Consumer Responses to Rising Egg Prices and Limited Availability in the U.S., with a Focus on California and Nevada: A Systematic Review and Narrative Synthesis

Evelyne Girgis

Correspondence:
Dr. Evelyne Girgis, PhD
Professor, Lebanese University
Email: emgirgis@yahoo.com

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Abstract

Between 2022 and 2025, egg prices in the United States rose sharply, reaching an average of $5.90 per dozen in early 2025 due to compounded effects from Highly Pathogenic Avian Influenza (HPAI), inflation, regulatory changes, and supply chain constraints. This systematic review synthesizes consumer behavioral responses to egg price volatility and limited availability, focusing on income-level disparities, ethnic and regional differences, and substitution strategies. Following PRISMA guidelines, 41 peer-reviewed studies, market surveys, and government reports (2020–2025) were reviewed, with emphasis on California and Nevada due to their contrasting socioeconomic and regulatory environments. Key findings reveal that lower-income households in both states disproportionately reduced egg consumption or substituted with lower-cost protein alternatives such as legumes, canned fish, or nut butters. In contrast, high-income and urban populations shifted to plant-based commercial egg alternatives. Ethnic minority communities, particularly Black and Hispanic populations, showed greater price sensitivity and were more likely to modify food purchasing habits. Media exposure further shaped consumer sentiment, with reports of panic buying and perceived scarcity. Findings highlight the need for improved public education on affordable, nutritionally equivalent substitutes and equitable food policy interventions to mitigate future disruptions in protein access.

Keywords
Egg inflation, egg shortage, consumer behavior, \protein substitution, California food access, Nevada food insecurity, PRISMA review.

Introduction

In recent years, volatility in the U.S. food system has intensified, placing pressure on household budgets and altering consumption habits nationwide. Among the most visibly affected grocery items has been eggs—a dietary staple valued for affordability, versatility, and nutrient density. From 2022 to early 2025, the price of a dozen eggs nearly doubled, reaching an average of $5.90 by February 2025 [8, 5]. This steep increase was driven by a convergence of factors including ongoing outbreaks of Highly Pathogenic Avian Influenza (HPAI), inflation in agricultural inputs, regional supply constraints, and shifts in regulatory policy such as California's Proposition 12, which mandates cage-free housing for laying hens [6].

Eggs are not only a household staple but also a key nutritional source of protein, choline, and vitamin B12—especially important for vulnerable groups such as low-income families, children, and the elderly [11]. Therefore, disruptions to egg availability, whether through elevated cost or reduced physical supply, carry direct implications for food security and dietary adequacy. These challenges have been especially acute in regions with significant socioeconomic disparity or regulatory complexity.

California and Nevada offer a compelling comparison in this context. California, with its progressive agricultural regulations and diverse urban population, saw more pronounced price shifts linked to cage-free mandates and localized shortages. In contrast, Nevada, with its rural expanses and limited food distribution infrastructure, experienced accessibility issues even when prices remained relatively stable. Both states also reflect ethnic and economic diversity, making them ideal case studies for understanding nuanced consumer responses.

This review systematically examines how American consumers, particularly across income levels and ethnic groups in California and Nevada, responded to egg price spikes and limited availability. It addresses a critical gap in the literature: how market shocks influence food choice behavior and protein substitution, and what this reveals about food resilience in a post-pandemic, inflationary economy.

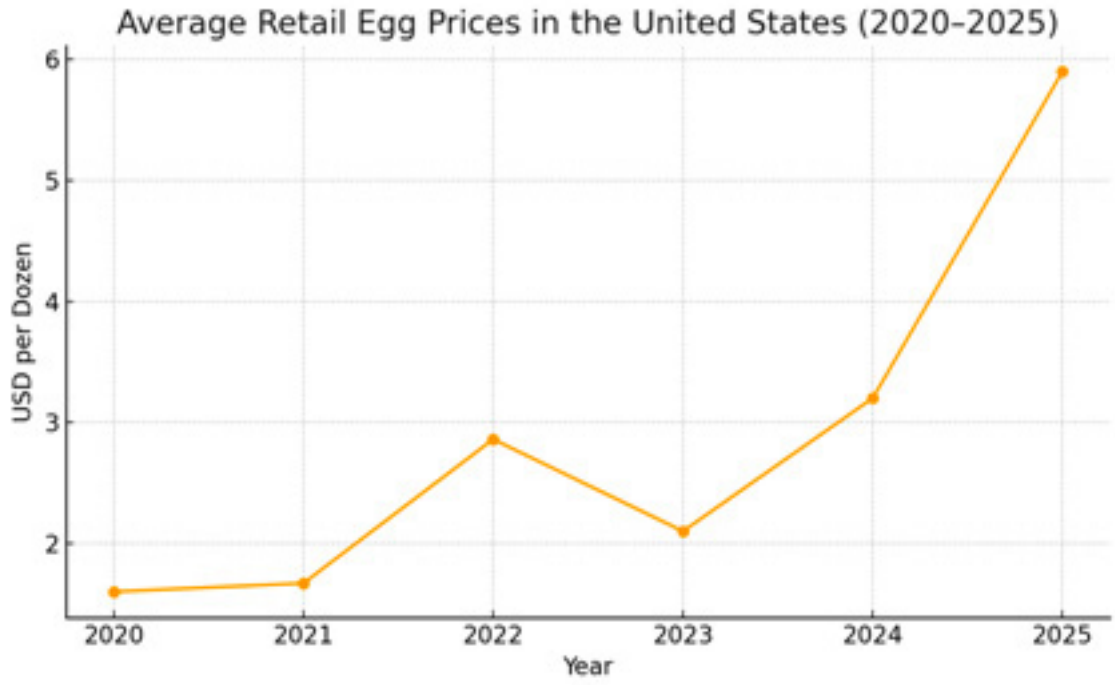
Methods

This study follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Databases searched include PubMed, Scopus, Google Scholar, USDA Economic Research Service (ERS), Statista, and industry reports (2020–2025). Keywords included: "egg price inflation," "egg shortage USA," "consumer substitution behavior eggs," "California egg prices," "Nevada grocery trends," and "protein alternatives to eggs."

Inclusion criteria: Studies and reports published between January 2020 and June 2025; U.S.-focused data; content on egg price trends, substitution behavior, demographic differences, or regional food access.

Exclusion criteria: Non-U.S. data, production-only reports, opinion pieces.

Graph 1: Increase in average retail egg prices [19]



Data Extraction and Synthesis: This study extracted data on consumer demographics (income, ethnicity, location), price thresholds, food substitution patterns, emotional and behavioral responses, and policy implications. Findings were synthesized thematically and organized into six analytical categories: national trends, income and ethnic disparities, regional behavior (California vs. Nevada), substitution strategies, media influence and policy implications.

Results

Thematic analysis yielded six key domains of consumer response to egg price inflation and supply disruptions: (1) national emotional and purchasing trends; (2) income-based and ethnic disparities; (3) regional differences in California; (4) regional differences in Nevada; (5) protein substitution strategies; and (6) the role of media and perception.

1. National Trends and Emotional Response

National data show that egg price sensitivity has become a visible stressor for many Americans. A 2025 Clarify Capital survey found that 33% of U.S. consumers stopped purchasing eggs unless prices dropped below $5 per dozen, despite a national average of $5.90 [5]. Emotional responses included anxiety, frustration, and disillusionment with grocers and government policy [14]. Widmar and colleagues noted that perceived price gouging became a widespread concern, triggering reactive purchasing [25].

Moreover, egg price increases were felt not only in the home but also in the service industry: restaurants reported increased menu costs and reduced offerings of egg-based dishes [8]. Consumer frustration with fluctuating prices prompted behavior changes even among those not facing food insecurity, indicating broad psychosocial impact.

2. Income-Based and Ethnic Disparities

The burden of egg price inflation was disproportionately experienced by low-income households and ethnic minorities. Several surveys, including those by UserTesting [24] and USDA ERS [22], reported that families earning below $35,000 annually were twice as likely to skip egg purchases or reduce frequency of consumption compared to those earning over $75,000.

Black and Hispanic households, in particular, reported higher levels of food insecurity linked to reduced access to traditionally affordable protein sources. These groups often substituted eggs with lower-cost, shelf-stable proteins such as canned tuna, dried beans, or powdered milk [16,7]. Food banks in major cities such as Los Angeles, Las Vegas, and Fresno noted increased demand for these items during late 2024 and early 2025 [7].

In contrast, high-income consumers were more likely to shift to premium, plant-based substitutes such as JUST Egg, Simply Eggless [18], or mung bean blends [13]. This trend also correlated with increased interest in flexitarian and vegan diets.

3. Regional Consumer Behavior: California

California saw some of the steepest egg price increases nationwide, due to the 2022 enforcement of Proposition 12, which restricted sales of eggs not produced in cage-free environments [9, 2]. Retail prices in urban centers like San Francisco and Los Angeles surged above $6.50/dozen at peak.

Urban and middle-to-high-income Californians responded by adopting:
- Plant-based egg substitutes [12]
- Nutrient-rich vegan recipes that replicate traditional egg-based dishes
- Alternative breakfast staples such as smoothies, oats, or nut butters

Ethnic variations were notable. Asian-American consumers were more comfortable with soy-based alternatives like tofu, which substituted well in both savory and baking contexts [13]. Latinx households were more likely to continue using eggs in traditional cooking, often reducing frequency rather than seeking plant-based replacements.

Food insecurity also rose in low-income California ZIP codes. Public schools in cities like Oakland and Fresno experienced strain in offering breakfast programs reliant on eggs [3]. Emergency food distribution sites adjusted by sourcing powdered egg or shelf-stable proteins.

4. Regional Consumer Behavior: Nevada

In Nevada, rural and semi-rural populations were especially vulnerable—not due to cost alone but to supply disruptions and scarcity. Communities in northern and central Nevada reported persistent shelf gaps in grocery stores, especially during peak avian flu outbreaks in late 2024 [15].

Consumer adaptations in Nevada included:
- Meal rationing—families reduced the number of egg-based meals per week
- Canned protein reliance—notably tuna, sardines, and chicken
- DIY substitutions—flaxseed and applesauce used in baking

Plant-based commercial alternatives were less common in Nevada, both due to limited retail availability and lack of consumer familiarity. Interviews with local extension agents revealed that many consumers were unaware of plant-based egg options or did not trust their nutritional value [20].

5. Substitution Strategies and Nutritional Implications

Consumers across both states employed a range of substitutions for eggs, influenced by availability, culture, and nutrition literacy. Refer to Table 1 below for common alternatives.

Nutritional implications vary. While many substitutions provide protein, some lack choline, B12, or bioavailable iron, nutrients concentrated in eggs. Over time, reduced egg consumption could impact micronutrient adequacy, particularly in young children and older adults [11].

Table 1: Common Egg Substitutes by Demographic Group

Substitute Type	Examples	Demographics Most Likely to Use
Canned proteins	Tuna, sardines, chicken	Rural, low-income households
Plant-based	Tofu, JUST Egg, flax/chia	Urban, higher-income, health-conscious
DIY baking substitutes	Vinegar + baking soda, banana, applesauce	Middle-income households, parents, bakers
Legumes	Lentils, chickpeas	Budget-conscious consumers
Grain-based alternatives	Peanut butter, oatmeal	Children's meals, breakfast-focused households

6. Role of Media and Public Sentiment

Media coverage, particularly during the peak of the avian flu outbreak, amplified perceived scarcity. Widmar and colleagues [25] identified that social media panic-buying posts contributed to stockpiling behavior in major cities. Hashtags like #EggCrisis and #EggFlation trended on platforms such as TikTok and X (formerly Twitter) during Q4 2024, creating feedback loops between perception and actual market strain.

A notable finding is that many consumers misattributed the cause of shortages, blaming retailers or "hoarders," when in fact systemic production disruptions were the root issue [6]. This misperception highlights a need for clear public communication during future food system shocks.

Discussion

This review reveals how a critical food item, eggs, became a case study in consumer adaptability, food insecurity, and nutritional inequality amid economic and public health disruptions. The price surge and supply fluctuations during 2022–2025 were not isolated economic phenomena; they acted as a magnifying lens on broader issues of food system fragility, income inequality, and information asymmetry in consumer markets.

- **Socioeconomic Impact and Behavioral Economics**

Consumer responses closely align with price elasticity theory and behavioral economics: lower-income consumers responded to price shocks with substitution or avoidance, while higher-income consumers were more flexible and exploratory in alternatives [23]. This economic stratification in food adaptability has implications beyond eggs. It suggests that food inflation exacerbates nutritional disparities, particularly when the inflated item is a nutrient-dense staple.

Our findings align with international trends observed during food crises. For example, Rondoni and colleagues [17] observed similar patterns in Europe, where low-income households substituted away from eggs and animal protein in response to price shocks during the COVID-19 pandemic. Yet, the U.S. case is unique in its regulatory fragmentation—state-level policies like California's Proposition 12 intensified supply issues not experienced uniformly across the nation

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- **Nutrition and Public Health Risks**

Eggs offer more than just protein; they are rich in choline, vitamin B12, selenium, and lutein. Substitutes like tofu, legumes, and flaxseed are often nutritionally incomplete, especially for children and seniors [11]. A prolonged reduction in egg consumption could exacerbate micronutrient deficiencies in already vulnerable populations.

School nutrition programs and emergency food providers need guidance on incorporating low-cost, nutrient-dense alternatives that meet these needs. Powdered eggs and fortified cereals may help, but public education on how to build balanced meals without eggs is urgently required.

- **Media, Misinformation, and Crisis Perception**

The review also illustrates how media—especially social media platforms—shape consumer perception. Panic buying, perceived scarcity, and misinformation (e.g., blaming stores or immigrants for shortages) led to behaviors that further strained supply chains. Widmar and colleagues [25] and Morning Consult [14] both documented how emotional decision-making, rather than rational economic behavior, dominated during peak shortage periods.

This suggests a role for public crisis communication strategies. Government agencies and consumer advocacy groups must be proactive in debunking myths, promoting calm, and offering clear guidance on substitutes and nutritional safety.

- **Policy and Programmatic Implications**

Findings point to several policy gaps and opportunities:
• Expand SNAP/WIC coverage to include high-quality protein substitutes, such as plant-based egg alternatives or fortified products.
• Support local egg production through subsidies or infrastructure in rural areas like Nevada.
• Increase public education on affordable, culturally relevant protein options.
• Regulate pricing transparency to mitigate consumer distrust during inflationary periods.

Equity-focused interventions are especially critical. For example, communities with limited grocery access—often food deserts—may need mobile markets or delivery-based subsidy programs to receive stable protein supplies.

Conclusion

Between 2022 and 2025, rising egg prices and fluctuating availability served as a stress test for the U.S. food system—revealing how economic pressure, regulation, and misinformation impact not only what people eat but how they emotionally and behaviorally respond to disruption.

This review finds that consumer responses were shaped by income, ethnicity, geography, and media exposure. Low-income and minority populations disproportionately reduced egg consumption or relied on nutritionally inferior substitutes, while higher-income consumers pivoted to premium or plant-based alternatives. California and Nevada, as case examples, illustrate the regional complexity in response patterns due to legislation, distribution systems, and cultural food practices.

Policy makers, nutritionists, and food system planners must address these disparities with structural interventions and culturally competent education. Ensuring access to affordable, nutritionally complete protein sources during future supply disruptions is not only a matter of food security—but of public health equity.

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