

Evaluation of a urinary test to assess vitamin B12 status in older people

Submission date 07/10/2011	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered
Registration date 28/11/2011	Overall study status Completed	<input type="checkbox"/> Protocol
Last Edited 17/07/2015	Condition category Nutritional, Metabolic, Endocrine	<input type="checkbox"/> Statistical analysis plan
		<input checked="" type="checkbox"/> Results
		<input type="checkbox"/> Individual participant data

Plain English summary of protocol

Background and study aims

Surveys of the diets and nutritional well-being of the UK population show that vitamin B12 status, measured as plasma B12 concentration, deteriorates as people age. Poor vitamin B12 status has various adverse health outcomes, including anaemia, impaired functioning of the nervous system and cognitive impairment (increased absent-mindedness that is related to age), all of which are a particular concern among the elderly. In an aging population these numbers are destined to increase, with consequences on healthcare and society. An additional public health concern relates to the fact that poor vitamin B12 status may not be so readily detected should the fortification of flour with folic acid be made a legal requirement in the UK. Vitamin B12 status is usually determined by measuring plasma B12 concentration and many studies have suggested that this has important limitations. Low plasma vitamin B12 concentrations are not always reflective of poor B12 status, and patients with clinical evidence of B12 deficiency do not always have low plasma B12 concentrations. It is important to have a robust system in place for monitoring B12 insufficiency, particularly of the elderly population, and therefore it is timely to re-examine the limitations of the method in current use. Methylmalonic acid (MMA) is a compound that is produced in cells when there is inadequate vitamin B12 available for the normal functioning of the cell. This is reflected in an increased concentration of MMA in the plasma and the urine. This compound is excreted very efficiently by the kidney, which concentrates the metabolite in the urine, making it a potentially more sensitive indicator of low tissue levels than plasma concentration. Therefore urinary MMA may be a good early indicator of poor vitamin B12 status.

Despite the potential value of urinary MMA, this measurement has never been rigorously evaluated as a functional biomarker of vitamin B12 status. In particular there has been no attempt to examine how the amount of MMA in the urine changes when vitamin B12 in the diet increases. The objective of our study is to look at those factors which may influence the amount of MMA in the urine in an elderly population.

Who can participate?

You can take part if you are aged 65-85 and are healthy.

What does the study involve?

You will be asked to attend the Clinical Research Facility on one occasion and give a small sample

of blood and urine. Your height and weight will also be measured. You will be visited in your home to complete a lifestyle questionnaire and food diary.

What are the possible benefits and risks of participating?

There is no intended personal benefit from taking part in the study, although the results will be extremely important to help develop a better measure of vitamin B12. You may experience some brief discomfort during the blood collection.

Where is the study run from?

Human Nutrition Unit, University of Sheffield (UK).

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

The study will be running for two years starting in January 2008. It is anticipated that recruitment will be complete by October 2009.

Who is funding the study?

The Food Standards Agency (FSA), London (UK).

Who is the main contact?

Prof Hilary Powers

h.j.powers@sheffield.ac.uk

Contact information

Type(s)

Scientific

Contact name

Prof Hilary Powers

Contact details

Professor of Nutritional Biochemistry

Human Nutrition Unit

University of Sheffield

The School of Medicine

Sheffield

United Kingdom

S10 2RX

-

h.j.powers@sheffield.ac.uk

Additional identifiers

Protocol serial number

N05077

Study information

Scientific Title

Urinary Methylmalonic Acid (MMA): a functional biomarker of B12 status applicable to large scale surveys: Part 1 - the cross sectional study

Acronym

UMMA 1

Study objectives

Urinary methylmalonic acid (MMA) is a robust, sensitive functional biomarker of vitamin B12 status that can be used in large scale surveys

Ethics approval required

Old ethics approval format

Ethics approval(s)

South Sheffield Research Ethics Committee (NHS), 07/04/2008, ref: 08/H1309/4

Primary study design

Observational

Study design

Cross-sectional study

Study type(s)

Diagnostic

Health condition(s) or problem(s) studied

Public health/nutrition particularly in older people; B12 deficiency

Interventions

Men and women aged 65 to 85, with no clinical evidence of vitamin B12 deficiency, will be recruited from GP practices in the Sheffield area. They will be asked to supply a small blood sample for the measurement of plasma B12, plasma cystatin, pepsinogen and plasma transcobalamin, as well as a full blood count. Urine samples will be collected for methylmalonic acid (MMA) and creatinine measurements. Participants will also complete a lifestyle questionnaire and four day food diary. The purpose of the study is to assess the demographic, clinical and lifestyle determinants of urinary MMA concentrations. This study will also identify participants eligible for the intervention study.

Intervention Type

Other

Phase

Not Applicable

Primary outcome(s)

Urinary methylmalonic acid corrected for urinary creatinine

Key secondary outcome(s)

1. Serum holotranscobalamin
2. Plasma vitamin B12

3. Plasma pepsinogen I
4. Full Blood Count
5. Plasma cystatin
6. Dietary assessment
7. Lifestyle questionnaire

Completion date

30/12/2009

Eligibility

Key inclusion criteria

1. Men and women (aged 65 to 85)
2. Healthy

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Senior

Sex

All

Key exclusion criteria

1. Severe cognitive impairment
2. Gastric or ileal surgery
3. Regular vitamin B12 injections

Date of first enrolment

01/01/2008

Date of final enrolment

01/10/2009

Locations

Countries of recruitment

United Kingdom

England

Study participating centre

University of Sheffield

Sheffield

United Kingdom
S10 2RX

Sponsor information

Organisation

University of Sheffield (UK)

ROR

<https://ror.org/05krs5044>

Funder(s)

Funder type

Government

Funder Name

Food Standards Agency

Alternative Name(s)

The Food Standards Agency, FSA

Funding Body Type

Private sector organisation

Funding Body Subtype

Other non-profit organizations

Location

United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary

Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
	results				

[Results article](#)

01/03/2012

Yes

No