

RESEARCH AUTISM

Research Report



Development of gluten and casein free test foods for use in an autism dietary trial

Introduction

This study was carried out by researchers from Newcastle University, Northumbria Healthcare NHS Foundation Trust, Edinburgh University and Guy's and St. Thomas Foundation Trust at three locations in the United Kingdom, between February 2007 and September 2008. The study aimed to discover whether it is possible to produce a range of foods suitable for daily consumption by young children with autism that can be used in scientifically valid and reliable studies of dietary interventions.

This study is important because many families with autistic children undertake a gluten and casein free (GFCF) diet even though there is little scientific evidence to support its use. There is an urgent need to conduct scientifically valid and reliable studies into this intervention. Such a study cannot be done until it can be shown that the test foods essential for these studies can be manufactured in such a way that the children, their parents and researchers, are not able to detect if those foods contain gluten and/or casein or neither substance

Key Findings

- It is possible to manufacture GFCF test foods in such a way that children, parents and researchers cannot tell if those foods contain gluten or casein or not.
- The majority of children completed the study with only a small number withdrawing because of food refusal.
- The majority of parents reported that their children were usually willing to try new foods and the majority of children tried some of the test foods.
- The children eating food stuffs with added gluten consumed the most food and the children eating foodstuffs with added casein consumed the least food - possibly indicating that gluten's properties are easier and casein's are harder to disguise.
- Muffins and krispie bars were the most popular products, porridge was the least popular product.
- The majority of parents prepared the test food mixes without any difficulty.
- Approximately half of parents reported they would like more variety, particularly savoury options (e.g. bread) and smaller portions for younger children.

Conclusion

- It is possible to manufacture GFCF test foods that are identical in appearance with some containing added amounts of gluten and/or casein, in such a way that they are acceptable to children and their parents.
- This means that it is possible to produce test foods suitable to conduct double-blind, random control trials i.e. scientifically valid and reliable studies, of the GFCF dietary intervention.

Background

The term autism describes a neuro-developmental condition, usually present from early childhood and persisting through life, which is associated with difficulties in social functioning, communication and behaviour.

Many people believe that gluten – a protein found in cereals such as wheat and barley - and/or casein – a protein found in dairy products, such as milk and cheese – may exacerbate or even cause some of the symptoms of autism. Because of this many families with autistic children follow a gluten and casein free (GFCF) diet, even though there is little scientific evidence to support its use.

Current study

The current study was designed to answer one key question not answered by previous research i.e. whether it is possible to produce test foods double blinded for gluten and casein that are suitable for use in a dietary intervention trial with young children with autism.

Methods

- R&D and ethical approval was given for health professionals to recruit 60 children with autism.
- Following assessment of eligibility and informed consent, their families received a supply of test foods, detailed cooking instructions and behaviour and food preference questionnaires for self-completion.
- Heron Foods developed a range of GFCF test foods including a muffin, porridge and batter mix, and pre-prepared lemon and almond cookies and chocolate krispie bars. (Fig 1).
- To provide the estimated average habitual intake of gluten (10 g) and/or casein (10 g) two portions of the test foods were offered each day.
- The children were randomly allocated to four groups (A-D), each of which received foodstuffs containing different amounts of gluten and/or casein or neither.
- Numbers were evenly spread between groups (A: 12, B: 13, C: 14, D: 13). All groups included some children with core autism and ASD (33% of the sample).
- Group A received 5 g added gluten. Group B received 5 g added casein. Group C received no additional gluten or casein. Group D received 5 g of both gluten and casein
- Other foodstuffs containing gluten and/or casein were not withdrawn from the children's diet.
- Parents offered the test foods to their children for 28 days and recorded daily consumption.



Figure 1. A portion of each Test Food. Parents offered two portions/day.

Participants

At the beginning of the study all of the children were diagnosed with autism, aged 3-6 years old, free of any other chronic or serious medical conditions, not undertaking any other medically prescribed dietary interventions, and living in a family home in Newcastle, Edinburgh or London.

Measures

The test foodstuffs were assessed using a number of measures including how willing the children were to try the foods and how easy it was for the parents to prepare the food.

Research Design

The study was conducted with children with autism and was double blind. However the participants continued with usual diet which may have affected the quantity of foods consumed. In addition, the parents were asked to estimate the proportion of each food consumed on each occasion and to record this estimate. More accurate assessment of the quantity of foods and so gluten and or casein could have been made if parents had been asked to weigh test foodstuffs left over on each occasion.

Results

- 52 (age 57 +/- 10 months) children completed the study with only 3 families withdrawing due to food refusal.
- More than 80% of parents in all groups prepared the test food mixes without any difficulty.
- 47% of parents reported they would like more variety, particularly savoury options and smaller portions for younger children.
- 63 % of parents reported that their children were usually willing to try new foods and 94% of children tried some of the test foods.
- The children eating test foods with added gluten consumed more of the test foods than the children eating test foods with added casein only.
- Muffins and krispie bars were the most popular products, porridge was the least popular product.
- The percentage of times half or more of a portion of test food was eaten is shown below.

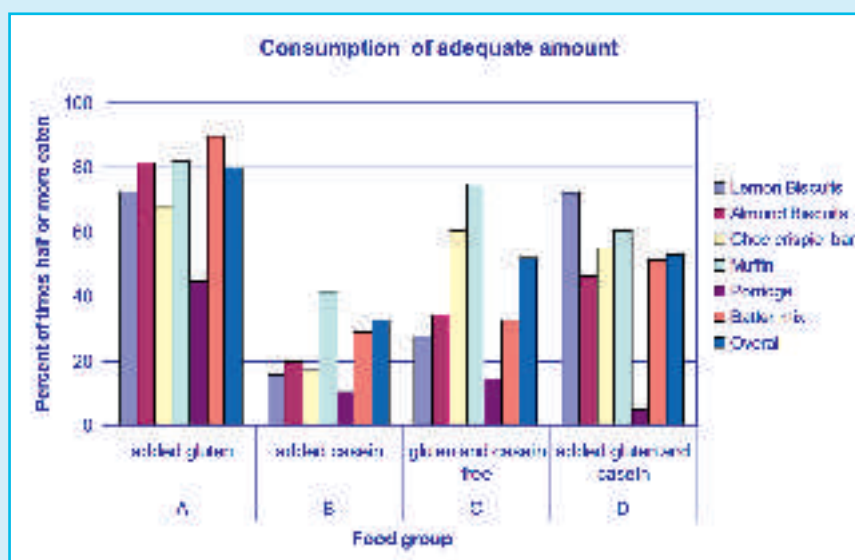


Figure 2. Comparing the proportion of times an adequate amount of each food item was consumed across food groups.

Further Information

Full study

This research report is based on Adams S. et al. (2008). Development of double blind gluten and casein free test foods for use in an autism dietary trial. *Journal of Human Nutrition and Dietetics*, 21(4), p. 374. A more detailed paper is in preparation for submission to the BMC Health services research journal.

Other studies

An evaluation of a number of other studies into the effectiveness of special diets, and other interventions, can be found on the Research Autism website at www.researchautism.net

This website is one of the biggest, most up-to-date, and most scientifically reliable websites in the world for information about autism, the issues facing people with autism, and the interventions used to help them.

Organisations

- **Research organisations** Newcastle University, Northumbria Healthcare NHS Foundation Trust, Edinburgh University and Guy's and St. Thomas Foundation Trust.
- **Funders** Research Autism and The Children's Foundation. Charities that funded the research study and the subsequent dissemination activities.
- **Other relevant organisations** Heron Foods in Cork developed and manufactured the GFCF test foods.

Research Autism

We are the only UK charity exclusively dedicated to research into interventions in autism. We commission, carry out and support high quality, independent research into new and existing health, education, social and other interventions.

Research Reports

'Research Reports' is an irregular series of scientific research reports into autism issues published by Research Autism. Each report is designed to explain sometimes complex scientific research findings to a non-scientific audience.