Comparison of Listeriosis Risk Factors Among Three 'At-Risk' Consumer Groups: Pregnant Women, Older Adults and Chemotherapy Patients

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Introduction

Due to weakened immune function, listeriosis is particularly associated with 'atrisk' consumers, predominantly affecting pregnant women, older adults (aged ≥60 years) and people receiving chemotherapy for the treatment of cancer¹.

Sporadic incidence of listeriosis is frequently related to refrigerated ready-to-eat (RTE) food products stored/consumed in the domestic kitchen². Given the psychrotrophic characteristics of *Listeria monocytogenes*³, time and temperature control of RTE food is required to reduce the risks associated with listeriosis, recommended practices include⁴:

- Ensure safe refrigeration temperatures (≤5.0°C);
- Adhere to 'use-by' dates on RTE foods, and
- Consume RTE foods within two days of opening.

Changes in UK epidemiology trends have identified a reduction in pregnancy associated cases and increases in cases associated with older adult consumers and cancer patients¹.

Subsequently, determination of these three 'at-risk' consumer groups' cognitive and behavioural risk factors associated with listeriosis may identify associations between perception and practices that may impact on domestic food safety.

Purpose

The aim of the study was to compare the cognitive and behavioural risk factors associated with listeriosis among three 'at-risk' consumer groups.

Methods

Questionnaire development - A systematic review of literature informed design and development of a quantitative self-complete questionnaire to ascertain food safety knowledge, self-reported practices and attitudes relating to domestic food handling and storage practices associated with listeriosis.

Sample - Participants were recruited according to predetermined criteria, the study included:

- Older adults (aged \geq 60 years) (n=100)
- Pregnant and post-partum (≤12 months) women (n=40)
- Chemotherapy patients and family caregivers (≤36 months post-treatment)
 (n=172)

Data analysis - IBM SPSS statistics 17.0, Microsoft Office Excel 2007 and Access 2007 were used to conduct quantitative and statistical analysis of the data.

Results

As indicated in Table 1, the study determined the knowledge, attitudes and self-reported practices of older adults, pregnant women and chemotherapy patients/family caregivers that participated in the study relating to; safe refrigeration temperature, adhering to 'use-by' dates on RTE foods, and consuming RTE foods within two days of opening. Statistical analyses were conducted to determine significant differences between identified listeriosis risk factors according to consumer group, findings from the analyses include:

Ensure safe refrigeration temperatures:

Awareness of safe refrigeration temperatures was determined to be significantly greater (p<0.01) among chemotherapy patients/family caregivers, with older adults determined to be least knowledgeable of refrigeration. Attitudes towards refrigeration were significantly (p<0.001) more negative among older adults.

No significant difference were determined (p>0.05) in self-reported refrigeration practices, however, the majority of all respondents reported refrigeration temperatures would be "never" checked.

Adhere to 'use-by' dates on RTE foods:

The study determined that older adults were significantly less knowledgeable (p<0.01) of 'use-by' dates, had more negative attitudes (p<0.001) towards 'use-by' dates and were more likely to report consumption of foods beyond the 'use-by' date (p<0.005) than pregnant women and chemotherapy patients/family caregivers.

Pregnant women indicated greater knowledge, expressed more positive attitudes and self-reported fewer malpractices than older adults and chemotherapy patients/family caregivers.

Consume RTE foods within two days of opening:

Although older adults' attitudes in this study were determined to be significantly (p<0.01) more negative towards consuming RTE foods within two days of opening than pregnant women and chemotherapy patients/ family caregivers.

No significant differences in knowledge and self-reported practices were determined, with majority of all 'at-risk' consumers (82-89%) reporting consumption beyond recommendations and (61-68%) indicating awareness of consuming RTE foods within two days of opening.

Table 1: Comparison of older adults (aged ≥60 years) (n=100), pregnant and post-partum (≤12 months) women (n=40) and chemotherapy patients/family caregivers (n=172) knowledge, attitudes and self-reported practices of listeriosis risk factors

LISTERIOSIS RISK FACTORS	KNOWLEDGE			ATTITUDES			SELF-REPORTED PRACTICES		
	OLDER ADULTS	PREGNANT WOMEN	CHEMOTHERAPY PATIENTS	OLDER ADULTS	PREGNANT WOMEN	CHEMOTHERAPY PATIENTS	OLDER ADULTS	PREGNANT WOMEN	CHEMOTHERAPY PATIENTS
Ensure safe refrigeration temperatures	13% were aware of recommended refrigeration temperatures (5°C)	25% were aware of recommended refrigeration temperatures (5°C)	57% were aware of recommended refrigeration temperatures (5°C)	53% had positive attitudes towards refrigeration temperatures	68% had positive attitudes towards refrigeration temperatures	68% had positive attitudes towards refrigeration temperatures	65% reported to 'never' check refrigerator operating temperature	65% reported to 'never' check refrigerator operating temperature	58% reported to 'never' check refrigerator operating temperature
	Significant difference determined (p<0.001)			Significant difference determined (p<0.001)			No significant differences (p>0.05)		
Adhere to 'use-by' dates on RTE foods USE BY 01-01-07	72% were knowledgeable of 'use-by' dates indicating food safety	95% were knowledgeable of 'use-by' dates indicating food safety	75% were knowledgeable of 'use-by' dates indicating food safety	0% had positive attitudes towards consumption of foods with expired 'use-by' dates (46% negative)	75% had positive attitudes towards consumption of foods with expired 'use-by' dates	65% had positive attitudes towards consumption of foods with expired 'use-by' dates	58% reported to consume RTE food products beyond the 'use-by' date	35% reported to consume RTE food products beyond the 'use-by' date during pregnancy	39% reported to consume RTE food beyond the 'use-by' date during chemotherapy
	Significant difference determined (p<0.01)			Significant difference determined (p<0.001)			Significant difference determined (p<0.005)		
Consume RTE foods within two days of opening	68% aware of consuming RTE foods within recommended		61% aware of consuming RTE foods within recommended two days after opening	45% had negative attitudes towards consuming foods within the recommended two days after opening	68% had positive attitudes towards consuming foods within the recommended two days after opening	48% had positive attitudes towards consuming foods within the recommended two days after opening	89% reported RTE foods would be consumed beyond two days after opening	83% report that RTE foods would be consumed beyond two days after opening during pregnancy	82% report that RTE foods would be consumed beyond two days after opening during chemotherapy
VAREA & A	No significant differences (p>0.05)			Significant difference determined (p<0.001)			No significant differences (p>0.05)		

Significance of study

- Significant differences in knowledge, attitudes and self-reported practices between 'at-risk' consumers may indicate why reduced pregnancy associated-cases and increased older adult and chemotherapy associated-cases are reported in the UK. Engagement with targeted food safety education may be contributory to the observed reduction in pregnancy associated listeriosis cases in the UK.
- Lack of knowledge, negative attitudes and reported implementation of food safety malpractices among older adults may increase the risks associated with listeriosis in the home which may contribute to the increased association of this consumer group with incidence of listeriosis.
- Consequently, to increase the knowledge of listeriosis risk factors, to improve attitudes towards domestic food safety, and, to enhance food safety practices in the homes of 'at-risk' consumers, there is a need for targeted food safety education for older adults and chemotherapy patients and their family caregivers to enable successful engagement with education to reduce the incidence of listeriosis among these 'at-risk' consumer groups.

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