

Institution: Liverpool Hope University		
Unit of Assessment: A6 Agriculture, Food and Veterinary Sciences		
Title of case study: Improving Health and Nutrition of University Students - Change in Practice in Response to the Local Assessment of Nutritional Status.		
Period when the underpinning research was undertaken: 2010 - 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Dr Farzad Amirabdollahian	Associate Professor	2011 - Present
Dr Claire Macdonald-Clarke	Lecturer	2015 - Present
Dr Grace Farhat	Lecturer	2017 - Present
Period when the claimed impact occurred: 2014 - 2020		
Is this case study continued from a case study submitted in 2014? N		
<p>1. Summary of the impact (indicative maximum 100 words) Our collaborative research together with students demonstrated that poor diet and lifestyle habits put young adults at risk of developing noncommunicable diseases. This case study documents the improvement of the university's health promotion practice in response to local research, through improving infrastructure for assessment of physical health, systematic promotion of healthier food options, improving cooking skills, and improving food provision and catering services. The above conceptual framework was submitted to the Healthy Universities network and became a resource toolkit for changing practice based on local assessments, while it was also discussed with stakeholders to influence the national debate and practice.</p>		
<p>2. Underpinning research (indicative maximum 500 words) The transition period into young adulthood is a critical time for establishment of lifelong healthy habits. The UK National Diet and Nutrition Survey (NDNS) has identified that the youngest adults (i.e. aged 18 - 24 years) consumed larger quantities of high calorie, high-fat foods and fewer portions of fruits and vegetables than other adults. The Health Survey for England (HSE) also showed that the adults within the youngest age category consumed, on average, three portions of fruit and vegetables per day; far less than the UK's recommendation of 'Five-a-day', referring to eating at least five portions (400g) of fruit and vegetables. Most University Students (USs) belong to this age group, and this makes British USs a group potentially vulnerable to positive energy balance and consequently at risk of developing health complications such as obesity and its associated comorbidities, such as diabetes, cardiovascular disease, and cancer later in life.</p> <p>The project CINSYA (Collaborative Investigation on the Nutritional Status of Young Adults) was designed to actively engage students in practical perspectives of conducting research and delivering health promotion based on local need assessments. The project is innovative because of the extensive involvement of undergraduate students in design, delivery and dissemination, and their unique involvement in the development of health promotion activities. This project has been running for several years (since 2014), hosting several final year undergraduate research projects, dissertations, and voluntary summer placements.</p> <p>As part of CINSYA, we examined more than 550 USs in a cross-sectional study in the city of Liverpool, UK. We collected the demographic data (using validated questionnaires of the NDNS), assessed body composition (via using a multi-frequency bioelectrical impedance), diet and physical activity (through three days integrated diet and physical activity diary), and blood</p>		

biomarkers. We then examined gender and socioeconomic variations to understand health and nutritional status of our USs and consider the key strategic areas of focus for developing health promotion interventions.

The physiological assessments demonstrated that more than half of our local population were at risk of developing metabolic syndrome (i.e. demonstrated at least one cardiometabolic risk factor). Among the risk factors, abdominal obesity (especially abnormalities in waist circumference indices), hypertension and dyslipidaemia (typically represented by abnormalities in circulatory lipoproteins) were the most frequent risk factors. This is an important finding considering that young adults who develop metabolic syndrome are at increased risk of developing cardiovascular disease and diabetes in later life, while it is also worthy of note that the above risk factors are modifiable and strongly associated with poor dietary and lifestyle choice. The separate analysis of the dietary data also confirmed that poor quality of diet, in particular, has substantially contributed to several inadequate micronutrients' intake within our local USs population, while the subgroups analysis demonstrated that with increasing weight amongst the USs, the quality of diet decreases.

A package of interventions was developed together with students to enhance the nutritional status of the university students through change of practice.

3. References to the research (indicative maximum of six references)

1. Farhat, G., Lees, E., Macdonald-Clarke, C.J., and Amirabdollahian, F (2019) 'Inadequacies of micronutrient intake in a sample of normal weight and overweight young adults aged 18-25 years: A cross-sectional study.' *Public Health* (doi: 10.1016/j.puhe.2018.10.016)
2. Amirabdollahian F., and Haghghatdoost F (2018) 'Anthropometric Indicators of Adiposity Related to Body Weight and Body Shape as Cardiometabolic Risk Predictors in British Young Adults: Superiority of Waist-to-Height Ratio.' *Journal of Obesity* (doi: 10.1155/2018/8370304)
3. O'Sullivan, N and Amirabdollahian, F (2016) 'Loyal Tongue, Liberal Mind: International Students' Experiences on Dietary Acculturation in England.' *Journal of International Students*, 6 (1). pp. 107-127. ISSN 2166-3750
4. Glendenning, G., Alaunyte, I and Amirabdollahian F (2015) 'An investigation into gender variation in the nutritional status of young adults'. *Proceedings of the Nutrition Society*. (doi:10.1017/S0029665115003687).
5. Lowry, S., Alaunyte, I and Amirabdollahian F (2015) 'Diet quality, usage and perceived benefits of nutritional supplements in young healthy adults'. *Proceedings of the Nutrition Society* (doi:10.1017/S002966511500381X).
6. Foster, H., Alaunyte, I and Amirabdollahian F (2015) 'An investigation in the quality of diet and adequacy of energy and macronutrient intake amongst male and female university students'. *Proceedings of the Nutrition Society* (doi:10.1017/S0029665115003675).

4. Details of the impact (indicative maximum 750 words)

In this case study, we report change in practice of health promotions in response to the assessment of nutritional status of USs. The impact case study uses the definition of Impact on 'students' within and beyond the submitting HEI (Paragraph 300 b - Guidance on Submission), first to establish the improvement of practice at Liverpool Hope University (LHU), and then impact beyond LHU, through offering a conceptual framework for development of evidence-based health promotion activities based on local assessment of nutritional status.

1. Improvement of Practice within Liverpool Hope University

1.1 Improving infrastructure for assessment of physical health

To address hypertension and increased cardiometabolic risk reported in our research, we installed a fully automated blood pressure monitor in the School of Health Sciences for self-screening of staff and students. During the open days, applicant days, school visits and events, a complementary self-assessment of blood pressure was made available to all staff, students and visitors. We also delivered complementary health screening for young adults during the Freshers Fair and Science Week, providing opportunities for anthropometric assessments and measurement of blood biomarkers of glucose and lipid metabolism. Furthermore, we

strategically promoted the work of Tim Cogley Cardiac Screening Foundation (<https://www.timcogleyfoundation.com>, a charity affiliated with Liverpool Hope University, supporting free health screening for young adults) and proactively supported the complementary Cardiac Screening offered.

1.2 Systematically promoting healthier options

We produced a guide for 'Eating Well' for students in close collaboration with nutrition students. This was made available to more than 6000 students through the University website (S1). As part of the resources for the 'Eating Well', a 'Student's Guide to Nutrition, with recipes, tips and ideas' were produced as an outcome of an organic collaboration between registered nutritionists, nutrition students and the student support and wellbeing team of the student administration (S2). The PDF copy of the guide was sent to all new students (more than 1000 students/year) by email and widely distributed to all halls of residences of the university as hard copy, while printed recipe-cards using recipes from the guide were given out at student events, which produced very positive feedback. This is an example of feedback received from a fresher student: "...the section on *'tips to keep your bills down' and 'shopping tips' provided some new and useful information. As a student that lives away from home, this was very handy [and also] as a food shopper that was not used to shopping before. This was a handy guide [Immediately] before starting university when trying to get an idea of healthy meal plans and recipe(s), as I had not done this before it was useful for inspiration and ideas*" (S3).

1.3 Improving infrastructure for enhancement of Cooking Skills

Food Preparation and Cooking workshops were produced and delivered as part of the Let's Get Cooking programme (in collaboration with Mersey Waste Munchers project) for students in their first year of study, to improve cooking confidence and basic cooking skills, with the pledge that students also cascade the message via teaching cooking skills to their friends and classmates. The British Dietetic Association praises our work as an exemplar of *'Food Sharing Social Success'* and students involved reported an increase in cooking confidence, cooking for friends and increased consumption of vegetables [S4].

1.4 Improving the Food Provision and Catering Services

Nutrition academics and students spent time with the catering staff to discuss the specific nutritional and health issues of young adults, as a result of which the catering staff made changes to the environment with product placement and marketing images to promote healthy choices and consider health and food sustainability in food provision. In view of the discussions, several of the in-house catering recipes for food and drinks prepared on campus were nutritionally analysed using professional dietary analysis software. Chefs and catering assistants were provided with this information together with suggestions for potential changes to recipes, and used this information to improve the nutritional quality of the recipes (S5). The discussions between the research team and catering staff, shaped a close and continuous dialogue and collaboration on the integration of best practice guidelines in catering and nutrition, reducing the portion size of energy dense foods, students placements and knowledge transfer partnerships (S6).

2. Improvement of Practice beyond Liverpool Hope University

2.1 Promoting the change of Practice in the Healthy Universities Network

The Healthy Universities is a well-established network of 97 British HEIs and several international associate-member organisations that advocate using holistic understanding of health, and a whole university approach for systematic health promotion. We submitted a case study to champion improving the health promotion practice based on local assessment of nutritional status. The case study received inspiring praise from the network's professorial chair, for *"commitment to whole university approach, cooperative approach for working with students at all stages of the process, and range of practical responses to the research"* (S7) and became part of the Toolkits and Resources of the Healthy Universities (S8).

2.2. Disseminating the new Practice amongst Students and Practitioners, the Policy makers, and the Public

Impact case study (REF3)

The research findings, together with the subsequent evidence-based change in university practices (in response to the local assessment of the Nutritional status of the USs) were presented within a keynote speech at the Westminster Higher Education Forum to bring the matter to the attention of the member of Parliament and the policy makers (S9). This was also presented as part of the Continuous Professional Development accredited study day of the Association for Nutrition, sharing the knowledge with practitioners, registrants of the Association for Nutrition and the Nutrition Students across the Northwest England and beyond through delivery of an online Facebook Live talk (S9), while also promoted in local community and received coverage from media (S10).

5. Sources to corroborate the impact (indicative maximum of 10 references)

Source 1 (S1) Eating Well at the University (University Webpage developed)

Source 2 (S2) Students Guide to Nutrition

Source 3 (S3) User's contact information provided separately for verification

Source 4 (S4) British Dietetic Association's commentary on Food Sharing Social Success

Source 5 (S5) Sample of Catering drinks Nutritional Analysis

Source 6 (S6) Evidence of collaborations with Catering Department

Source 7 (S7) User's contact information provided separately for verification

Source 8 (S8) Healthy Universities Case Study

Source 9 (S9) How to improve Students' Diet? (Talk at the Westminster HE Forum) and Training of nutritionists as part of Professional CPD.

Source 10 (S10) Dissemination of message in community and through the regional media