



# Improvements in stage of change correlate to changes in dietary intake and clinical outcomes in a 5-year lifestyle intervention in young high-risk Sri Lankans



N. Guess<sup>a,\*</sup>, L. Vasantharajah<sup>b</sup>, M. Gulliford<sup>c</sup>, G. Viberti<sup>d</sup>, L. Gnudi<sup>d</sup>, J. Karalliedde<sup>d</sup>, M. Wijesuriya<sup>b</sup>

<sup>a</sup> Diabetes and Nutritional Sciences Division, Kings College London, London, United Kingdom

<sup>b</sup> Diabetes Association of Sri Lanka, Colombo, Sri Lanka

<sup>c</sup> King's College London, Primary Care & Public Health Sciences, London, United Kingdom

<sup>d</sup> King's College London, Cardiovascular Division, London, United Kingdom

## ARTICLE INFO

### Article history:

Received 31 January 2016

Received in revised form 2 June 2016

Accepted 8 July 2016

Available online 9 July 2016

### Keywords:

Transtheoretical model

Disease prevention

Diet

Diabetes

Fat

Fibre

## ABSTRACT

The objectives of a stage-matched approach to lifestyle change are that individuals progress forward through the stages of change. It also posits that progression through the stages of change is associated with positive changes in lifestyle behaviours. Measuring the relationship between stage of change and food intake is challenging due to the plurality of dietary behaviours. Furthermore, it is not clear whether changes in behaviour are sustained long-term. In this study we assess the movement through stages of change in the intensive (visits every 3 months) and control groups (visits annually) of a large-scale primary prevention study in cardiovascular disease, carried out in 2637 children and young adults in Sri Lanka between 2007 and 2012. We also examine their relationship to dietary behaviours and clinical outcomes. We demonstrate that individuals in both groups continue to progress through stages of change over the course of the study and that measures of dietary behaviours improved from baseline to final follow-up. We also demonstrate that stage of change positively correlates to dietary behaviours including the ratio of recommended: not-recommended items, unpolished: polished starches and low-fat: high-fat food items throughout each year of the study. Finally, participants in the later stages of change at Y2, Y3 and Y4, had a significantly attenuated increase in weight and waist circumference at the final visit in both groups. We therefore demonstrate the usefulness of stage-matched approach in modifying complex dietary behaviours, and that stage of change is a valid measure of dietary behaviours across a large population over time.

© 2016 Elsevier Inc. All rights reserved.

## 1. Background

It is clear lifestyle intervention is central to the prevention of type 2 diabetes (T2D) and the metabolic syndrome (Orchard et al., 2005; Lindström et al., 2003). The success of lifestyle change lies in altering several behaviours including decreasing calorie and saturated fat intake; and increasing dietary fibre and physical activity (Orchard et al., 2005; Lindström et al., 2003). In the Finnish Diabetes Prevention Study, the relative risk of T2D reduced with each additional behaviour changed (Tuomilehto et al., 2001).

The traditional approach to behaviour change has often been dogmatic and education-based, with the practitioner advising the patient on appropriate action to take (Kravitz et al., 1993). However, this approach assumes that the patient is already motivated to make the changes suggested (Guise, 2000). The transtheoretical model (TTM) of

behaviour change postulates that individuals are at different stages of readiness to adopt a new behaviour (Prochaska et al., 1997). It is also suggested that providing instruction to an individual in the pre-contemplation stage (the individual is not intending to change in the foreseeable future) is thought to be ineffective (Prochaska et al., 1997). For this reason previous lifestyle prevention programs have included only individuals who are ready to change (DPP Group Diabetes Prevention Program Research Group, 1999; Look AHEAD Research Group, 2007a). However, providing “stage-matched” individualised interventions tailored to a subject’s individual stage of behaviour change is thought to be more effective than a single cross-population intervention (Prochaska et al., 1994). The objectives of this approach are that 1) individuals move forward through the stages of change, and 2) movement through the stages of change is associated with positive changes in health behaviours. The efficacy of “stage-matched” personalized assessment and advice has been demonstrated in people with T2D (Clark et al., 2004; Jalilian et al., 2013), hypertension (Friedberg et al., 2015), and cardiovascular disease (CVD) (van der Veen et al., 2002).

However, the evidence is not completely consistent. Both the implementation and assessment of behaviour change programs which aim to

\* Corresponding author at: Diabetes and Nutritional Sciences Division, Faculty of Life Sciences & Medicine, King's College London, FWB 4.13 150 Stamford Street, London SE1 9NH, United Kingdom.

E-mail address: [Nicola.Guess@kcl.ac.uk](mailto:Nicola.Guess@kcl.ac.uk) (N. Guess).

alter food intake can be particularly challenging due to the plural nature of dietary change (Spencer et al., 2007; Naylor et al., 1999). For example, in contrast to smoking cessation programs focussed on a singular behaviour, dietary change may include decreasing saturated fat intake, increasing fruit and vegetable intake and decreasing portion sizes. Therefore, examining progression through the stages of change and the relationship between stage of change and lifestyle behaviours requires a study with sufficient statistical power to assess changes in individual dietary components (Naylor et al., 1999).

Frequent follow-up visits (more than once a month, face-to-face contact during the first three months) are thought to be most effective at engendering lasting behaviour change (Carvajal et al., 2013), but recidivism is a common occurrence in lifestyle interventions (Look AHEAD Research Group and RR, 2010; Appel et al., 2006). The majority of TTM-based behaviour-change programs include follow-up data of only up to one year (Steptoe et al., 2003; Mau et al., 2001; Prochaska et al., 2005; Auslander et al., 2002). Long-term follow-up is important to determine whether a stage-matched approach can alter dietary behaviours over time.

Therefore, in this large scale study, we aimed to examine progression through the stages of change as defined by the TTM and to examine how readiness to change relates to healthful dietary changes over a 4-year follow-up in a developing population.

## 2. Method

The design of the trial is described in full elsewhere (Wijesuriya et al., 2011). In brief, 4683 Sri Lankan urban young males and females aged 5–40 years at high risk of metabolic syndrome were randomized to intensive lifestyle modification group or less intensive control group. The principles of the lifestyle change program, which included changes in diet and physical activity, were based upon the Indian Diabetes Prevention Program (IDPP) (Ramachandran et al., 2006). Clinical and dietary data was collected at baseline, and annually up to the final follow-up. The study was given ethical approval from the Sri Lanka Medical Association Ethical Review Committee (ERC 07-010). Permission from the Ministry of Education was obtained for this study which was conducted under the Good Clinical Practice Guidelines and according to the principles expressed in the Declaration of Helsinki for clinical research. All participants provided written informed consent.

### 2.1. Recruitment and participants

Inclusion criteria of the trial were first degree family history of T2D, physical inactivity, elevated BMI and raised waist circumference (WC). Exclusion criteria were subjects with no or only one identifiable risk factor and subjects with diagnosed end-points. Participants were recruited from schools and work places to include a range of educational levels including no formal education, <5 years formal education, secondary education, pre-university and higher education (Wijesuriya et al., 2011). Following screening of 23,298 participants, 5164 were identified as being eligible for the trial of whom 4682 participants attended the baseline screening. As this study assesses the TTM of behaviour change which has not been well validated in those under 11 years (Spencer et al., 2007), this study examines the data of all individuals over the age of 10 years at study recruitment ( $n = 2637$ ).

### 2.2. Peer-to-peer approach

The baseline and follow-up dietary advice was given by trained lifestyle interventionists. The lifestyle interventionists were recruited from the local communities and did not have a medical or nutrition background. We used this approach because such community-driven initiatives provide the community with the skills and resources to implement and continue health promotion and disease prevention programs (Hennessey Lavery et al., 2005). Furthermore, since our cohort was also young, with more than half of people under 18 years, we also used this peer-to-peer approach to try to develop camaraderie between the interventionist and participant, such that a mutual trust and friendship could develop (Shinitzky and Kub, 2001). A training manual was used according to International Diabetes Federation assessors and this was supervised by representatives from Kings College London. In total, 25 people were trained. The training was done by specialists in diet, exercise and counselling using a

standardised training manual approved by the International Diabetes Federation. The training included presentations on CVD, diet, exercise, and motivational interviewing techniques; working through case studies together as a group; role-play to practice counselling skills, measuring serving sizes, and dealing with barriers to change. The initial training lasted 6 weeks. Throughout the study, lifestyle interventionists were also required to attend weekly case discussions in addition to having to make a weekly presentation on a relevant health topic to the principal investigator and head of research. This ensured the quality of advice remained consistent throughout the study.

### 2.3. Dietary goals

Individualised advice was given based on the needs of the subjects. In those with a raised BMI (age and gender appropriate) advice was given to achieve a 5% weight loss and in children, the aim was to limit weight gain. For both weight management and CVD risk reduction, specific goals included avoidance of simple sugars and refined carbohydrates, reduce total fat intake (not to exceed 20 g/day), restricted consumption of saturated fat and inclusion of more fibre-rich food such as whole grains, legumes, vegetables and fruits (Ramachandran et al., 2006). In order for the advice to be delivered by people the lifestyle interventionist, a simplified exchange approach was used. A list of food groups was developed with high-energy dense (not-recommended) or low-energy dense (recommended) varieties highlighted (Supplementary data). While, some of the foods in the not-recommended category are not known to have detrimental effects on CVD risk (e.g., egg yolks) and others are thought to be beneficial (e.g., nuts), they were included in the not-recommended lists due to their high-energy content. This approach simplified the delivery of the dietary advice, and participants were advised to make “exchanges” as opposed to “reduce intake of x”.

### 2.4. Stage-matching

Due to the whole-diet approach of the intervention, a generalised construct of “readiness to make healthy dietary changes” was used (Supplementary data). This approach was chosen for several reasons. Firstly, the exchange model was straight-forward for the interventionists to use in improving the diet of the participants, such that they did not require a detailed knowledge of which foods were high in fat, saturated fat, high in calories or low in fibre. For the interventionists to know which dietary behaviours belonged to which stage of change construct (i.e., readiness to reduce foods high in saturated fat or high in fibre) they would need to which food group this belonged to. Such an approach may have introduced variability in the advice given and inaccurate data collection. Secondly, while constructs specific to an individual behaviour are often the most used method to assess drivers of change, some researchers suggest that a general construct such as ‘readiness to change’ or ‘concern for one’s health’ may be preferable where multiple behaviours are modified (Koshy et al., 2012). Finally, there is no consensus on the ideal number of behaviours that can be modified at one time (Nigg et al., 2002). Our whole-diet approach was to make incremental changes in the number of recommended versus not-recommended items.

The dietary exchange advice was then provided to participants based on their stage of change (Supplementary data). For example, participants in precontemplation received information such as how improving the diet by making small exchanges could reduce the risk of CVD. In contemplation, interventionists reviewed possible benefits of dietary improvement, or discussed barriers to dietary exchange. If the participant was ready and open at the pre-action stages, one or two dietary exchanges were suggested. In preparation, the interventionist and participant developed an exchange plan including how and when such exchanges should be made. In action the interventionist and participant reviewed exchanges made, and discussed strategies to cope with triggers or barriers to dietary adherence. In the maintenance stage, advice was reinforced, and participants were provided with social support strategies and problem-solving skills.

### 2.5. Dietary data collection

The interventionists collected the dietary data at each follow-up, and servings were estimated using standard serving spoons and tablespoons. Serving sizes of biscuits, dairy and beverages were assessed using common household items. All counselling and follow-up sessions took place in the clinic. If the participant was under 15 years, the parents also came along as any changes required their support and understanding.

Download English Version:

<https://daneshyari.com/en/article/6046060>

Download Persian Version:

<https://daneshyari.com/article/6046060>

[Daneshyari.com](https://daneshyari.com)