

Food safety in the German military is affected by changes to European food hygiene regulations and the advent of convenience foods

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ABSTRACT

The German military began implementing the European Food Regulation in 2003, and it was finished in 2006. In order to increase the safety of the food served to the troops, the German military also pioneered the use of convenience-based foods in 2003. This study's objective was to assess how these modifications affected food safety and the likelihood of food-borne disease outbreaks in the German military. Retrospective examination of data from 517 food-borne outbreaks that have place between 1995 and 2019 in the German military's responsibility regions both at home and abroad was done for this aim. Because of this, there was a significant drop in the occurrence of food-borne out

breaks between the first and second observation periods. Desserts and prepared foods (first period), fresh produce, soups, and sauces were food items that were frequently discovered to be contaminated with pathogens (second period). While major pathogens were identified from suspected foods during disease outbreaks in both periods—*Bacillus cereus*, *Enterobacteriaceae*, *Salmonella spp.*, and *Staphylococcus aureus*—the absolute number of isolates dropped dramatically in the second period. Hence, it can be stated that the introduction of convenience meals and the application of European food hygiene laws both significantly improved food safety.

Keywords: Food-borne disease outbreaks; Food law; Convenience foods; German military

INTRODUCTION

The operational preparedness of military troops is influenced by good nutrition and food safety. However, the need to respond to outbreaks may need tighter controls, such as the temporary shutdown of kitchens, as well as a reduction in the variety of foods available. In this instance, the measures and the closure of the soldier kitchens are the responsibility of the specialists from the Supervisory Centre for Public Law Duties of the German military Medical Service Division III Veterinary Issues. Based on the findings of the epidemiological investigation into the outbreak, the actions that were done. As a result, especially during missions, this may cause military men to become demoralised. According to the European Food Safety Authority and the European Centre for Disease Prevention and Control (EFSA and ECDC), *Listeria monocytogenes*, *Salmonella spp.*, *Yersinia spp.*, *Enterohaemorrhagic E. coli* (EHEC), and *Campylobacter spp.* are the most common food-borne pathogens in Europe (2020). Contrarily, according to the World Health Organization (WHO), *norovirus*, *Campylobacter spp.*, *Salmonella spp.*, and EHEC are the principal causes of food-borne ill-

-nesses globally (WHO (World Health Organization), 2015; WHO (World Health Organization), 2022). Food safety can be greatly improved by hygiene precautions, food laws, and regulations. The Foods and Commodities Act (Foods and Commodities Act, 1997) was the only national law in Germany that governed food until January 2002. At the European level, food legislation has been unified since 2002. European food safety regulations were fully applied in the German military as of January 1st, 2006. The German military's area of responsibility has been subject to the implementation of the requirements of the European Regulation (EC) No 178/2002 (DIN, 1997) and the EU hygiene package ((EC) No 852/2004 (EC (European Commission), 2004), No 853/2004 (EC (European Commission), 2004), No 854/2004 (EC (European Commission), 2004), No 2160/2003 (EC (European Commission), 2003), and No 2073/2005 (EC (European). Additionally, the General Food Hygiene Regulation A1-840/5-4001, which exclusively applies to the area of responsibility of the German military, lays forth tighter criteria than the European and German food laws in order to assure an even greater level of health protection.

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2003 saw the introduction of convenience food to the German military. Since then, the percentage of items served in military food service facilities that are prepared quickly has gradually climbed to 85%. Among all the categories, level 3 convenience food items are crucial to the feeding of the military. Foods that are prepared for use in the kitchen, such as standardised meat cuts, cleaned and cut vegetables, and vacuum-packed peeled potatoes, are considered Level 3 items. This indicates that these dishes must still be prepared using other ingredients and in accordance with a recipe, at the very least being heated through ($> 72^{\circ}\text{C}$). Foods with a higher level of convenience are utilized if the aforementioned measures are not feasible because of limits on food hygiene, such as infrastructure issues. For instance, there are cook-and-serve goods that simply require heating to the serving temperature ($> 65^{\circ}\text{C}$). Sandwiches and other ready-to-eat foods are used sparingly. Using highly convenient foods has the benefit of allowing the handling of untreated materials (like unwashed and uncut fruits and vegetables) to be outsourced to facilities with specialised equipment and cutting-edge monitoring and testing systems. This includes, for instance, using particular HACCP concepts from (EC) No. 852/2004 in conjunction with the microbiological requirements of (EC) No. 2073/2005, which include, among other things, sampling the environment for microorganisms and looking into critical control points for *Listeria monocytogenes*. Modern monitoring also includes various monitoring techniques, like the usage of metal detectors. These guidelines lessen the possibility of final foods being re- or cross-contaminated with pathogenic bacteria during preparation in field and troop kitchens. This study sought to determine whether changes to European food laws and the modernization of related food safety ideas, such as Good Hygiene Practices (GHP) and Hazard Analysis and Critical Control Points (HACCPs), affected the frequency of outbreaks of foodborne illness in the German military during the study period (1995–2019). Also, based on the epidemiological and assessed microbiological data at the time, correlations between food groups and pathogens were retrospectively examined. This method's objective was to identify whether bacteria were prevalent in high-risk food categories and whether any food groups were more likely than others to result in outbreaks of foodborne illness. From this, it was feasible to draw the conclusion that the introduction of convenience foods and the reform of European food hygiene regulations had an effect on the German military's food safety. Data gathering and sample taking. The Task Force LMV responsible at the time gathered and tested the following samples in the context of food-borne disease outbreaks in the German military from 1995 to 2019: suspected food samples, drinking water samples, environmental samples, and patient samples. This review of the investigation's findings is therefore retrospective and was made at that time. The information gathered at the time in the context of epidemiological studies of food-borne disease outbreaks has always adhered to a standard to gain the most comprehensive picture of the situation. Based on the information available from the responsible physician in the affected unit, a food or causative agent is narrowed down for this purpose. The specialists from the Task Force LMV in charge at the time then proceeded to on-site inspections, which included speaking with patients and kitchen staff as well as conducting a thorough document

examination, including protocols for monitoring temperature controls in food storage and processing. This led to the next steps, which included a targeted sampling of suspect food, environmental samples, and stool samples. If possible, the symptoms, the course of the disease, and the suspect meals could be used to narrow the pathogen spectrum. Each case's scope of samples and examinations was selected so that as many potential explanations as feasible could be looked into and evaluated (German Federal Ministry of Defense., 2017). Food samples included retained ration samples, or food that had been frozen at -18°C for seven days as advised by the German Institute for Standardization DIN 10526 since 2016 or held in cool circumstances for 48 hours as per earlier standards. The German military medical service's Central Institute examined environmental and food samples. A medical examination laboratory received samples of the affected people's stools and vomit. The focus of the investigation was on the identification of food-associated viruses as well as the diagnosis of "food-borne pathogens of illness and intoxication." The German General Law and German Military Regulations have different rules for reportable food-borne outbreaks: If a food-handler falls under the definition of paragraph 42 of the German Infection Protection Act (IfSG) (IfSG (Infection Protection Act) of July 20, 2000), or b) if two or more similar illnesses occur for which a common cause is probable or suspected, an outbreak of food poisoning or infectious gastroenteritis must be reported. A group illness with a suspected food-associated cause is defined as the occurrence of five or more cases of illness with gastrointestinal symptoms for each day and unit as a reportable incident under German military regulation A1-840/5-4001, "Food Hygiene." In the event that there are more than five illnesses with the same symptoms, the German military's area of responsibility is subject to a double reporting requirement.