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# 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

**Registration date**
04/09/2008

**Overall study status**
Completed

**Last Edited**
20/11/2017

**Condition category**
Circulatory System

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] 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 ismeasured 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 Faisel Khan
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# Contact information

### Type(s)
Scientific

### Contact name
Dr Faisel Khan

### Contact details
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# Additional identifiers

### EudraCT/CTIS number
2008-003387-18

### IRAS number

### ClinicalTrials.gov number

### Secondary identifying numbers

2007cv23; 2008-003387-18; 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

### Study design
Randomised placebo-controlled parallel-group double-blinded study

### Primary study design
Interventional

### Secondary study design
Randomised controlled trial

### Study setting(s)
Other

### Study type(s)
Treatment

### Participant information sheet
Not available in web format, please use the contact details to request a patient information sheet

### 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 measure
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

### Secondary outcome measures
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

### Overall study start date
12/01/2009

### 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

### Age group
Adult

### Lower age limit
18 Years

### Sex
Female

### Target number of participants
60

### 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
Scotland

United Kingdom

### Study participating centre
### University of Dundee
Dundee
United Kingdom
DD1 9SY

# Sponsor information

### Organisation
University of Dundee (UK)

### Sponsor details
c/o Dr James Houston
Research and Innovation Services
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+44 (0)1382 384664
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### Sponsor type
University/education

### Website
http://www.dundee.ac.uk/

### ROR
https://ror.org/03h2bxq36

# Funder(s)

### Funder type
Charity

### Funder Name
Heart Research UK (UK)

### Alternative Name(s)

### Funding Body Type
Private sector organisation

### Funding Body Subtype
Other non-profit organizations

### Location
United Kingdom

# Results and Publications

## Publication and dissemination plan
The protocol is available from the authors on request but is not available online.

## Intention to publish date

## 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 |