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A study to determine whether the daily consumption of flavonoid-rich pure cocoa has the potential to reduce fatigue in people with relapsing remitting multiple sclerosis (RRMS)

Submission date
04/05/2016

Registration date
06/05/2016

Last Edited
07/03/2019

Recruitment status
No longer recruiting

Overall study status
Completed

Condition category
Nervous System Diseases

[X] Prospectively registered

[X] Protocol

[_] Statistical analysis plan

[X] Results

[_] Individual participant data

Plain English summary of protocol

Background and study aims
Multiple sclerosis (MS) is one of the most common diseases of the central nervous system (brain and spinal cord). Healthy nerves are coated in a fatty casing (myelin sheath) which helps messages to travel quickly and smoothly along nerves. When a person is suffering from MS, the immune system, which normally helps to protect against infection, attacks the myelin sheath, stripping it from the nerves (demyelination). This demyelination means that messages cannot travel along the nerves effectively, causing a range of symptoms including problems with balance and coordination and weakness in the arms or legs. One of the most common symptoms of MS is fatigue (extreme tiredness), affecting around 80% of sufferers. Pure cocoa may have the ability to improve fatigue because it contains substances called flavonoids. Flavanoids are becoming increasingly recognized for their potential to improve bodily processes which can worsen fatigue due to its antioxidant properties. However to date, no well-designed studies have looked at the role of cocoa consumption for fatigue management in people with MS. The aim of this study is to find out whether a flavonoid-rich cocoa drink is an effective means of improving fatigue in people with MS.

Who can participate?
Adults diagnosed with relapsing-remitting MS (RRMS) within the last 5 years who are experiencing fatigue

What does the study involve?
Participants are randomly allocated to one of two groups. Those in the first group are asked to drink a hot flavonoid-rich pure cocoa drink every morning for six weeks. Those in the second group are asked to drink a hot low flavonoid pure cocoa drink every morning for six weeks. At the start of the study and again after three and six weeks, participants in both groups completes a number of questionnaires and physical assessments in order to find out if their fatigue has improved. Participants also provide a blood sample at these times so that the level of glutathione (a chemical indicator of antioxidant status) can be measured.

What are the possible benefits and risks of participating?
It is currently unknown whether there will be any direct benefits to those taking part in the study. There is a small risk of pain or bruising during and after blood testing.

Where is the study run from?
1. Oxford Brookes University (UK)
2. John Radcliffe Hospital, Oxford (UK)

When is the study starting and how long is it expected to run for?
January 2016 to December 2017

Who is funding the study?
Multiple Sclerosis Society (UK)

Who is the main contact?
Dr Shelly Coe
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Contact information

Type(s)
Public

Contact name
Dr Shelly Coe

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Additional identifiers

Protocol serial number
30344

Study information

Scientific Title
A feasibility study to determine whether the daily consumption of flavonoid-rich pure cocoa has the potential to reduce fatigue in people with Relapsing and Remitting Multiple Sclerosis (RRMS)

Study objectives

The aim of this study is to explore the potention of a flavonoid-rich cocoa drink in the treatment of fatigue in people with Multiple Sclerosis (pwMS).

Ethics approval required
Old ethics approval format

Ethics approval(s)
West Midlands - Solihull Research Ethics Committee, 31/03/2016, ref: 16/WM/0134

Study design
Randomised; Interventional; Design type: Treatment, Dietary, Physical

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Specialty: Neurological disorders, Primary sub-specialty: Multiple sclerosis; UKCRC code/ Disease: Neurological/ Systemic atrophies primarily affecting the central nervous system

Interventions
Following provision of informed consent and study screening, eligible participants complete a baseline assessment and are randomly allocated to either the high flavonoid cocoa intervention group or the control cocoa group.

High flavonoid cocoa intervention group: Participants will consume a high flavonoid pure hot cocoa drink daily (in the morning) for 6 weeks (in a normal sized mug).

Control cocoa group: Participants will consume a low flavonoid hot cocoa drink daily (in the morning) for 6 weeks (in a normal sized mug).

Participants in both groups repeat the baseline assessments at three and six weeks. Also during the six weeks, participants will be asked to wear a wrist watch for 2-3 of the 6 weeks, in order to gather information about daily activity. Three times a day participants will receive a text message asking about level of fatigue via a mobile phone.

Intervention Type
Other

Primary outcome(s)
1. Fatigue is measured using a numerical rating scale (NRS) at baseline and three times daily for six weeks
2. Fatigability is measured using a 6 minute walk test and The Adult Memory and Information Processing Battery (AMIBP) at baseline, 3 and 6 weeks

Key secondary outcome(s))
1. Compliance to the intervention is determined through measuring blood glutathione levels at baseline, 3 and 6 weeks
2. Levels of physical activity are measured using wearable activity monitors (worn like a watch)

for a total of 17 days (3 days prior to trial, week 3 and week 6) and The Physical Activity Scale for the Elderly (PASE) questionnaire at baseline, 3 and 6 weeks
3. Dietary patterns are measured using a 3-day 24-hour food record at baseline, 3 and 6 weeks
4. Inflammation is measured by testing blood TNF-alpha and lipid peroxidation levels at baseline, 3 and 6 weeks
5. Quality of life is measured using EQ5D5L at baseline, 3 and 6 weeks
6. Health related quality of life specific to MS is measured using the Preference-Based Multiple Sclerosis Index (PBMSI) at baseline, 3 and 6 weeks
7. Demographics and basic health information are measured using the basic health questionnaire at baseline, 3 and 6 weeks
8. Limitations in daily activity is measured using the Barthels Index (BI) at baseline, 3 and 6 weeks
9. Anxiety and Depression are measured using the Hospital Anxiety and Depression Scale (HADS) at baseline, 3 and 6 weeks

Completion date
01/10/2017

Eligibility

Key inclusion criteria
1. Aged 18 years and over
2. New (<10 year) clinical diagnosis of relapsing-remitting multiple sclerosis (RRMS)
3.
Treatment naïve or taking first line DMTs - glatiramer acetate, interferone beta, teriflunomide and

dimethyl furmarate
4. Willing to comply to consuming the cocoa drink;
5. A fatigue measure of greater than 4 on the Fatigue Severity Scale (FSS)
6. An Expanded Disability Status Scale (EDSS) score of < 4.5;
7. Able to walk with or without a walker for at least 16 meters (length of the 6 minute walk test);

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Sex
All

Key exclusion criteria
1. Those experiencing
a relapse or sudden change in their MS symptoms within the previous three months
2. Conditions affecting the central nervous system other than MS (excluding migraines)

3. Contraindications to providing a blood sample
4. Any other conditions that may be associated with fatigue, e.g. anaemia
5. On medication for the treatment of depression
6. Pregnant or lactating
7. Insufficient mental capacity to consent
8. Objection to contacting their GP and clinicians
9. Currently taking part in another drug trial or expected change in medication during the trial

Date of first enrolment
23/05/2016

Date of final enrolment
31/07/2017

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Oxford Brookes University
Gipsy Lane
Headington
Oxford
United Kingdom
OX3 0BP

Study participating centre
John Radcliffe Hospital
Headley Way
Oxford
United Kingdom
OX3 9DU

Sponsor information

Organisation
Oxford Brookes University

ROR
https://ror.org/04v2twj65

Funder(s)

Funder type
Charity

Funder Name
Multiple Sclerosis Society

Alternative Name(s)
mssocietyuk, MS Society UK, Multiple Sclerosis Society UK, Multiple Sclerosis Society of Great Britain and Northern Ireland, The MS Society, MS Society

Funding Body Type
Private sector organisation

Funding Body Subtype
Associations and societies (private and public)

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study will be stored in a repository. The trialists have not yet put the data (in SPSS, pre analysed format) onto a repository. They are currently setting up a clinical trials unit at their University and therefore the data will be stored there, and anyone can request access, will need to provide information on how they would like to use the data and they will then grant access to the SPSS file. The trialists are writing at least two more papers from the data in addition to the main trial paper and the protocol paper, so would like to work on the data analysis for these papers prior to making the data available.

IPD sharing plan summary
Stored in repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/05/2019	07/03/2019	Yes	No
Protocol article	protocol	23/01/2018		Yes	No
HRA research summary			28/06/2023	No	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes