How Does the Food Safety Knowledge of Student Dietitians Compare at a University in Wales, Lebanon and Ohio?

Vicky J. Gould¹*, Ellen W. Evans², Elizabeth C. Redmond², Nisreen Alwan³, Laura Hjeij³ & Sanja Ilic⁴







⁴Modern University for Business and Science, Beirut, Lebanon.

*Corresponding author: vjgould@cardiffmet.ac.uk





Introduction

In Europe and the U.S, consumers see healthcare professionals such as Doctors and Dietitians as the most trusted sources of food safety information.¹ Dietitians are perceived to be key, trusted spokespersons who deliver food-related dietary advice to the general public which includes individuals who are immune-compromised.²

Individuals who have a compromised immune system have an increased risk of foodborne infection.³ Dietitians have access to groups and individuals who are at risk of foodborne illness due to immunosuppression or medical treatments², and are therefore well placed to deliver food-safety information to reduce the risk of foodborne illness in vulnerable patients.

Provision of food safety information by registered dietitians can inform susceptible patient groups of risk-reducing food safety behaviours resulting in reduced risk of foodborne illness.⁴ Dietitians require appropriate information and training to allow them to deliver effective food safety advice to susceptible patients.

Previous research has determined gaps in practicing registered dietitians general food safety knowledge and pathogen awareness, which may result in patients being inadequately informed and thus, potentially more susceptible to foodborne illness. Dietitians need appropriate and adequate knowledge and skills to deliver effective food-safety advice, which can be gained during dietitian training. Training for dietitians in the UK, USA and in Lebanon is very similar, however the approach to the food safety aspect of training varies between institutions.

Attitudes towards food safety may influence trainee-dietitians' likelihood to engage with and deliver food safety advice to patients. Understanding trainee-dietitians attitudes towards food safety is required to enable delivery of effective food safety education to those in need.

Purpose

The aim of this research was to assess and compare food safety knowledge of student-dietitians in three accredited dietetics programs in utilizing different food safety teaching strategies.

Methods

Recruitment: Trainee dietitians (aged >18 years) studying at Cardiff Metropolitan University, Wales, UK (n=34) and The Modern University for Business and Science (MUBS) Beirut, Lebanon (n=25) and Ohio State University, Columbus, USA (n=102).

Data Collection: Utilised piloted self complete quantitative questionnaires. Questionnaires included a series of closed, multiple choice questions to determine respondent profile, knowledge of food safety practices, attitudes towards and reported experience of food safety training.

Data analysis: Quantitative data analysis was undertaken using Microsoft Excel 2016 and IBM SPSS Statistics package 23.

Ethical Approval: Approval was obtained from the Health Care and Food, Ethics Panel at Cardiff Met (reference no: 9299) and the Ethics committees at MUBS, Lebanon and Ohio State.

Results

Attitudes towards food safety education and training

From the 210 student dietitians that participated, 70% recalled having received food safety training/education as part of their degree course. Recall differed significantly (p<0.05) between the institutions, as indicated in Table 1. All student dietitians in Cardiff participated in a one-day food safety training programme, students in Beirut attended food service practicums and food microbiology lectures, whereas in Ohio, 69% of students completed microbiology and foodservice sanitation courses, and 39% completed ServSafe certification.

Table 1. Recall of food safety education and training among trainee dietitian in Wales (n=78), Lebanon (n=30) and Ohio (n=102).

Cardiff Met., Wales (<i>n</i> =78)	MUBS, Lebanon (<i>n</i> =30)	Ohio State University, USA (<i>n</i> =102)			
• 100% reported completing a one-day food safety training programme (Royal Society for Public Health Level 2 Award in Food Safety).	• 100% reported studying food safety as part of degree course modules: 'food microbiology and parasitology', 'food hygiene' or 'food service management'.	 39% reported completing Servsafe food handler or protection manager certification. 69% reported attending classes that included food safety: 'food service systems', 'food service sanitation' and 'basic microbiology'. 			
though all institutions provided food safety training/education, cumulative					

Although all institutions provided food safety training/education, cumulative findings indicate a need for targeted training:

- 40% indicated that they would find it difficult to identify individuals at a high risk of foodborne illness.
- 40% worried that they did not know the correct food safety information to provide to patients.
- 93% of trainee dietitians reported they would like to learn more about food safety for vulnerable populations.

On average, only 43% agreed that they felt confident to give an immune-compromised patient food safety information. This varied significantly across the three institutions (Table 2). Trainee dietitians in Wales (30%) and Ohio (45%) were significantly (*p*<0.001) less confident than those in Lebanon (72%). Consequently, significantly more of those in Wales, (whereby one-day food safety training is delivered) perceived that the food safety education they had received was not clinically applicable (31%) compared to Lebanon (14%) and USA (9%).

Table 2. Attitudes towards food safety training and education among trainee dietitian in Wales (n=74), Lebanon (n=29) and USA (n=94).

Proportion of trainee dietitians that agreed/strongly agreed that	Wales (n=74)	Lebanon (<i>n=29)</i>	USA (<i>n=94)</i>	Significant differences
I would be confident to give an immune-compromised patient food safety information	30%	72%	45%	X ² (8, n=197) = 46.243, p<0.001, Cramer's V = 0.343
the food safety education I have received is not clinically applicable.	31%	14%	9%	X ² (8, n=197) = 31.086, p<0.001, Cramer's V = 0.281

Food safety knowledge

Foodborne pathogens

The majority (Lebanon 63-93%, Wales 71-97%, USA 40-90%) indicated awareness of common foodborne pathogens. Awareness was different in all three regions (*p*<0.05). Students in Columbus had the highest awareness of *Campylobacter* and *Clostridium* while Cardiff students had the highest awareness of *Listeria*, *E. coli* and *Staphylococcus* (Figure 1).

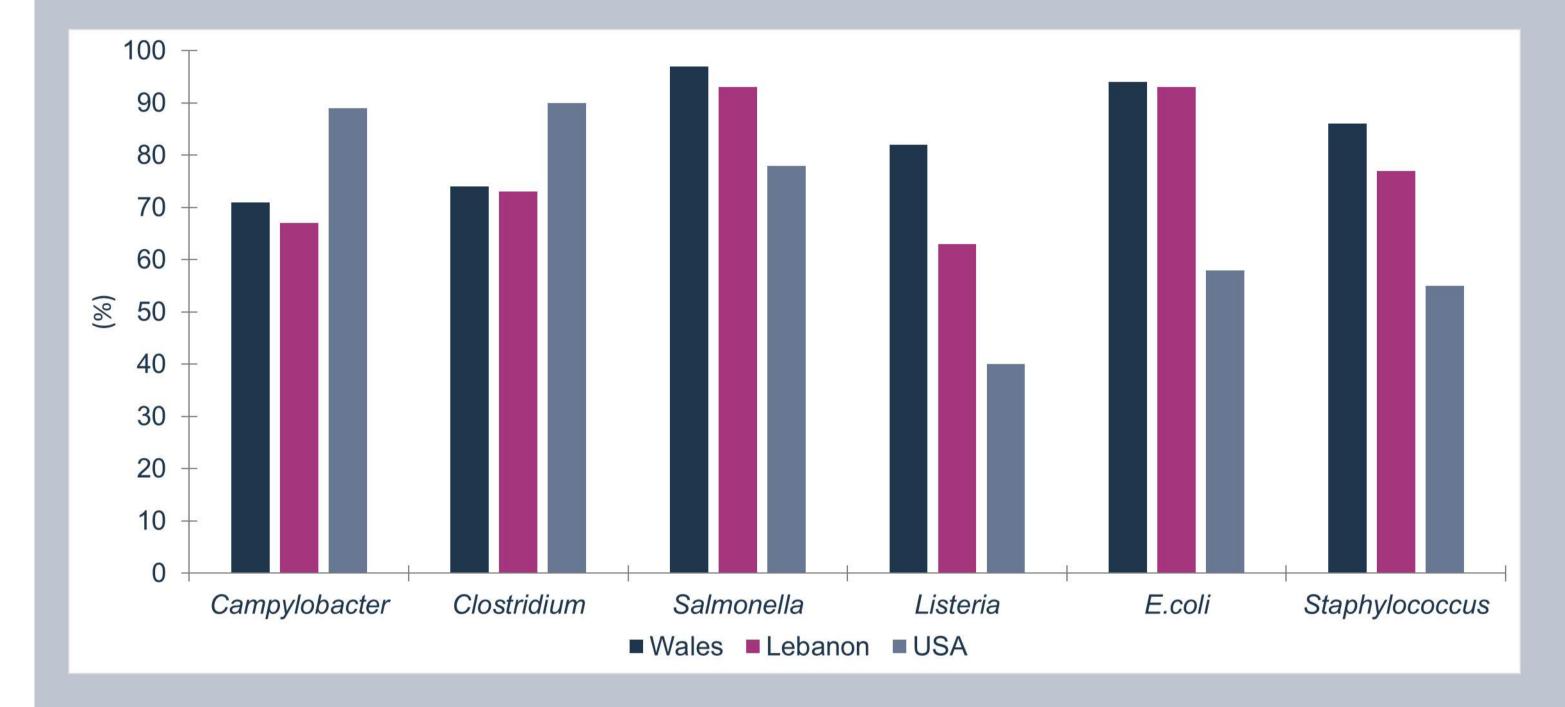


Figure 1. Awareness of foodborne pathogens (Wales n=78, Lebanon n=30 and Ohio n=102).

Cooking

Although the majority (Lebanon 100%, USA 99%, Wales 89%), were aware of the need to use a thermometer to ensure food safety.

Handwashing

The majority were aware of the need for handwashing (Figure 2). The need for handwashing before commencing food preparation was significantly greater (p<0.001) among students in Wales (99%) than in Lebanon (80%) and USA (81%). Significantly fewer student dietitians (p<0.05) in USA (81%) were aware of the need to wash hands after handling raw meat than in Lebanon (97%) and Wales (95%).



Figure 2. Awareness of occasions that require handwashing (Wales n=78, Lebanon n=30 and Ohio n=102).

Food safety knowledge

Cross-contamination

As indicated in Figure 3, the majority were aware that practices such as failing to wash hands after raw chicken (Wales 100%, Lebanon 93%, 76% USA) or failing to clean a chopping board after raw chicken (Wales 96%, Lebanon 90%, 76% USA) would increase the risk of cross-contamination.

Awareness of other practices such as washing raw meat were lacking, significantly fewer student dietitians (p<0.001) in Lebanon (47%) and USA (39%) were aware that washing raw meat increases the risk of cross-contamination compared to UK (76%). Ohio students had the lowest awareness of cross-contamination practices; compared to Cardiff and Beirut (p<0.05).

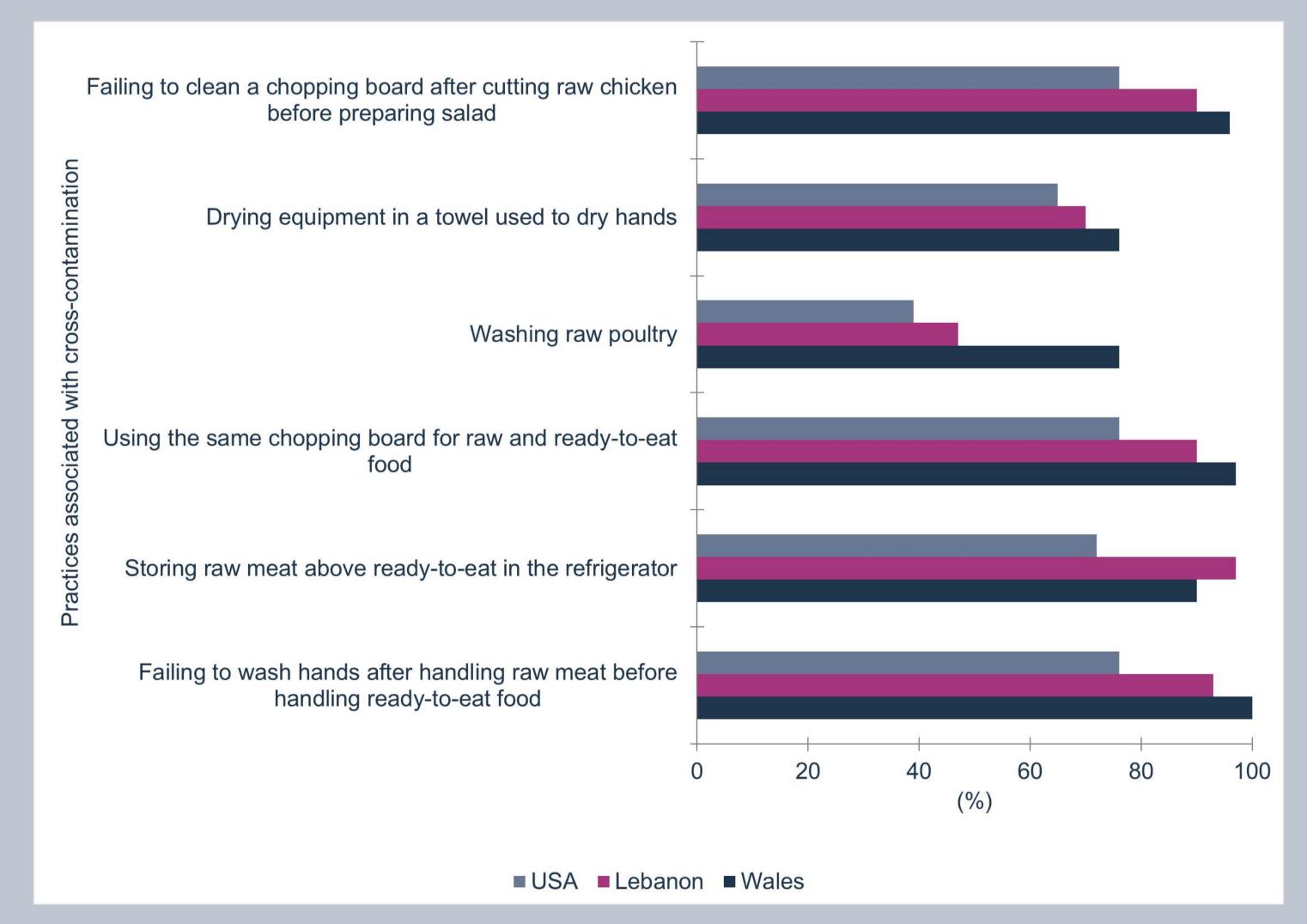


Figure 3. Awareness of cross-contamination associated practices (Wales n=78, Lebanon n=30 and Ohio n=102).

Date labelling

Awareness of the 'use by' date indicating food safety was significantly lower (p<0.005) among students in Lebanon (30%) compared to Wales (81%) and USA (74%).

Refrigeratio

Positive attitudes were expressed towards checking refrigerator operating temperatures (Lebanon 96%, USA 95%, Wales 80%). Although the majority of students in USA (93%) and Lebanon (100%) identified the need to use a thermometer to check refrigerator operating temperature significantly fewer (p<0.001) students in Wales identified the need.

Significance of study

Trainee dietitians from Cardiff Metropolitan University, Wales, UK; The Modern University for Business and Science (MUBS) Beirut, Lebanon and Ohio State University, Columbus, USA; indicated that food safety should be part of a dietitian's role when advising vulnerable patients.

This is the first study that compares the food safety knowledge and attitudes of student dietitians from three international institutions. Significant differences were determined. Differences in knowledge between institutions may suggest that teaching approach affects knowledge retention.

Although student dietitians indicated awareness of key food safety practices, a lack of confidence and a perceived lack of knowledge was indicated by students in all institutions.

The delivery of food safety education and training, that is intended for those working in food manufacturing or catering settings may not be clinically applicable to enable dietitians to deliver targeted food safety advise to vulnerable patients in healthcare settings.

Consequently, there is a need to determine the best practices in teaching student-dietitians food safety and explore the interpretation of dietetic curriculum requirements in institutions that deliver accredited training.

Acknowledgements

Cardiff Met., the ZERO2FIVE Food Industry Centre, MUBS and Ohio State, wish to acknowledge the students who completed the questionnaire.

References

- 1.Redmond, E., C. Griffith and S. King. (2005) Evaluation of consumer food safety education initiatives in the UK and determination of effective strategies for food safety risk communication. Food Standards Agency Research Project B20003. Food Research and Consultancy Unit, University of Wales Institute, Cardiff. Accessed 5th Nov 2018.
- 2. Buffer, J.P., Kendall, L., Mederios, M, S and Sofos, J. (2013) Nurses and Dietitians differ in food safety information provided to highly susceptible clients. Journal of Nutritional Educational Behaviour. 45, p 202-108
- 3. Evans, E and Redmond, E. (2015) Food Safety Strategies for Cancer Patients. ZERO2FIVE Food Industry Centre. Final Report. Tenovous Cancer Care Innovation Grant: TIG2014-30.
- 4. Gerba C.P., Rose, J.B and Haas, C.N. (1996) Sensitive populations: who is at the greatest risk? International Journal of Food Microbiology. 30, p113-23.
- 5. Medeiros, L. C. & Buffer, J. (2012) Current Food safety Knowledge of registered Dietitians. Food Protection Trends. Vol. 32, p688-696
- 6. Medeiros, L.C. & Lejeune, J.T. (2015) Food Safety Information Processing and Teaching Behavior of Dietitians: A Mental Model Approach. Agriculture. Vol. 5, p132-154.