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POTENTIAL HEALTH RISKS OF CONSUMING CONTAMINATED FLOUR

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Abstract

Background: Flour is an essential, widely consumed staple and an ideal vehicle for multi-micronutrient fortification. Wheat flour, in particular, is valued for its nutritional content, providing protein, B-group vitamins, minerals, and dietary fiber. The Gaza Strip, home to nearly 2.2 million people—47% of whom are children—has been under prolonged blockade and recurrent conflict. Recent hostilities have intensified food and nutrition insecurity, forcing many households to rely on flour from informal or compromised sources. Historically, flour was not considered a source of pathogenic microorganisms; however, recent evidence has identified pathogens such as *Salmonella* and *Escherichia coli* in wheat flour, linked to foodborne outbreaks. Flour is also susceptible to fungal contamination, including molds such as *Aspergillus*, *Penicillium*, and *Fusarium*, which can produce harmful mycotoxins. In addition, concerns exist regarding chemical contaminants, including pesticide residues, heavy metals, and anthropogenic radionuclides. These risks are particularly significant for vulnerable populations such as children and pregnant women.

Objectives: (1) To identify and classify major microbial, fungal, and chemical contaminants found in flour; (2) to investigate reports of contaminated flour consumption in Gaza, including its scale, causes, and immediate health impacts; (3) to review current methods for detecting contamination; and (4) to evaluate preventive strategies for controlling contamination.

Methods: A comprehensive literature review was conducted to identify common contaminants, including *Salmonella*, *E. coli*, aflatoxins, pesticide residues, and heavy metals. In parallel, a structured household survey was administered to collect descriptive data on awareness, storage practices, and self-reported health effects related to flour consumption.

Results: Findings indicate that wartime conditions compel residents to consume contaminated or substandard flour despite awareness of potential health risks. A high prevalence of self-reported gastrointestinal symptoms was observed, underscoring the public health impact. The results highlight the need for multi-level interventions, including strengthening supply chains, improving quality control measures, enhancing public education, and conducting further research on contamination sources and mitigation strategies.

Conclusion: There is an urgent need to enhance monitoring and inspection systems, implement targeted public awareness campaigns, and strengthen international cooperation to ensure flour safety. Protecting the



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quality of this essential staple is critical for maintaining food security and safeguarding public health in Gaza under ongoing conflict conditions.

Keywords: Gaza; Contaminated flour; Food safety; Conflict zones; Health risks; Food security.