Is laughing good for your health?

Cantell School

Introduction

There have been many theories flying around that laughing has a good affect on your health. Some included: laughing can give you a 6 pack; laughing provides you with energy; and laughing reduces your risk of heart attacks.

We wanted an answer to these unanswered questions, as it may provide the medical industries with new ideas to help with illnesses.

Our hypothesis is that laughing may improve your mental health but we don't think it will help physical health.

Aim

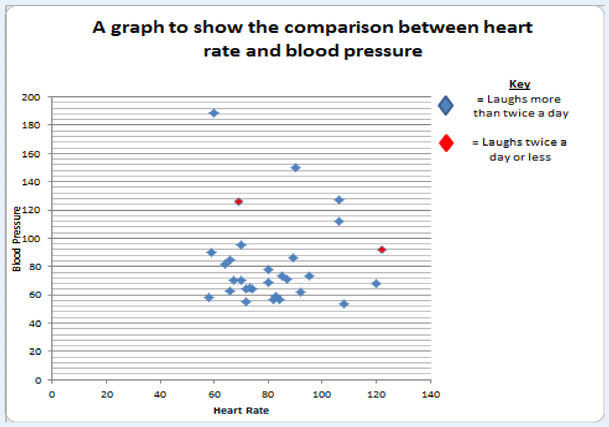
Our aim is to find an answer to the question, "Is laughing good for your health?"

Method

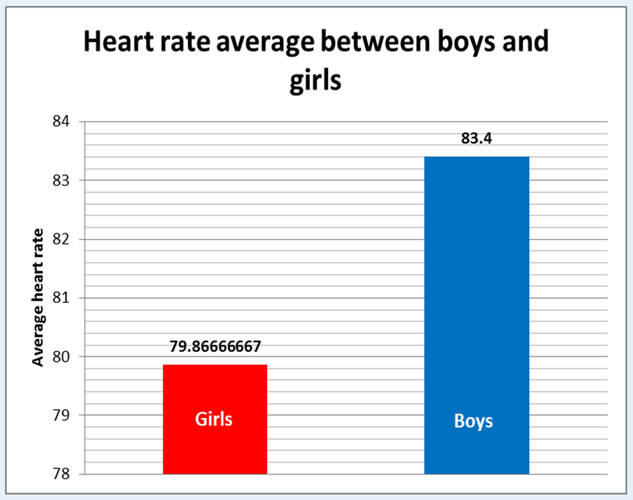
1. Created a questionnaire and printed it
2. Found blood pressure and heart rate monitors
3. Tested people using the equipment and asked them to fill in the questionnaire
4. Record results in a table
5. Made the graphs

Results

The average heart rate for girls was 79.86666667 and for boys it was 83.4. In the questionnaire people mainly answered that they laugh more than twice a day. The scatter graph shows a positive correlation. Although everyone said that they laugh very regularly we got a large range in physical health test results.



This graph shows the correlation between the heart rate and blood pressure of the people we took data from.



This graph shows the difference between the heart rates in boys and girls. We decided to add this graph as we noticed such a large difference between boys and girls.

Number	How often do you laugh?	Do you feel good when you laugh?	Do you feel good when you have laughed?	Do you think that laughing improves your mental health?	Do you think laughing improves your physical health?	Do you think laughing could ever give you a six pack?
1	Once a day	Sort of	Yes	Sort of	Yes	No
2	More than twice a day	Yes	Yes	Yes	Yes	Yes
3	More than twice a day	Yes	Yes	Yes	Yes	Sort of
4	More than twice a day	Yes	Yes	Yes	No	No
5	More than twice a day	Yes	Yes	Yes	No	No
6	More than twice a day	Yes	Yes	Yes	Sort of	Not sure
7	Twice a day	Yes	Yes	Yes	Yes	No
8	More than twice a day	Yes	Yes	Yes	No	No
9	More than twice a day	Yes	Yes	Yes	No	No
10	More than twice a day	Yes	Yes	Sort of	Sort of	No
11	More than twice a day	Yes	Yes	Yes	Yes	Sort of
12	More than twice a day	Yes	Yes	Sort of	No	No
13	More than twice a day	Yes	Yes	Sort of	Sort of	No
14	More than twice a day	Yes	Yes	Yes	Yes	No
15	More than twice a day	Yes	Yes	Yes	Yes	Sort of
16	More than twice a day	Yes	Yes	Yes	Yes	No
17	More than twice a day	Yes	Yes	Sort of	No	Not sure
18	More than twice a day	Yes	Yes	Yes	No	No
19	More than twice a day	Yes	Yes	Sort of	Yes	Not sure
20	More than twice a day	Yes	Yes	Yes	Yes	Not sure
21	More than twice a day	Yes	Yes	Yes	Sort of	Sort of
22	More than twice a day	Yes	Yes	Yes	Sort of	No
23	More than twice a day	Yes	Yes	Sort of	No	No
24	More than twice a day	Yes	Sort of	Sort of	Yes	Sort of
25	More than twice a day	Yes	Sort of	Sort of	Sort of	No
26	More than twice a day	Sort of	Sort of	No	No	No
27	More than twice a day	Yes	Yes	Yes	No	No
28	More than twice a day	Yes	Sort of	Sort of	Sort of	Sort of
29	More than twice a day	Yes	Sort of	Yes	Sort of	Yes
30	More than twice a day	Yes	Yes	Yes	Yes	Sort of

This table shows our questionnaire results. We numbered the people who took part for confidentiality, instead of using their names.

Conclusion

Our investigation showed that laughing does not improve your physical health but did not prove anything about mental health. However it is a well known fact that many psychologists use laughing in their therapies so it must

One particular result gave us another question… why are boys' heart rates so much higher than girls'?

We have achieved our aim and got the final answer that laughing does not help your physical health but it may help your mental health. The hypothesis we made at the start of the experiment was pretty accurate.

Acknowledgements

From the science department in our school we got the blood pressure monitor and heart rate monitor. After this we went out to do experiments on students in Year 9 (we asked some teachers for a tutorial in using the equipment before we did this).

References

We only have used the data we have collected from around the school.

How does mass affect a student's grip strength?

The Mountbatten School

Introduction
Following our visit to LifeLab, we produced our own hypothesis. We wanted to find out if there was a link between someone's:

- **Mass** (Independent variable)

and their

- **grip strength** (Dependent variable).

Or if there was a link between someone's:

- **BMI** (IV)

and their

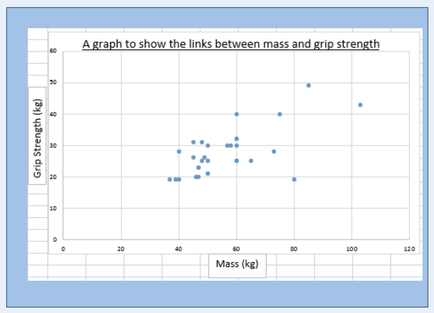
- **grip strength** (DV)

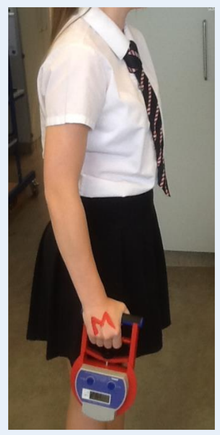
We thought that someone with a higher mass might have more muscle and therefore have stronger muscles (therefore have a higher reading on the grip meter).

Aim
Our aim was to find out whether someone's mass measurement was a good indicator of strength or if there was a link between their BMI and their grip strength.

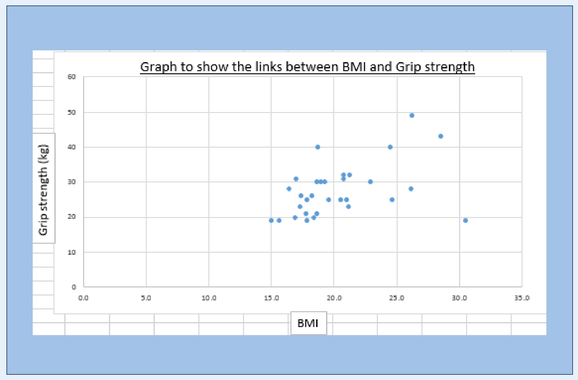
Method
- We asked 31 students if they would take part in our experiment. The data was collected anonymously for reasons of sensitivity.
- We measured their mass using kilograms and then measured their height in metres and centimetres. We needed to square the height to help us calculate their BMI later on in the investigation.
- After finding their mass and height, we needed to know their grip strength. The easiest way to do so was using an Analogue Hand Grip Dynamometer.
- We also asked what they thought their fitness level was. They could choose from, 1-Below average, 2-Average or 3-Fit.
- Finally after collecting all the data we were able to determine their BMI.

Results
The first graph shows the students' mass against their grip strength.

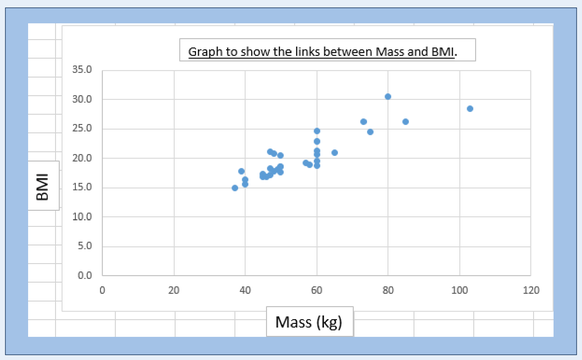




This shows BMI against grip strength.



This graph shows mass against BMI.



Conclusion
We expected to find the higher the mass of the student, the higher the grip strength. We thought this because students with a higher mass might have stronger muscles. Our graph shows that there is some correlation, but we would like to have the time to check some of the results which we consider to be anomalous. For example there was a student of 80kg whose grip strength was particularly weak at 19kg. On the whole, mass may be a good indicator of strength.

Likewise when we graphed the relationship between BMI and grip strength, we found that the higher the BMI, the higher the grip strength, but the pattern was not as clear. The BMI ranged from 15 to 30.5. We are likely to still be growing so we do not think that the BMI is really a good indicator of our strength.

If we did the experiment again we would prefer to have a digital hand grip meter to get a more accurate reading as we were having to read the dial which is hard to tell what value it is on.
We would like to investigate grip strength and aerobic capacity.

Acknowledgements
We would like to thank the University of Southampton for giving us the opportunity to experience the LifeLab sessions. We have learnt a lot and especially would like to thank Lisa Bagust, Hannah Davey and Kathryn Woods-Townsend for teaching us about a healthy balanced diet and a teenager's well-being.

References

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Scielo.br –relationship between hand grip strength and nutritional assessment methods used of hospitalized patients.

Influences on mothers' diets before pregnancy, and on the diet of their infants, and the effects on subsequent cognitive development of the children: Findings from the Southampton Women's Survey.

Inskip HM, Gale CR, Crozier SR, Godfrey KM, Lawrence WT, Baird J, Cooper C, Robinson SM and the Southampton Women's Survey Study Group.

MRC Epidemiology Resource Centre, University of Southampton, Southampton General Hospital, Southampton SO16 7AD.

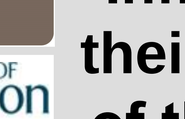
Aims: To examine influences on women's diets before pregnancy and effects on the diets and development of their children.

Background: Little is known about the effects of women's health, nutrition and lifestyle before pregnancy on the later health and development of their children.

The Southampton Women's Survey

12,500 non-pregnant Southampton women aged 20-34 years interviewed between 1998 and 2002 about diet, body composition, physical activity, social circumstances & lifestyle. Buccal and blood samples taken.

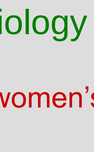
3,150 subsequent pregnancies studied. Ultrasound scans at 11, 19 & 34 weeks. Interviews at 11 & 34 weeks



Maternal blood samples
Paternal buccal & blood samples
Maternal grandparents' buccal samples

Neonatal anthropometry.
Cord bloods.
Placenta samples

Children followed-up at 6, 12, 24 and 36 months.
Samples seen at 4 and 6 yrs.
8 yr visits to start in 2009

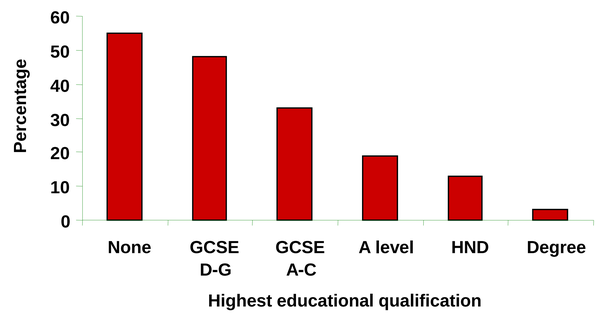


Methods: The Southampton Women's Survey is described in the diagram on the left.

We have assessed the influences on the women's diets before pregnancy, and on the diets of the infants in the first year of life. In a sample of 241 children, we examined the relationships between infant diet and IQ at age 4 years. Principal components analysis was used to summarize the dietary data, providing scores that indicate the degree to which women's and infants' diets conform to current recommendations.

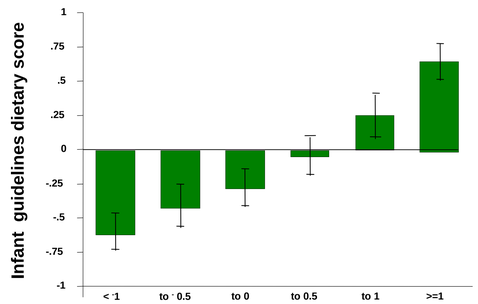
Results. Educational attainment is a powerful positive influence on the quality of a woman's diet. Figure 1 shows a strongly graded relationship between educational qualifications and the percentage of women with diets in the poorest quarter of the diet distribution.

Figure 1. Percentages of women in the lowest quarter of the dietary score by highest educational qualification



Robinson S *et al*, Eur J Clin Nutr 2004;58:1174-80.

Figure 2. Infant guidelines dietary score according to dietary score of the mother

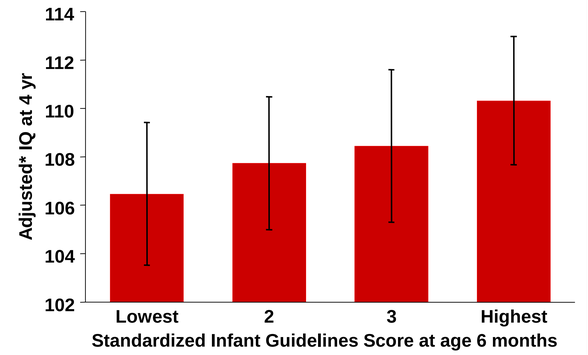


Robinson S *et al* Brit J Nutr 2007;98:1029-37

Figure 2 shows that the more closely women follow dietary recommendations before pregnancy then the more likely they are to feed their infants according to guidelines.

When IQ was assessed at age 4 years we found a significant positive relationship with the infant guidelines dietary score at six months of age, as shown in Figure 3. Children whose infant diets conformed most closely to recommendations had the highest IQs.

Figure 3. IQ at 4 years of age in relation to infant guidelines dietary score at 6 months



*IQ at age 4 adjusted for sex, birth order, gestation, birth weight, HOME score and maternal age, IQ, social class & education

Values are mean (95% CI)

Photographs ©Magda Segal

Conclusion: Efforts are needed to improve the quality of the diets of young women particularly from poorer educational backgrounds in Southampton in order to improve the nutrition and development of their children. An intervention study is about to start to improve diets of young women in deprived areas of Southampton.

Cohort description: Inskip HM, Godfrey KM, Robinson SM, Law CM, Barker DJ, Cooper C. Cohort profile: The Southampton Women's Survey. *Int. J. Epidemiol*. 2006;35:42-48

NIHR Southampton
Biomedical Research Centre in nutrition

Higher maternal vitamin D status in late pregnancy is associated with reduced aortic stiffness in 9-year old children assessed using magnetic resonance imaging

Bryant JA[1,2,4], Peebles C[2], Hanson MA[1,3], Davies L[4], Inskip H[4], Harvey N[4], Cooper C[4], Godfrey KM[1,3,4]

[1]NIHR Southampton Biomedical Research Centre, University of Southampton and University Hospital Southampton NHS Foundation Trust; [2]Cardiothoracic Radiology, University Hospital Southampton NHS Foundation Trust; [3]Institute of Developmental Sciences, University of Southampton, and [4]MRC Lifecourse Epidemiology Unit

Background

- Recent studies have shown an association between lower vitamin D status and greater arterial stiffness[1,2].
- Greater arterial stiffness is a recognized risk factor for cardiovascular disease and can be assessed by measurement of aortic distensibility[3]. Lower aortic distensibility indicates increased stiffness of the aortic wall.
- Poor early development has been linked to increased risk of cardiovascular disease in later life[4].
- Experimental studies in rats have shown that vitamin D deficiency in pregnancy is associated with endothelial dysfunction in the offspring[5].
- We examined the association between maternal 25(OH)-vitamin D status in late pregnancy & childhood vascular function age 9 years.

Methods

- Maternal 25(OH)-vitamin D concentration measured in late pregnancy in participants in the Southampton Women's Survey.
- Non-invasive magnetic resonance imaging (MRI) assessment of local aortic root stiffness (arterial distensibility) in 196 children aged 9 years.
- A high-resolution breath hold single slice steady-state free precession (SSFP) cine acquisition was acquired through the aortic root (Fig. 1). Images were acquired at 25 phases across the cardiac cycle.
- Brachial Blood Pressure (BP) measured immediately following MRI.
- Change in vessel lumen area across the cardiac cycle measured by an automated segmentation technique implemented under Matlab[6] (Fig. 2).
- Distensibility (10^{-3}mmHg^{-1}) calculated from maximum (systole) and minimum (diastole) area and BP measurements:

$$\text{Distensibility} = \frac{(\text{Maximum} - \text{minimum area}) / \text{minimum area} \times 1000}{\text{Pulse Pressure}}$$

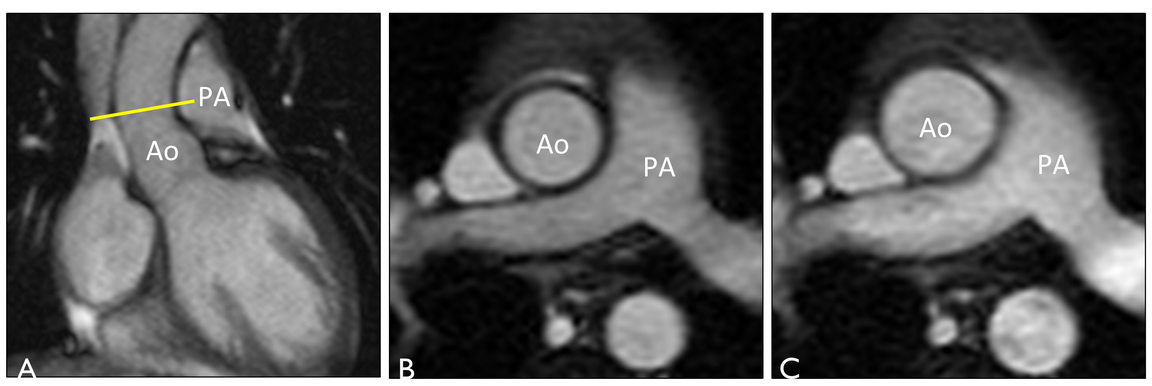


Figure 1. (A) SSFP cine slice position (yellow line) on a left ventricular outflow tract cine image perpendicular to the long axis of the aorta, at the level of the pulmonary arteries (PA). Corresponding cine images of the ascending aorta / aortic root (Ao) at minimum volume in diastole (B) and maximum volume in systole (C).

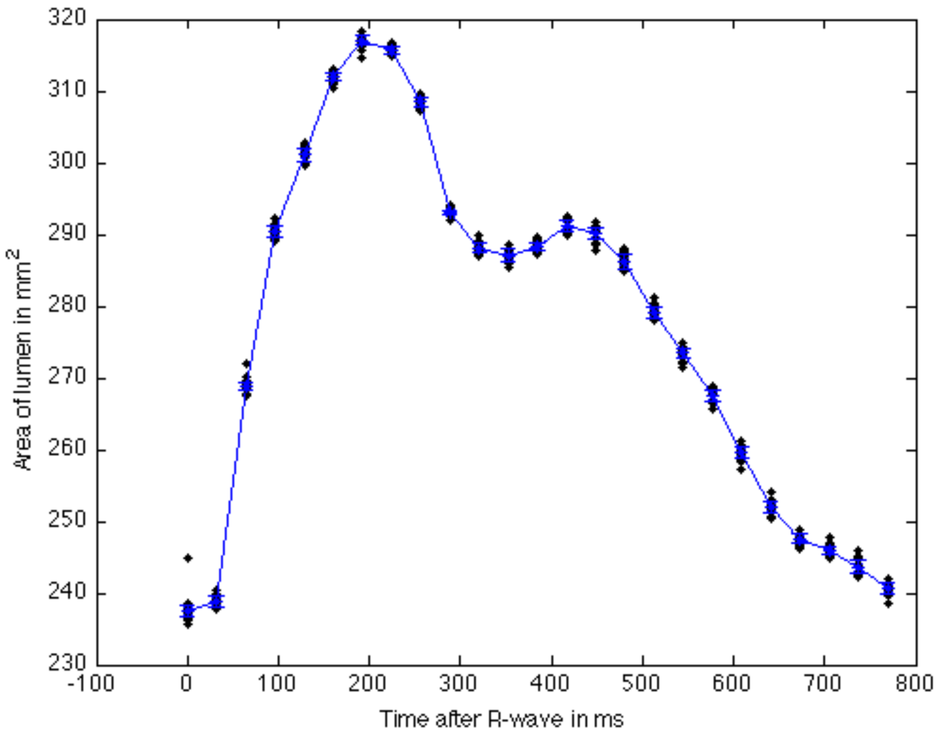


Figure 2. Change in vessel lumen area measured at 25 phases across the cardiac cycle using an automated segmentation technique implemented under Matlab.

Results

- Girls and children with a shorter stature had greater aortic root distensibility (less stiff arteries) (Fig. 3).

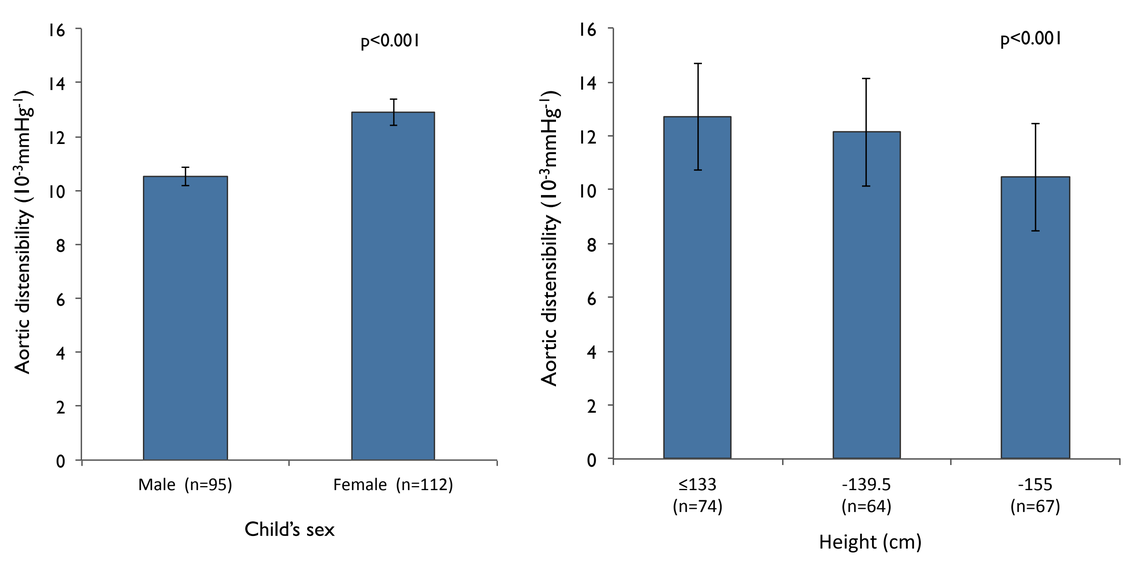


Figure 3. Female sex and shorter stature are associated with greater aortic distensibility (lower arterial stiffness) at age 9 years.

- Higher late pregnancy maternal 25(OH)-vitamin D concentration was associated with greater aortic distensibility (b=0.002 AU/nmol/l, [95%CI 0.0004 to 0.004], p=0.015, n=196) (Fig. 4).
- Adjustment for the child's sex and height had little effect on this finding.

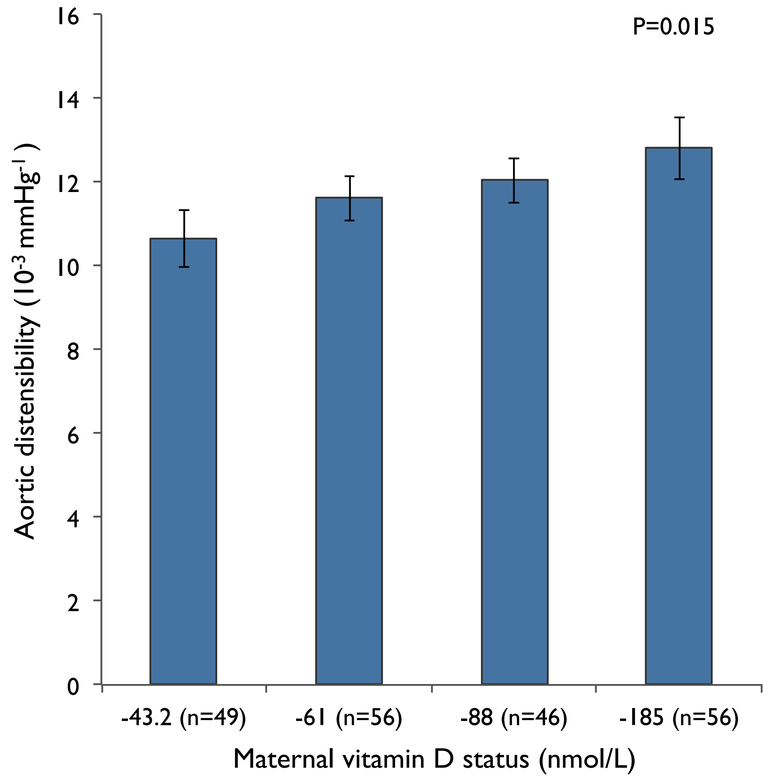


Figure 4. Lower vitamin D status in late pregnancy is associated with lower child's aortic distensibility (greater arterial stiffness) age 9 years.

Conclusion

Our data suggest an effect of maternal vitamin D status during pregnancy on vascular development in utero, leading to changes in arterial structure in the offspring. Although the effect is modest, even small favourable changes in childhood aortic structure may have substantial beneficial consequences setting the child on a lower trajectory for cardiovascular risk later in the lifecourse.

Funding

This work was supported by funding from the Medial Research Council, Arthritis Research UK, the British Heart Foundation and the National Institute for Health Research (NIHR) Southampton Biomedical Research Centre.

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The Southampton Biomedical Research Centre is funded by the National Institute for Health Research (NIHR) and is a partnership between University Hospital Southampton NHS Foundation Trust and the University of Southampton

Involving service users in trial design: outcomes, splint selection and placebo design in a trial of treatment for thumb-base osteoarthritis

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1) School of Clinical Sciences, University of Bristol, UK; 2) Arthritis Research UK Primary Care Centre, Keele University, UK; 3) Faculty of Health Sciences, University of Southampton, UK

Background and aims

Thumb-base osteoarthritis (OA) affects 20% of people aged ≥55. It is associated with long-term pain, work disability, reduced quality of life and overall function.

Optimal management for thumb base OA has the potential to deliver benefits for patients, health services and society. A common approach is splinting. However, previous trials of splints for thumb-base OA have not included placebo groups and it is not clear if they assess outcomes or splints that are important or acceptable to patients.

To address these gaps, and in light of recent evidence about the value of patient involvement in research, we conducted a patient involvement project to inform the design of a new trial of splints for thumb-base OA: the OTTER trial.

Methods

Service users: Two involvement sessions took place with a total of eight people (seven women and one man, age 65-72 years) who all wore hand splints for thumb -base OA.

Session aims: Sessions aimed to identify outcomes to include in a future trial; identify splints to assess in a Delphi study prior to the trial; and to design a placebo splint.

Session organisation: Sessions were facilitated by a researcher experienced in patient involvement , and a research-lead in occupational therapy. Another research staff member took notes, and a user support worker attended one session.

Session content: Group members were encouraged to discuss their experience of OA, their use of splints and outcomes of importance to them. They were then shown 45 splints, which they discussed and tried. Concepts of randomisation, uncertainty (and equipoise) and placebo were introduced. Group members worked alongside facilitators to identify key elements of a placebo splint that would make it convincing and acceptable, and worked on some design possibilities using various materials.

Evaluation: At the end of each session, group members completed brief satisfaction questionnaires.

Groups of service users discussed living with thumb-base OA and their splints

Service users discussed the pros and cons of a variety of splints for thumb-base OA

Randomisation, uncertainty and placebo were introduced in plain English, before group members worked to design a placebo splint using various materials

Findings

1) Outcomes to assess in a future trial

Group members identified impact of OA on everyday and leisure activities. These included: housework, driving, gardening and other tasks requiring dexterity and grip. Splints were mostly used to relieve pain. However, splints hindered some activities and some service users felt embarrassed by them.

2) Identification of acceptable splints

Through discussing their own splints, and by trying other new ones, group members defined acceptable elements of splint design.

What makes a splint wearable?
Warmth, colour, material, fastening, washability

What factors affect a splint's support and immobilisation?
Rigidity, fit, pressure

3) Designing a placebo splint

Groups made suggestions about how to ensure that the placebo was convincing, and acceptable. They also discussed how to maintain 'blinding' in a future randomised trial. Both groups agreed on a placebo design, which included consideration of appearance and minimal support to the thumb and wrist. To maintain trial integrity, the final placebo design is not shown here. These are some illustrative comments:

'The repulsive flesh/pink colour of the splint would be convincing'

'Should not be able to be pulled tight [to minimise any potential effect]'

'Participants wearing a [non-placebo] splint should not come into contact with those wearing a placebo at clinic'

'[The splint] requires some pressure, anywhere on the thumb, in order to be convincing'

Evaluation

All 8 service users were 'very satisfied' that their views in the session had been taken into account. All were 'very satisfied' that their group had made decisions about how to design a placebo splint. All were either 'satisfied' or 'very satisfied' that their group had made decisions about the placebo design.

Conclusions

- Patient involvement activity is an efficient way to include service users in early stages of trial design. Service users found the process satisfactory.
- The impact of the involvement activity on the pilot trial is still to be evaluated. It will be important to assess the acceptability of the placebo in practice.

This study was funded by Arthritis Research UK, as part of the OTTER trial (ref 19400)
Further information may be obtained from: Dr Rachael Gooberman-Hill, School of Clinical Sciences, University of Bristol, UK, R.Gooberman-Hill@bristol.ac.uk, or Dr Jo Adams, Faculty of Health Sciences, University of Southampton, UK, ja14@soton.ac.uk
Service users provided their consent for use of photographic images of the sessions. Authors have no conflicts of interest.