hydroxyvitamin D and parathyroid hormone (PTH) levels

All measurements taken at the start of the study (i.e., before the intervention) and at 4 and 8 weeks post-intervention

Completion date

11/07/2010

Eligibility

Key inclusion criteria

1. Aged greater than or equal to 18 years
2. Female
3. Serum 25 hydroxyvitamin D less than 75 nmol/L
4. South Asian ethnicity, as defined by the participant

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Lower age limit

18 Years

Sex

Female

Key exclusion criteria

1. Symptomatic
2. Cardiovascular disease (including previous stroke, transient ischaemic attack [TIA], angina, myocardial infarction, angioplasty, coronary bypass grafting, symptomatic peripheral vascular

disease, chronic heart failure, atrial fibrillation)

3. Already taking vitamin D supplements. Consumption of fish oils will not be a contraindication to enrolment as the vitamin D content is very low relative to the dose used in the study.

4. Estimated glomerular filtration rate less than 40 ml/min (by four-variable Modification of Diet in Renal Disease [MDRD] equation)

5. Liver function tests (alanine aminotransferase [ALT], bilirubin, alkaline phosphatase) greater than 3 x normal. These two criteria will ensure that sufficient renal and hepatic function is available to convert vitamin D to the active 1,25 hydroxy form.

6. Unable to give written informed consent

7. Corrected calcium level of greater than 2.60 or less than 2.15 mmol/L

8. Clinical diagnosis of osteomalacia

9. History of renal calculi, sarcoidosis or metastatic malignancy. Excluding these groups will minimise the risk of side effects from vitamin D supplementation.

10. Pregnant or of childbearing age and not taking reliable contraception

Date of first enrolment

12/01/2009

Date of final enrolment

11/07/2010

Locations

Countries of recruitment

United Kingdom

Scotland

Study participating centre

University of Dundee

Dundee

United Kingdom

DD1 9SY

Sponsor information

Organisation

University of Dundee (UK)

ROR

<https://ror.org/03h2bxq36>

Funder(s)

Funder type

Charity

Funder Name

Heart Research UK (UK)

Alternative Name(s)

HRUK

Funding Body Type

Private sector organisation

Funding Body Subtype

Trusts, charities, foundations (both public and private)

Location

United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are/will be available upon request from Dr Catrina Forde (c.forde@dundee.ac.uk). Study data are available for non-commercial, bona-fide academic analyses in collaboration with the authors; decisions on data access will be made between the investigators and the Sponsor (University of Dundee). Participant consent for unrestricted sharing of individual participant data was not obtained.

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/10/2013		Yes	No
Basic results		20/11/2017	20/11/2017	No	No
HRA research summary			28/06/2023	No	No