Are people who receive chemotherapy informed of the increased risk of foodborne infection?

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Introduction
Chemotherapy patients have an increased risk of foodborne illnesses due to immunosuppression. Cancer patients are reported to have a five-fold increased risk for development of listeriosis.

To minimise the risk of foodborne illness it is important that cancer patients consume foods prepared and cooked at home according to food safety recommendations and avoid risk associated food products.

It is suggested that limited food safety information is available to chemotherapy patients. There is a lack of data on their food safety knowledge, practices and perceptions are lacking.

To date, there has been no review, or evaluation of the availability and adequacy of UK food safety information accessible for chemotherapy patients and family caregivers.

Methods
A mixed methods research approach was utilised:

- Online food-related patient information resources were obtained from National Health Service (NHS) chemotherapy providers in England, Scotland and Wales, the Department of Health (DoH) and identified UK cancer charities. Resources were reviewed for the inclusion of food safety information using a web-based approach.
- In-depth interviews (n=15) were conducted with patients and family caregivers to establish the food-related experiences perceived importance of food safety among chemotherapy patient and family caregivers.
- Self-complete questionnaires (paper-based and online) were completed (n=172) by chemotherapy patients (70%) and family caregivers (50%) to determine the knowledge, attitudes and self-reported practices regarding food safety during chemotherapy treatment.

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The funding source had no involvement in the study design, in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication.

Publications
The findings from this study are published in:


Acknowledgments
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References

Results
The availability and adequacy of food safety information for chemotherapy patients

In total, 45 online food-related patient information resources were identified and evaluated. A summary of food safety messages is included in Table 1.

Overall, 67% of resources included one or more food safety practice, ranging from one (e.g. “Ensure eggs are thoroughly cooked”) to 43 practices. The majority (70%) included only ten practices or less.

Hand hygiene
Hand hygiene was the most frequently recommended practice. Washing hands before preparing food was cited in 45% of reviewed resources. Details regarding critical hand washing occasions such as after handling raw meat/poultry were lacking (see figure). 20% recommended use of soap and warm/ hot water 16% recommended a clean hand towel should be used.

Cleaning
The most frequently included cleaning practice (included in 25%) was “wash fruits and vegetables before eating.” Information on cleaning kitchen surfaces was lacking (18% resources). Only 7% recommended allowing kitchen equipment, crumbs or raw meat to air dry instead of using a towel.

Patient and family caregiver awareness of the risk of foodborne illness during chemotherapy treatment

Interviews with patients and family caregivers determined that many were aware of the increased risk of infection due to immunosuppression during chemotherapy but may underestimate foodborne infection risk.

Many could not recall receiving food safety information prior to chemotherapy treatment. Some suggested if advice had been provided, they might not have paid attention to it due to other concerns.

Safety was of minimal concern compared to being able to cook or eat. Problems associated with chemotherapy side effects were reported including appetite loss, dry mouth, mucositis, diarrhoea and constipation.

The questionnaires determined that the majority of patients (81%) reported being more concerned about diet and nutrition than food safety during treatment.

Significance of study
Findings from this study have determined that:

- Although information is available, access to specific food safety information for patients and caregivers is limited, considerable gaps exist and information provided varies greatly between sources
- The most comprehensive sources of food safety information were tailored for neutropenic patients
- The risk of food poisoning was often underestimated by patients and family-carers
- Overall, weak positive attitudes were expressed towards the importance of food safety during chemotherapy treatment. Attitudes were significantly more positive among the most ‘at-risk’ patients/caregivers and those that had received food safety information.

Potential unsafe recommendations
Information deemed to be potentially ‘unsafe’ was included in 21% of resources, including “eat room temperature foods.” (Resource 10). Foods should not be subjected to potentially unsafe temperatures. Such foods out for refrigeration for two hours or longer should be discarded.

Although some information attempted to ensure food safety messages were inadequate. “Raw fish and steamed fish must be cooked for at least seven minutes. Most should be two to three minutes longer.” Cooking time without portion size/cooking temperature is inadequate, and external temperature will not indicate internal temperature, using a thermometer is the best way to ensure cooking efficacy.

Listeriosis risk reducing behaviours
Inclusion of risk reducing behaviours were lacking. 7% recommended that ready-to-eat foods should be consumed if they look good. 22% included recommended refrigeration temperature (31% referred to adhering to use by date).

Risk associated foods
Recommendations reporting risk associated food products to be avoided included 34% of resources. The most frequently food products were:

- raw/unprocessed eggs (42%)
- raw/unprocessed meat or poultry (42%)
- raw/unprocessed fish (33%)
- raw/unprocessed seafood (8%)

Only half of those that included risk associated food products listed safer alternative food products (25%).

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Table 1: Significant differences (p<0.05) in attitudes towards food safety determined according to respondents demographics/characteristics/foodstuffs.

<table>
<thead>
<tr>
<th>Demographic/foodstuffs</th>
<th>Attitudinal Rating</th>
<th>p &lt; 0.05</th>
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<tr>
<td>Neutropenic patients</td>
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**Significance of food safety information**

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- Overall, weak positive attitudes were expressed towards the importance of food safety during chemotherapy treatment. Attitudes were significantly more positive among the most ‘at-risk’ patients/caregivers and those that had received food safety information.

Conclusion of the study has determined there is an identified need for a patient-orientated approach for chemotherapy patients and family caregivers to reduce the risk of foodborne infection during chemotherapy treatment.