School based education programme to reduce salt intake in children and their families (School-EduSalt): cluster randomised controlled trial

Feng J He,[1] Yangfeng Wu,[2 3 4] Xiang-Xian Feng,[5] Jun Ma,[6] Yuan Ma,[1 2 3] Haijun Wang,[6] Jing Zhang,[2] Jianhui Yuan,[5] Ching-Ping Lin,[2 7] Caryl Nowson,[8] Graham A MacGregor[1]

[1]Wolfson Institute of Preventive Medicine, Barts and The London School of Medicine and Dentistry, Queen Mary University of London, London, UK
[2]George Institute for Global Health at Peking University Health Science Center, Beijing, China
[3]Department of Epidemiology and Biostatistics, Peking University School of Public Health, Beijing, China
[4]Peking University Clinical Research Institute, Beijing, China
[5]Changzhi Medical College, Shanxi, China
[6]Institute of Child and Adolescent Health, Peking University Health Science Center, Beijing, China
[7]University of Michigan Medical School, Ann Arbor, MI, USA
[8]School of Exercise and Nutrition Sciences, Deakin University, Geelong, Australia
Correspondence to: F He
f.he@qmul.ac.uk

Cite this as: *BMJ* 2015;350:h770
doi: 10.1136/bmj.h770

This is a summary of a paper that was published on thebmj.com as *BMJ* 2015;350:h770

thebmj.com

- Research News: Too little salt in diet can be as bad as too much (*BMJ* 2014;349:g5507)
- Analysis: Food policies for healthy populations and healthy economies (*BMJ* 2012;344:e2801)
- Research: High salt meals in staff canteens of salt policy makers (*BMJ* 2011;343:d7352)

STUDY QUESTION

Can an education programme targeted at schoolchildren lower salt intake in those children and their families?

SUMMARY ANSWER

A reduction in salt intake can be achieved by integrating salt reduction education modules into primary school curriculums and empowering children to deliver the message to their families. Salt intake as measured by 24 hour urinary sodium excretion was reduced by about a quarter in both children and adults, over one school term of about 3.5 months, with an accompanying fall in systolic blood pressure in adults.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Salt intake is high in China, and it is added mainly by the consumers. Educating children in school is a novel, feasible, and effective approach to reducing salt intake in the population where most of the salt in the diet is added by the consumers.

Design

The study was a cluster randomised controlled trial, in which an independent statistician stratified randomisation using computer generated random numbers. Children in the intervention group were educated on the harmful effects of salt and on how to reduce salt intake using the schools' usual health education lessons. Children then delivered the salt reduction message to their families, particularly by persuading the person who did the cooking to reduce the amount of salt used. The intervention duration lasted one school term (about 3.5 months).

Participants and setting

We studied 279 children (age 10.1 in grade 5) from 28 primary schools in urban Changzhi, northern China. Additionally, 553 adult family members (age 43.8) participated in the assessments.

Primary outcome

The primary outcome was the difference between the intervention and the control group in the change of salt intake (as measured by 24 hour urinary sodium) from baseline to the end of the trial. The secondary outcome was the difference between the two groups in the change of blood pressure.

Main results and the role of chance

The mean baseline salt intake in children was 7.3 (SE 0.3) g/day in the intervention group and 6.8 (SE 0.3) g/day in the control group. In adults, salt intakes were 12.6 (SE 0.4) and 11.3 (SE 0.4) g/day, respectively. During the study there was a reduction in salt intake in the intervention group, whereas in the control group salt intake increased. The mean effect for the intervention compared with the control group was −1.9 g/day (95% confidence interval −2.6 to −1.3 g/day; P<0.001) in children and −2.9 g/day (−3.7 to −2.2 g/day; P<0.001) in adults. The mean effect on systolic blood pressure was −0.8 mm Hg (−3.0 to 1.5 mm Hg; P=0.51) in children and −2.3 mm Hg (−4.5 to −0.04 mm Hg; P<0.05) in adults.

Bias, confounding, and other reasons for caution

The School-EduSalt programme provides an important approach to lowering salt intake. To achieve the greatest reduction in population salt intake, however, this approach should be combined with other strategies—for example, by reducing salt content in school meals and processed food.

Generalisability to other populations

The results of this trial should be broadly applicable to most primary schools in China as the education programme was delivered using the schools' usual health education lessons as in the national school curriculum. Incorporating our education programme into the national curriculum would have a large impact on reducing salt intake in the population.

Study funding/potential competing interests

The study was funded by the UK Medical Research Council (MR/J015903/1).

Trial registration number

ClinicalTrials.gov NCT01821144.

Salt intake as calculated from 24 hour urinary sodium based on intention to treat analysis in study of school based education programme to reduce salt intake in children and their families

	Control (no salt education)			Intervention (salt education)			
	Mean (SE) salt intake (g/day)		Change from baseline* (95% CI)	Mean (SE) salt intake (g/day)		Change from baseline* (95% CI)	Adjusted difference† (intervention *v* control) (95% CI), P value
	Baseline*	End of trial*		Baseline*	End of trial*		
Children	6.8 (0.3)	8.0 (0.3)	1.2 (0.7 to 1.7)	7.3 (0.3)	6.6 (0.3)	−0.7 (−1.2 to −0.2)	−1.9 (−2.6 to −1.3), <0.001
Adults	11.3 (0.4)	12.1 (0.4)	0.8 (0.2 to 1.3)	12.6 (0.4)	10.4 (0.4)	−2.1 (−2.7 to −1.6)	−2.9 (−3.7 to −2.2), <0.001

*Adjusted for stratification variables at randomisation (school location and class size).
†Adjusted for age, sex, BMI, stratification variables at randomisation (school location and class size), and indoor and outdoor temperature.

Tumour necrosis factor inhibitors versus combination intensive therapy with conventional disease modifying anti-rheumatic drugs in established rheumatoid arthritis: TACIT non-inferiority randomised controlled trial

David L Scott,[1] Fowzia Ibrahim,[1] Vern Farewell,[2] Aidan G O'Keeffe,[3] David Walker,[4] Clive Kelly,[5] Fraser Birrell,[6] Kuntal Chakravarty,[7] Peter Maddison,[8] Margaret Heslin,[9] Anita Patel,[9] Gabrielle H Kingsley[1]

EDITORIAL by Miossec

[1]Department of Rheumatology, King's College London School of Medicine, London SE5 9RJ, UK
[2]MRC Biostatistics Unit, Institute of Public Health, University Forvie Site, Cambridge CB2 0SR, UK
[3]Department of Statistical Science, University College London, London WC1E 7HB, UK
[4]Musculoskeletal Unit, Freeman Hospital, High Heaton, Newcastle upon Tyne NE7 7DN, UK
[5]Department of Rheumatology, Queen Elizabeth Hospital, Gateshead NE9 6SX, UK
[6]Department of Rheumatology, Northumbria Healthcare, Northumberland NE63 9JJ, UK
[7]Department of Rheumatology, Queen's Hospital, Romford RM7 0AG, UK
[8]School of Medical Sciences, Bangor University, Bangor LL57 2DG, UK
[9]Centre for the Economics of Mental and Physical Health, Institute of Psychiatry, King's College London, London SE5 8AF, UK
Correspondence to: D L Scott
d.scott1@nhs.net

Cite this as: *BMJ* 2015;350:h1046
doi: 10.1136/bmj.h1046

This is a summary of a paper that was published on thebmj.com as *BMJ* 2015;350:h1046

thebmj.com

- Research: Rheumatoid arthritis, anti-tumour necrosis factor therapy, and risk of malignant melanoma (*BMJ* 2013;346:f1939)
- Research News: Conventional triple therapy as good as etanercept for uncontrolled rheumatoid arthritis (*BMJ* 2013;346:f3846)
- Clinical Review: Recent advances in the management of rheumatoid arthritis (*BMJ* 2010;341:c6942)

STUDY QUESTION

Do patients with active rheumatoid arthritis that has not been controlled by methotrexate and other standard treatments achieve comparable benefits from starting combinations of relatively inexpensive synthetic disease modifying drug compared with starting high cost biologics?

SUMMARY ANSWER

Starting intensive synthetic disease modifying drug combinations gives non-inferior outcomes and costs substantially less than starting tumour necrosis factor inhibitors in those patients with active rheumatoid arthritis who meet English criteria for biologic drugs.

WHAT IS KNOWN AND WHAT THE STUDY ADDS

Tumour necrosis factor inhibitors are effective in patients with active rheumatoid arthritis, and some economic models justify use when methotrexate does not work, despite the considerable expense. This large non-inferiority trial, however, showed that patients achieve non-inferior benefits in disability, with no demonstrable difference in quality of life or prevention of joint damage, with combined synthetic disease modifying drugs, which cost considerably less.

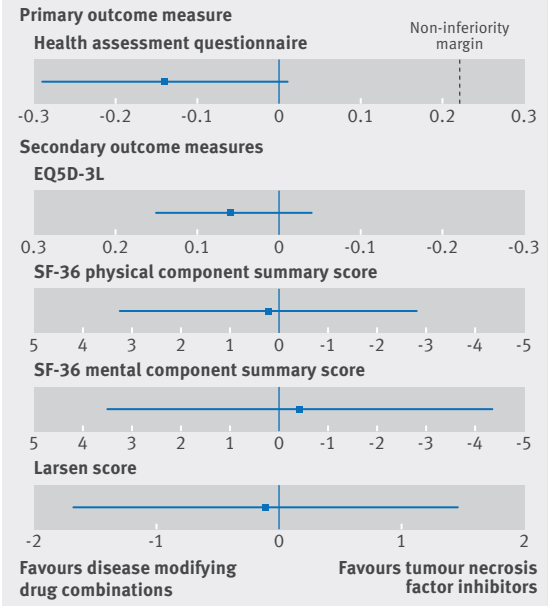
Design Open label 12 month pragmatic randomised multicentre two arm non-inferiority trial with block randomisation and computer generated allocation.

Participants and setting 205 patients with rheumatoid arthritis eligible for tumour necrosis factor inhibitors by current English guidance who were managed as outpatients at 24 English rheumatology centres.

Primary outcome 12 month falls in disability measured with the patient recorded heath assessment questionnaire (range 0-3). A 0.22 non-inferiority margin for combinations of disease modifying drugs versus the biologic strategy was used.

Main results and the role of chance Health assessment questionnaire scores fell by −0.30 after patients who started taking tumour necrosis factor inhibitors and −0.45 in those who started taking a combination of disease modifying drugs. The difference between groups in unadjusted linear regression analysis favoured combination disease modifying drugs. The mean difference of −0.14 (95% confidence interval −0.29 to 0.01) was below the prespecified non-inferiority boundary of 0.22. Health and social care costs were £5545 (€7570, $8586) less for each patient starting combination disease modifying drugs.

Observed treatment differences in patients with rheumatoid arthritis randomised to combinations of disease modifying drugs or tumour necrosis factor inhibitors



Harms 28 patients had serious adverse events (18 randomised to biologics; 10 randomised to combination disease modifying drugs); six and 10 patients, respectively, stopped the allocated treatment because of toxicity.

Bias, confounding, and other reasons for caution Our trial was pragmatic and unblinded with some eligible patients not wanting to take part. The patients received individualised treatment regimens and were able to stop or switch treatments. As patients were followed for only 12 months, there was also insufficient time to fully assess the potential benefits of biologics. Use of the health assessment questionnaire as the primary outcome measure is a final reason for caution.

Generalisability to other populations The patients had diverse ethnicities and deprivation levels. They were seen in routine practice settings in geographically dispersed English centres. The primary outcome was patient centred and focused on issues crucial for people with arthritis.

Study funding/potential competing interests The National Institute for Health Research Health Technology Assessment programme funded this trial.

Trial registration ISRCTN 37438295.

Statins and congenital malformations: cohort study

Brian T Bateman,[1 2] Sonia Hernandez-Diaz,[3] Michael A Fischer,[1] Ellen W Seely,[4] Jeffrey L Ecker,[5] Jessica M Franklin,[1] Rishi J Desai,[1] Cora Allen-Coleman,[1] Helen Mogun,[1] Jerry Avorn,[1] Krista F Huybrechts[1]

EDITORIAL by Haramburu and colleagues

[1]Division of Pharmacoepidemiology and Pharmacoeconomics, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA, USA
[2]Division of Obstetric Anesthesia, Department of Anesthesia, Critical Care, and Pain Medicine, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA
[3]Department of Epidemiology, Harvard School of Public Health, Boston, MA, USA
[4]Division of Endocrinology, Diabetes and Metabolism, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA
[5]Department of Obstetrics and Gynecology, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA
Correspondence to: B T Bateman
bbateman@partners.org

Cite this as: *BMJ* 2015;350:h1035
doi: 10.1136/bmj.h1035

This is a summary of a paper that was published on thebmj.com as *BMJ* 2015;350:h1035

thebmj.com

- Research News: Tight blood pressure control during pregnancy offers no clear benefits (*BMJ* 2015;350:h549)
- Research News: Statins may have fewer side effects than is claimed (*BMJ* 2014;348:g2151)
- News: NICE recommends wider use of statins in draft guidelines (*BMJ* 2014;348:g1518)

STUDY QUESTION

Does maternal use of a statin during the first trimester increase the risk for congenital malformations in infants?

SUMMARY ANSWER

Women taking statins during the first trimester of pregnancy were at an increased risk of delivering an infant with malformations. However, the association was explained by underlying characteristics of users, mainly pre-existing diabetes, and statins themselves did not seem to have any meaningful teratogenic effect.

WHAT IS KNOWN AND WHAT THIS PAPER ADDS

Statins are considered contraindicated in pregnancy. This analysis did not show a significant teratogenic effect of statin use during the first trimester.

Participants and setting

Medicaid beneficiaries with completed pregnancies linked to liveborn infants, 2000-07.

Design, size, and duration

A cohort of 886 996 completed pregnancies linked to liveborn infants of women enrolled in Medicaid from 2000 to 2007, of which 1152 were exposed to a statin during the first trimester.

Main results and the role of chance

In unadjusted analyses, the prevalence of malformations in the offspring of women who used statins in the first trimester was 6.34% compared with 3.55% in those who did not (relative risk 1.79, 95% confidence interval 1.43 to 2.23). Controlling for confounders, particularly pre-existing diabetes, accounted for this increase in risk (1.07, 0.85 to 1.37). There were also no statistically significant increases in any of the organ specific malformations assessed after accounting for confounders. Results were similar across a range of sensitivity analyses.

Bias, confounding, and other reasons for caution

While our data suggest that statins do not significantly increase the overall risk of malformations, we cannot exclude the possibility that they confer risk of rare, specific malformations or that particular individual statins are associated with specific risks. We also cannot comment on any long term effects on the fetus of in utero exposure to statins. More information about the long term effects of such exposure and about the effect on other neonatal outcomes, as well as replication of our findings in other large datasets with well measured information on statin use, confounders, and outcomes, are needed before statin use during pregnancy can be considered safe.

Generalisability to other populations

Our cohort was drawn from beneficiaries of Medicaid, which includes women on a low income. The results should, however, be generalizable to other populations.

Study funding/potential competing interests

This study was supported by the Eunice Kennedy Shriver National Institute of Child Health & Human Development of the NIH (Bethesda, MD) under award No K08HD075831 (BTB), the National Heart Lung and Blood Institute of the NIH under award No K24HL096141 (EWS), and the National Institute of Mental Health of the NIH under award No K01MH099141 (KFH). Medicaid Analytic eXtract pregnancy cohort creation was supported by the Agency for Healthcare Research and Quality (AHRQ) (grant R01HS018533). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. SHD has consulted for GlaxoSmithKline-Biologics and AstraZeneca for unrelated projects. JMF has consulted for Aetion and received grant support from Merck for unrelated projects. PhRMA, Takeda, Pfizer, and Bayer provide training funds for pharmacopidemiology students at Harvard School of Public Health (SHD).

Risk for major congenital malformations in infants of women who did or did not use statins during first trimester. Medicaid Analytic eXtract 2000-07

	Full cohort			Relative risk (95% CI)		
Statin use	Total No	No of congenital malformations	Risk (%)	Unadjusted	Stratified on diabetes	Propensity score stratified
No statins	885 844	31 416	3.55	Referent	Referent	Referent
Statins	1152	73	6.34	1.79 (1.43 to 2.23)	1.34 (1.07 to 1.68)	1.07 (0.85 to 1.37)