

Bruneian Consumers' Knowledge, Attitudes and Self-Reported Practices Associated with Food Safety in the Home: Implications for Culturally Bespoke Food Safety Education.

Nur Arina Hj Hamidun¹, Ruth Fairchild¹ and Elizabeth C. Redmond^{2*}

¹Cardiff School of Sport and Health Sciences, Cardiff Metropolitan University, Cardiff, CF5 2YB, Wales, United Kingdom

²ZERO2FIVE Food Industry Centre, Cardiff Metropolitan University, Cardiff, CF5 2YB, Wales, United Kingdom

*Corresponding author: eredmond@cardiffmet.ac.uk

Introduction

Foodborne disease is a global concern and safe food-handling in the home is known to be important in reducing the risk of illness (Redmond and Griffith, 2003). Although food safety is a shared responsibility, food handlers (including consumers) are ultimately the 'last line of defence' in the food safety chain (Käferstein, 2003; Byrd-Bredbenner *et al.*, 2013). Therefore, it is important to understand what factors influence key food safety behavioural implementation in the home. Such information can be used to target specific preparation or storage practices, as well as inform development of focussed, food safety educational approaches. Indeed, data driven intervention design is reportedly more effective in achieving desired outcomes (Andreason, 1995).

Cultural differences are reported to influence food consumption behaviours (Nemec, 2020) and recent European research has investigated such cultural aspects in relation to food preparation and food safety (Skudland *et al.* 2020). It is important that cultural and habitual behaviours are accounted for in the development of focussed food safety education approaches to ensure relevance and appropriateness to the target audience. Limited consumer food safety research has been undertaken in Brunei and available data indicates a need for consumer food safety behavioural improvement (Ampuan Hj Said *et al.*, 2011; Murang *et al.*, 2015). Therefore, there is a need to further understand consumer' cognitive influences of food safety practices in Brunei to inform risk-reducing food safety interventions.

Aims

The study aims to explore and understand Bruneian consumer attitudes, knowledge and self-reported practices associated with home food safety.

Methods

Interviews

- An interview schedule was developed based on a review of consumer food safety studies. Qualitative data capture explore and understand culturally appropriate food handling and storage self-reported behaviours, attitudes as well as perceptions associated with food safety in the home in Brunei.
- Twenty Bruneian consumers were recruited using convenience sampling approach.
- Inclusion criteria: Bruneians aged >18 years, preparation of at least two meals a week, no current or previous food industry employment and able to speak conversational English.
- Semi-structured, in-depth interviews, lasting 35-60 minutes, were conducted using a face-to-face or telephone approach.
- Interviews were transcribed and coded using NVivo (Version 1.3 QSR International) and analysed using thematic analysis.

Questionnaire

- An online 'Qualtrics XM' questionnaire was developed, based on an existing UK-based questionnaire (Redmond *et al.* 2005) and using interview data to ensure cultural relevance. Attitudes towards key food safety behaviours were assessed using 5-point Likert scales.
- One hundred and forty-three consumers were recruited using 'call-to-action' posters.
- Inclusion criteria: Bruneians aged 18 years or above and prepared meals from raw ingredients at least twice a week.
- Data analysis: A statistical analysis of responses occurred using SPSS Statistics for Windows (Version 27).

This research has received ethical approval from Cardiff Metropolitan University Health Care and Food Ethics Panel (Reference UG-2946).

Significance

- Variable cognitive influences associated with Bruneian consumers' home food-safety behaviours were not aligned with recommended practices and thus, food safety intervention is required to enable behavioural improvement.
- To reduce the risk of foodborne illness, culturally bespoke food safety education is needed in Brunei to target cognitive influences and practices specifically associated with washing raw meat, poultry and seafood and storage of rice at ambient temperature for extended periods of time.

Results and Discussion

Results indicated that, cumulatively, Bruneian consumers have a positive attitude towards food safety, however, culturally habitual practices may present food safety risks. For example, the majority (88%) of consumers indicated washing raw meat, poultry and seafood to be important and reported to be common practice. Similarly, storage of cooked rice at ambient temperature for periods exceeding recommendations (WHO, 2006) was frequently reported.

Bruneian Consumer Knowledge, Attitudes and Self-Reported Food Safety Practices: Qualitative and Quantitative Findings.



"I think it's [hand washing] really important, because food contains germs [...] like bacteria, for example, raw chicken so if you don't wash them off properly that might infect other food" (A1).

"I usually just wash with water and then I proceed doing all the food prep and if [...] I cook fish, so raw food that is smelly then I would wash with soap but generally it's just with water" (C1).

Hand washing was commonly reported as "very important" and most participants reported washing hands "for 20 seconds", but a participant admitted that they "do it quickly" if they were "in a rush".

23% indicated that rubbing hands together for 20 seconds is too long (n=93).

43% considered it is not necessary to use soap every time hands are washed (n=93).

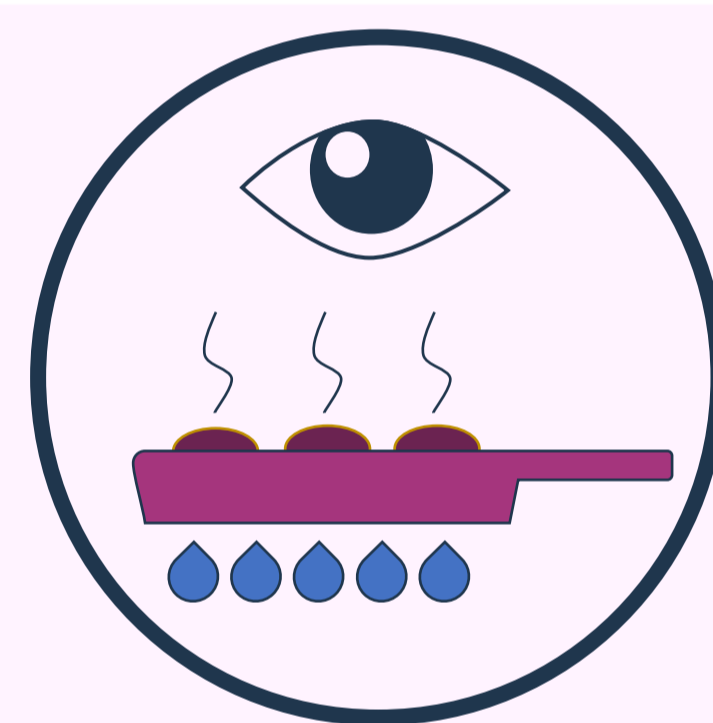
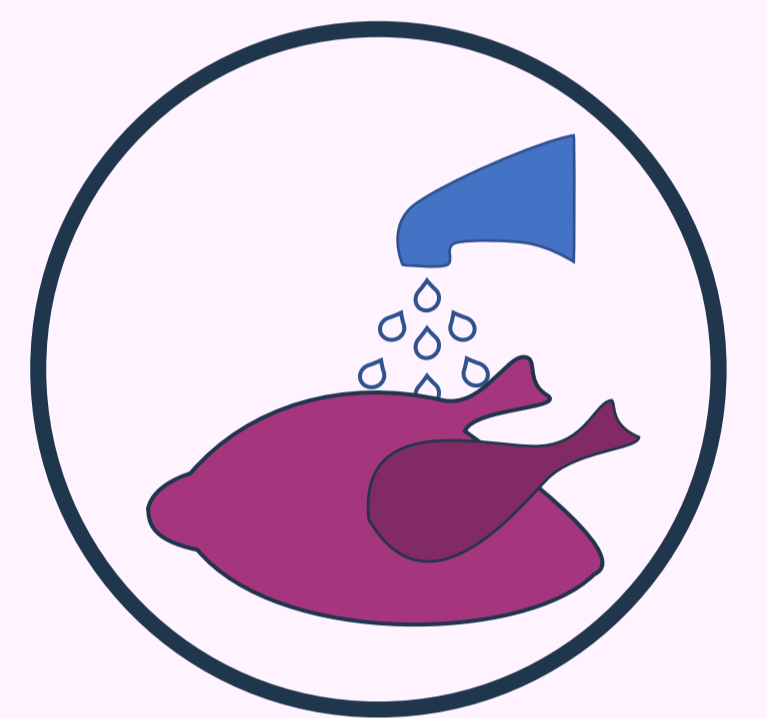
Washing chicken was a common practice reportedly implemented by all participants in the interview component of the study; this practice was perceived to "make it [the chicken] cleaner".

55% indicated that washing of raw meat, poultry and seafood removes bacteria (n=88).

88% thought that it is important to wash raw meat, poultry and seafood before preparation and cooking (n=88).

"I usually rinse it with water first and then pour some salt [...] and then [...] lay it out on the chicken skin... and then wash it off again with water" (A1).

"Usually I wash it [raw chicken] under running water and then I would throw away the skin, the fat and then make sure it's properly washed and then I will put it in a basket to dry before cooking" (C1).



"I read it somewhere cooking should be at least 75 degrees but to me, I don't check it" (C3).

"I usually just poke [meat] first with a knife to the deepest part, if red juices still come out then usually it's not cooked yet in the inside" (Participant A2).

"If I fry chicken....if it turns golden brown then it should be fine (Participant A8).

Different methods of **judging when food is cooked** when frying was reported, including seeing "the colour change", to "cut it open" and "estimate when it's done".

74% indicated that looking at the colour of meat is a reliable way to judge if it is cooked (n=84).

93% were aware that inadequate cooking of food increases the risk of food poisoning (n=84).

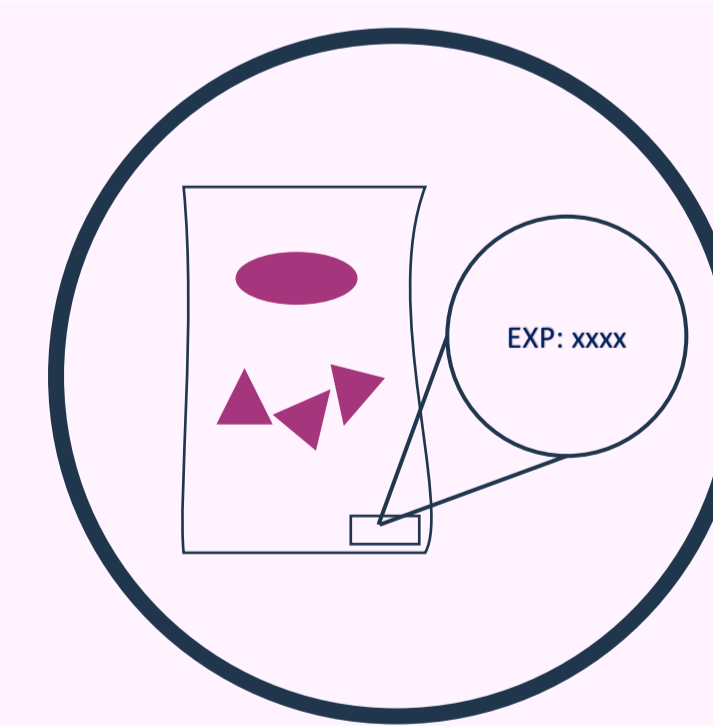
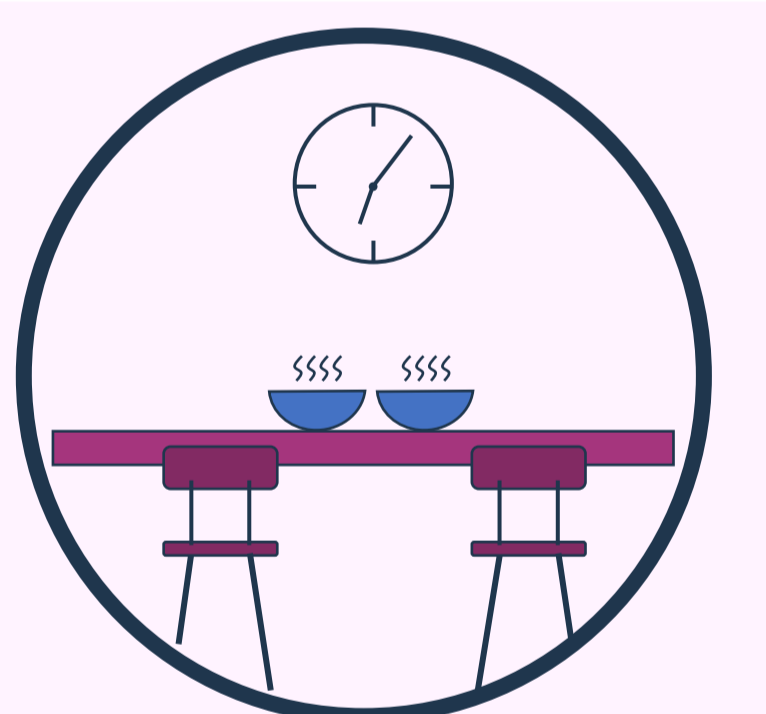
Unrefrigerated storage of cooked food such as rice was reported for "four to six hours"; cooked rice left in the rice cooker for >four hours was "typical" and was used for cooking "in the morning" to make "fried rice".

84% indicated that cooling food at room temperature is acceptable (n=80).

25% thought that storage of rice at room temperature until the next day does not increase the risk of food poisoning (n=80).

"I store it for later consumption, but make sure that the rice cooker is switched on and set to 'warm mode' so that the rice is not spoiled" (Participant B4).

"I store it; in two days I can still eat the leftover rice. After two days it will go bad. Usually after like four hours, I will make fried rice like I cook again" (Participant B5).



"Expiry date is the date that expire that's no longer can be used. Use by you can use it by the [...] I'm not sure about use by but best before you can still use it but maybe up to one to two months" (Participant D3).

"Expiry date maybe like, I can't eat the food beyond the date. Best before, I can still eat it after the date but then the taste or the quality or whatever, wouldn't be as good, I think. I'm not sure" (Participant A7).

For **date labelling**, all participants reportedly understood that 'expiry date' meant that food "should be used before that date", but 'best before' was either understood as "consumed optimally before that date" or the same as expiry date.

44% indicated that understanding expiry and best before dates on food can be difficult (n=80).

88% considered that (n=80) adhering to 'expiry dates' reduces the risk of food poisoning (n=80).

Discrepancies have been identified between cognitive influences associated with important, key food safety behaviours that are reported to be commonly implemented by Bruneian consumers. In some cases, specific food safety behaviours were perceived to be important for reducing the risk of food poisoning, but attitudes and awareness concerning the related food safety risks did not concur. As noted above, washing raw meat, chicken and seafood was reported to be an expected, acceptable and common practice by consumer in Brunei; concern or awareness for resultant cross contamination in the kitchen was not cited as a concern by the participants; failure to implement this practice was deemed as unacceptable.

References

- Ampuan Hj Said, A. N., Andriske, X. P. and Button, P. D. (2011) Food safety knowledge and practices of adolescents in Brunei Darussalam. *Brunei International Medical Journal* 11(Sup 3:s17):36
- Andreason, A. (1995) *Marketing Social Change*. Jossey-Bass, San Francisco, CA.
- Käferstein, F. K. (2003) Actions to reverse the upward curve of foodborne illness. *Food Control*. 14(2), 101-109.
- Murang, Z. R., Abiola, O., Ong, S. K. & Muharram, S. H. (2015) 'The knowledge and practice of food safety of adult consumers in Brunei-Muara district in Brunei Darussalam' *Brunei Int Med J.* 2015, 11 (Supp 3): s23.
- Nemec K. (2020) Cultural Awareness of Eating Patterns in the Health Care Setting. *Clinical Liver Disease*. 10;16(5):204-207.
- Redmond, E. C. and Griffith, C. J. (2003) Consumer food handling in the home: a review of food safety studies. *Journal of Food Protection*, 66(1), pp.130-161.
- Redmond, E. C., Griffith, C. J., King, S. & Dyball, M. (2005) Evaluation of consumer food safety education initiatives in the UK and determination of effective strategies for food safety risk communication (RRD-8). A report for the Food Standards Agency, London.
- Skudland, S. E., Borda, D., Didier, P., Dumitrascu, L., Ferreira, V., Foden, M. and Truninger, M. (eds.) (2020) European food safety: mapping critical food practices and cultural differences in France, Norway, Portugal, Romania and the UK. (SIFO report-6). Oslo: Oslo Metropolitan University.
- World Health Organisation (2006) Five Keys to Safe Food. Available at: <https://www.who.int/publications/i/item/9789241594639> [Accessed: 09/05/22].