

Sociodemographic factors, consumption frequency, and perceptions of ultra-processed food and dairy among young adults in Indonesia: a cross-sectional study

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Abstract. Ultra-processed foods (UPFs), including ultra-processed dairy, are increasingly consumed in Indonesia. This study investigated sociodemographic associations with UPF and dairy consumption and perceptions, as well as links to consumption patterns and reasons for intake among young adults. A cross-sectional online survey was conducted with 507 participants (mean age 26.8±8.3 years; 45% men, 55% women). Data were analysed using descriptive statistics, Spearman correlations (*r*), chi-square tests (χ^2), and Mann–Whitney U tests (*U*). Consumption frequency was similar across sociodemographic groups, with no significant associations for age, sex, education, expenditure, or residence. Perceptions of dairy products varied, with urban participants viewing dairy as more processed ($p=0.0093$) and less healthy ($p=0.023$), and women expressing greater concern about additives ($p=0.0433$). Reported reasons for UPF intake emphasized convenience (89.3%), availability (66.7%), and taste (55.0%), underscoring that practical and environmental drivers outweigh sociodemographic differences or health perceptions. These findings suggest that targeted nutrition education strategies in Indonesia are needed to address sex and residence-specific perceptions while promoting healthier alternatives among young adults.

1 Introduction

Global dietary patterns have shifted markedly in recent decades, a process described as the nutrition transition. Driven by urbanization, globalization, and technological advances, this transition has accelerated consumer preference for convenience-oriented foods, marked by declining intake of traditional diets and rising consumption of ultra-processed foods (UPFs) [1]. UPFs are industrial formulations made from inexpensive ingredients to enhance palatability and shelf life, typically high in added sugars, fats, and salt, while often low in

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fibre and micronutrients. Within the NOVA classification, they represent the highest level of processing (NOVA 4) [2].

Dairy products, traditionally considered healthy, are increasingly marketed in ultra-processed forms, while plant-based milk alternatives, popular in Indonesia, are also classified as UPFs [3]. Evidence shows limited consumer awareness of UPFs [4]. This study examines sociodemographic associations with UPF and ultra-processed dairy consumption and perception, as well as the relationship between perceptions and consumption patterns and reported reasons for intake among Indonesian young adults.

2 Method

2.1 Participants

A total of 507 participants were included in the study (mean age=26.78±8.26 years; 45% men, 55% women). The sample size was considered sufficient based on methodological recommendations [5]. Recruitment was conducted voluntarily via social media platforms, with 52% (n=264) residing in urban areas (Greater Jakarta) and 48% (n=243) in non-urban areas. All participants provided informed consent digitally. Data collection, storage, and processing complied with the General Data Protection Regulation (GDPR), and responses were anonymised. Ethical approval was exempted, as the study involved only anonymised questionnaire data without any clinical intervention. A purposive sampling approach was employed to achieve balanced representation across sex and residential areas. Inclusion criteria were individuals aged 17 years or older with prior exposure to the term “ultra-processed foods” and willingness to complete the questionnaire.

2.2 Data Collection

Data were collected using a structured online questionnaire, adapted from validated instruments and supplemented with items from a large European study on UPF perceptions [6]. Pre-testing with 35 participants confirmed reliability (Cronbach’s $\alpha=0.851$) and validity (corrected item–total correlations >0.73). The questionnaire comprised four main sections. The first section gathered sociodemographic information, including age, sex (male or female), educational background, monthly expenditure, and residence (urban or non-urban). The second section assessed consumption frequency and understanding of UPFs, covering frequency of consumption and reasons for intake. UPF consumption frequency was measured using structured response (options: 1–2 times per week, 3–5 times per week, every day, several times per month, very rarely, or never). The final section focused on perceptions of UPFs within the dairy category. This included questions on frequency of dairy consumption and perceptions of dairy products (milk, yogurt, processed cheese, butter, whipped cream, ice cream) in terms of processing level (1=minimally processed, 7=ultra processed), healthiness (1=unhealthy, 7=healthy), and additives (1=no additive, 7=many additives). Parallel items were included for plant-based milk alternatives, assessing perceptions of processing, healthiness, and additives.

The online survey was distributed via social media platforms to reach a broad population across Indonesia, specifically targeting individuals aged 17 years or older with prior exposure to the term “ultra-processed foods.” Average completion time was approximately 7–8 minutes. The data collection was conducted between January and June 2025.

2.3 Data Analysis

All analyses were conducted in R (version 4.3.2). Descriptive statistics summarized participant characteristics and responses. Associations between sociodemographic predictors and outcomes were examined using Spearman’s rank correlation for continuous variables (age), Chi-square tests for categorical variables (education, expenditure), and Mann–Whitney U tests for binary variables (sex, residence). Composite perception scores were created by averaging items within each category (dairy: processing, healthiness, additives; plant-based milk: processing, healthiness, additives). Associations between perception scores and consumption frequency of UPFs and dairy were examined using Spearman’s rank correlation. Results were reported as p-values for all tests, with correlation coefficient (r) additionally presented for age. Statistical significance was set at $p<0.05$.

3 Results and discussion

3.1 Associations between sociodemographic factors, consumption frequency, and perceptions of UPFs and dairy products

The associations between expenditure level and the frequency of UPF consumption, as well as those with age, sex, and educational level, are presented in Table 1. In this study, sociodemographic characteristics (age, sex, education, expenditure, and residence) were not significantly associated with the frequency of UPF or dairy consumption among young adults, suggesting that UPF intake is relatively uniform across demographic groups. However, perceptions of dairy products varied by residence and sex.

Table 1. Sociodemographic associations with UPF and dairy consumption and perceptions.

Variable	Age ¹	Sex ²	Education ³	Expenditure ³	Residence ²
Frequency of UPFs consumption	r=0.017, p=0.703	p=0.721	p=0.146	p=0.202	p=0.154
Frequency of dairy consumption	r=0.043, p=0.336	p=0.535	p=0.528	p=0.204	p=0.147
Perception of dairy processing	r=0.044, p=0.328	p=0.623	p=0.993	p=0.215	p=0.0093*
Perception of dairy healthiness	r=0.02, p=0.658	p=0.935	p=0.713	p=0.122	p=0.023*
Perception of additives in dairy	r=0.019, p=0.668	p=0.0433*	p=0.518	p=0.501	p=0.146
Perception of plant-based milk processing	r=0.044, p=0.323	p=0.0601	p=0.465	p=0.3	p=0.934
Perception of plant-based milk healthiness	r=0.048, p=0.279	p=0.396	p=0.336	p=0.55	p=0.885
Perception of additives in plant-based milk	r=0.043, p=0.337	p=0.126	p=0.777	p=0.318	p=0.862

Note: tested using ¹Spearman’s rank correlation coefficient (r), ²Mann–Whitney U test, ³Chi-square test, *Statistically significant at $p<0.05$

Participants living in urban perceived dairy products as more processed ($p=0.0093$) and less healthy ($p=0.0023$), while women expressed greater concern about additives in dairy products than men (0.0433). No significant differences were observed for perceptions of plant-based milk. These findings differ from prior studies that reported higher UPF consumption among individuals with lower socioeconomic status and lower education levels, with greater financial capacity linked to reduced reliance on UPFs [7]. Yet, evidence across countries remains inconsistent, as socioeconomic indicators show variable associations with UPF intake depending on national context and dietary patterns [8, 9]. The absence of significant associations in this study suggests that factors beyond socioeconomic status, such as food environment, cultural preferences, and marketing, may play stronger roles in shaping consumption behaviours. The significant differences in perceptions by residence likely reflect urban food environments, where exposure to packaged dairy products and discourse around processing is greater, while sex differences in additive perception may indicate heightened health awareness among women. Comparable findings have been reported, with urban–rural differences in UPF consumption diminishing since modern retail availability increases across regions [10, 11]. These results highlight that while consumption frequency is broadly similar across sociodemographic groups, perceptions of dairy products are socially patterned, shaped primarily by residence and sex rather than socioeconomic alone.

3.2 Associations between consumption and perceptions of UPFs and dairy products

No significant associations were found between perceptions of dairy products and consumption frequency (Table 2). Moreover, the correlations observed were weak. Although no statistically significant results were identified, the pattern suggests a potential segmentation of consumers into dairy-oriented and plant-based-oriented groups.

Table 2. Associations between perceptions and consumption frequency of UPFs and dairy products.

Perception	Frequency of UPFs consumption	Frequency of dairy consumption
Perception of dairy processing	$r=-0.029, p=0.509$	$r=0.002, p=0.965$
Perception of dairy healthiness	$r=0.023, p=0.605$	$r=0.015, p=0.73$
Perception of additives in dairy	$r=0.002, p=0.968$	$r=-0.059, p=0.184$
Perception of plant-based milk processing	$r=0.018, p=0.688$	$r=-0.011, p=0.809$
Perception of plant-based milk healthiness	$r=0.023, p=0.613$	$r=0.043, p=0.33$
Perception of additives in plant-based milk	$r=0.033, p=0.461$	$r=0.032, p=0.477$

The reasons for UPF intake revealed that convenience was the dominant driver, with 89.3% of participants citing “practical and easy to prepare,” followed by availability in stores (66.7%) and taste (55.0%). Affordability (32.7%), longer shelf life (31.8%), and lack of time to cook fresh foods (27.0%), while only 6.5% mentioned childhood habits. These findings highlight that UPF consumption is primarily motivated by practical and economic considerations rather than health perceptions. This aligns with previous studies showing that convenience, affordability, and marketing often outweigh nutrition knowledge in shaping dietary choices [8, 9]. In Indonesia, modern retail and widespread availability of packaged foods further reinforce these motivations [10, 11]. Taken together, the absence of strong perception and consumption links and the dominance of convenience- and

availability-related reasons underscore the complexity of dietary behaviour. Consumer attitudes toward plant-based milk appear to be shaped by cultural familiarity with dairy, while UPF intake is driven largely by structural and environmental factors. Future interventions should address affordability and convenience alongside awareness to promote healthier alternatives.

4 Conclusion

This study examined sociodemographic associations with UPF and ultra-processed dairy consumption and perceptions among Indonesian young adults. Consumption was uniform across groups, while perceptions varied by residence and sex. Convenience, availability, and taste were dominant drivers of UPF intake, suggesting that interventions should prioritize affordability, accessibility, and cultural familiarity to promote healthier alternatives.

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Open data statement: data supporting this study are presented in the manuscript.

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