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Trust and Acceptance of Biosimilar Medications among the General Population in Saudi Arabia: Cross-Sectional Study

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Abstract

Biosimilars are essential for improving healthcare access and sustainability; however, their adoption is strongly influenced by the public perception, knowledge, and trust. The curremt study aimed to comprehensively evaluate awareness, trust, acceptance, and related beliefs toward biosimilars among the general public in Saudi Arabia. A cross-sectional survey was conducted by the use of a structured bilingual questionnaire (35 items). Data from 512 participants were analyzed using descriptive statistics and regression analysis. Awareness of biologics was 68.4%, whereas awareness of biosimilars was significantly lower (38.7%). Misconceptions were prevalent, particularly regarding equivalence and safety. Trust was highest in physicians (76.3%) and pharmacists (71.5%). Acceptance of biosimilars was moderate, with 61.7% willing to initiate treatment and 53.2% accepting switching. Concerns were reported by nearly half of the respondents. Public perception of biosimilars is shaped by knowledge gaps, trust, and psychological factors. Targeted educational strategies are necessary to improve acceptance and support healthcare sustainability.

Keywords: Biosimilar, Biologics, Medications, Saudi Arabia

Introduction

Therapeutic agents can be derived from a wide range of sources, including natural products such as medicinal plants, which have demonstrated antimicrobial and antioxidant properties (Ahmed, 2023a; Ahmed et al., 2023b). In contrast, modern therapeutics such as biologic agents are derived from living systems using advanced biotechnological processes.

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Biologic therapies have significantly transformed the management of chronic and life-threatening diseases, including autoimmune disorders, cancers, and inflammatory conditions (World Health Organization, 2009; Food and Drug Administration, 2015; European Medicines Agency, 2017). Despite their clinical effectiveness, the high cost of biologic therapies represents a major burden on healthcare systems globally, limiting accessibility and sustainability (Peyrin-Biroulet *et al*., 2017; Cohen *et al*., 2018; Barbier *et al*., 2020). Biosimilars have emerged as cost-effective alternatives designed to provide comparable therapeutic outcomes while reducing healthcare expenditures (Peyrin-Biroulet *et al*., 2017; Cohen *et al*., 2018; Barbier *et al*., 2020). Unlike generic drugs, biosimilars are complex molecules derived from living systems and therefore require rigorous comparability assessments to ensure similarity in quality, safety, and efficacy (Blackstone & Joseph, 2013; Faasse & Petrie, 2013; Simoens *et al*., 2017; Vulto & Jaquez, 2017; Colloca *et al*., 2019; Barbier *et al*., 2020). Regulatory authorities such as the European Medicines Agency (EMA), the U.S. Food and Drug Administration (FDA), and the Saudi Food and Drug Authority (SFDA) have established strict regulatory frameworks to ensure the safe introduction of biosimilars into clinical practice (Grabowski *et al*., 2014; FDA, 2015; EMA, 2017; Jørgensen *et al*., 2017; McKinnon *et al*., 2018). These frameworks include analytical characterization, non-clinical evaluation, clinical trials, and post-marketing pharmacovigilance to ensure continued safety monitoring (Kurki *et al*., 2017; McKinnon *et al*., 2018; Barbier *et al*., 2022). Despite these stringent measures, skepticism toward biosimilars persists among both patients and the general public (Peyrin-Biroulet *et al*., 2017; Qahtani *et al*., 2024). Public perception is a critical determinant of biosimilar adoption, as acceptance is influenced not only by scientific evidence but also by trust in healthcare providers, regulatory institutions, and pharmaceutical companies (Troein *et al*., 2019; Barbier *et al*., 2020). Misconceptions such as the belief that lower cost implies inferior quality or that biosimilars are less effective can significantly hinder their uptake (Simoens *et al*., 2017). In addition, behavioral and psychological factors play a crucial role in shaping patient attitudes. The nocebo effect, defined as negative expectations leading to perceived adverse outcomes, has been increasingly recognized in the context of biosimilar switching (Faasse & Petrie, 2013; Colloca *et al*., 2019). This phenomenon may lead to decreased treatment adherence, increased reporting of side effects, and reluctance to switch from originator biologics, even in the absence of clinical differences (Jørgensen *et al*., 2017; Vulto & Jaquez, 2017). Understanding these

psychological dimensions is essential for optimizing patient outcomes and ensuring the successful implementation of biosimilar policies. In Saudi Arabia, the healthcare system is undergoing rapid development, with increasing utilization of biologic therapies in tertiary care settings. However, limited data exist regarding public awareness, trust, and acceptance of biosimilars. Given the importance of public perception in influencing healthcare decisions, assessing these factors is essential to support evidence-based policy-making and educational interventions. Therefore, this study aims to provide a comprehensive evaluation of awareness, trust, acceptance, and nocebo-related beliefs toward biosimilars among the general public in Saudi Arabia.

Materials and Methods

Study Design and Setting

This study employed a cross-sectional survey design conducted between February and April 2025 in the Kingdom of Saudi Arabia. The study aimed to assess awareness, trust, acceptance, and nocebo-related beliefs regarding biosimilar medications among the general population. The online survey approach was selected to enable a wide geographic reach and capture diverse demographic groups across multiple regions.

Study Population and Sampling

Participants were eligible if they were adults aged 18 years or older and currently residing in Saudi Arabia. A non-probability convenience sampling technique was used, with participants recruited through widely used social media platforms, including WhatsApp, Twitter (X), and Telegram. This approach facilitated rapid data collection and access to a broad population sample.

A total of 512 complete responses were included in the final analysis. Incomplete questionnaires and duplicate entries were excluded. Participation was voluntary, and no financial incentives were provided.

Questionnaire Development

A structured bilingual (Arabic and English) questionnaire consisting of 35 items was developed based on previously validated instruments and relevant literature. The questionnaire was designed to assess multiple domains:

1. Awareness and knowledge of biologics and biosimilars
2. Trust in healthcare professionals and institutions
3. Perceived efficacy and safety
4. Acceptance and behavioral intention
5. Nocebo-related beliefs and psychological perceptions

The questionnaire was initially developed in English, translated into Arabic, and then back-translated to ensure accuracy and consistency. Content validity was reviewed by experts in pharmacology and clinical practice to ensure clarity, relevance, and appropriateness for the target population.

Measurement Scale

Responses to attitudinal and perception-based items were measured using a 5-point Likert scale, ranging from:

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Reverse-coded items were included to minimize response bias and were appropriately recoded before analysis.

Data Collection Procedure

The questionnaire was distributed electronically using an online survey platform. The survey link was disseminated via social media channels, allowing participants to complete the questionnaire anonymously at their convenience. The estimated completion time was approximately 8–10 minutes.

Data collection was conducted over three months, ensuring an adequate sample size and representation.

Ethical Considerations

Ethical approval was obtained prior to data collection in accordance with Umm A-Qura University institutional research guidelines. Approval No. (HAPO-02-K-012-2026-04-3341). Participants were informed about the study objectives, and electronic informed consent was obtained before participation. Confidentiality and anonymity were strictly maintained, and no identifiable personal data was collected.

Statistical Analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics were used to summarize demographic characteristics and questionnaire responses, including frequencies, percentages, means, and standard deviations.

Inferential statistical analyses were performed to examine associations between variables. Chi-square tests were used for categorical variables, and independent t-tests or ANOVA were applied where appropriate.

Logistic regression analysis was conducted to identify predictors of biosimilar acceptance. Variables included in the regression model were education level, awareness of biosimilars, trust in healthcare professionals, and nocebo-related beliefs. Odds ratios (OR) with 95% confidence intervals (CI) were reported. A p-value of <0.05 was considered statistically significant.

Results and Discussion

A total of 512 participants were included in the final analysis. The demographic distribution indicated a predominance of female respondents (62.1%), **Table 1**, with the largest age group being 18–30 years (48.6%). The majority of participants held a university-level education (58.8%), reflecting a relatively educated sample population. However, only 24.2% reported a healthcare-related

background, suggesting that the findings largely represent perceptions of the general public rather than healthcare professionals.

Awareness analysis revealed a substantial disparity between familiarity with biologic medications (68.4%) and biosimilars (38.7%), indicating a significant knowledge gap **Figure 1**. This gap is further emphasized by the high prevalence of misconceptions, as more than half of participants (54.9%) incorrectly believed that biosimilars are identical to originator biologics. In addition, 57.6% associated lower cost with reduced quality, highlighting a strong bias linking price to therapeutic effectiveness.

Trust assessment demonstrated that healthcare professionals play a central role in shaping public perception. Physicians were the most trusted group (76.3%), followed by pharmacists (71.5%), while trust in pharmaceutical companies was considerably lower (49.7%). This gradient of trust suggests that interpersonal healthcare communication may be more influential than institutional messaging **Table 2**.

Perceptions of efficacy and safety were moderate, with approximately half of participants agreeing that biosimilars are as effective (52.4%) and as safe (50.1%) as originator biologics. However, a notable proportion of respondents selected neutral responses, reflecting uncertainty rather than strong opposition (Istyagina-Eliseeva *et al*., 2022; Spirito *et al*., 2022; Aruta & Durotan, 2023; Babaei *et al*., 2023; Kusumawardani *et al*., 2023; Doddapanen *et al*., 2024; Hima *et al*., 2024; Joungtrakul & Smith, 2024; Mohammad *et al*., 2024; Shaji *et al*., 2024).

Behavioral intention analysis showed that 61.7% of participants were willing to initiate treatment with a biosimilar when recommended by a physician, whereas acceptance of switching from an originator biologic was lower (53.2%). Importantly, acceptance increased to 64.5% when cost savings were emphasized, indicating that economic considerations significantly influence decision-making.

Nocebo-related perceptions were prominent, with 46–48% of participants expressing concerns about reduced effectiveness and increased side effects following switching. Additionally, a substantial proportion reported anxiety associated with switching, suggesting that psychological expectations may play a critical role in treatment perception **(Figure 2)**.

Table 1. Demographic Characteristics of Participants

Variable	Category	n (%)
Gender	Female	318 (62.1)
	Male	194 (37.9)
Age	18–30	249 (48.6)
	31–45	151 (29.5)
	>45	112 (21.9)
Education	High school	120 (23.4)
	University	301 (58.8)
	Postgraduate	91 (17.8)
Healthcare background	Yes	124 (24.2)
	No	388 (75.8)

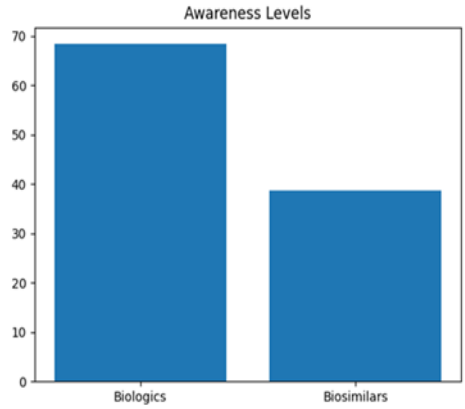

Figure 1. Awareness of Biologics vs Biosimilars

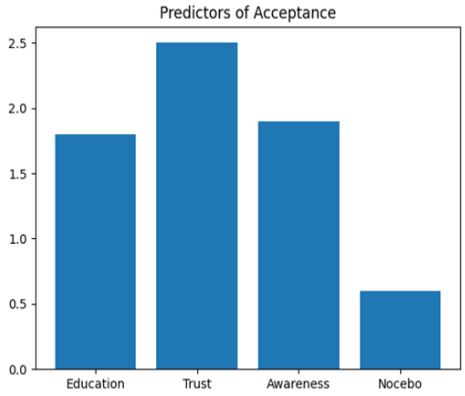

Figure 2. Predictors of Acceptance

Table 2. Key Perception Scores (Likert Scale)

Item	Mean ± SD
Trust physicians	4.1±0.8
Trust pharmacists	3.9±0.9
Trust regulators	3.8±0.9
Trust pharma companies	3.2±1.1
Biosimilars effective	3.6±1.0
Biosimilars safe	3.5±1.0
Initiate treatment	3.7±1.0
Switch acceptance	3.4±1.1
Switch anxiety	3.2±1.1
Perceived side effects	3.3±1.0
Cost benefit	4.0±0.9
Prefer originator	3.5±1.1
Social media influence	3.6±1.0
Need education	4.2±0.8

Confidence decision	3.3±1.1

This study provides a comprehensive evaluation of public perceptions toward biosimilars in Saudi Arabia, revealing several important findings with implications for clinical practice and healthcare policy. The most notable observation is the significant gap between awareness of biologic therapies and biosimilars, which mirrors findings reported in international studies (Jacobs *et al*., 2016; Peyrin-Biroulet *et al*., 2017). This discrepancy suggests that while biologics have gained public visibility, biosimilars remain poorly understood, likely due to limited targeted education and complex scientific concepts (Ganea *et al*., 2024; Hima *et al*., 2024; Joungtrakul & Smith, 2024; Varoneckaitė *et al*., 2024; Al-Sunbul *et al*., 2025; Rajadurai & Govindaraju, 2025).

The high prevalence of misconceptions identified in this study is particularly concerning. The belief that biosimilars are identical to originators or inherently inferior due to lower cost reflects a fundamental misunderstanding of biosimilar development and regulatory approval processes. Such misconceptions have been widely reported and are recognized as major barriers to biosimilar adoption (Jacobs *et al*., 2016; Simoens *et al*., 2017).

Trust emerged as a key determinant of acceptance, with healthcare professionals, especially physicians and pharmacists, being the most influential sources. This finding aligns with previous research demonstrating that clinician recommendation is one of the strongest predictors of biosimilar acceptance (Ho, 2021). However, the relatively low trust in pharmaceutical companies highlights the need for greater transparency and public engagement to improve confidence.

Another critical finding is the role of economic factors. Increased acceptance when cost savings were emphasized supports the growing body of evidence that biosimilars play a crucial role in improving healthcare affordability and sustainability (Blackstone & Joseph, 2013; Simoens *et al*., 2017). Nevertheless, the persistence of preference for originator biologics indicates that financial considerations alone are insufficient to drive behavioral change.

The impact of nocebo-related beliefs is one of the most significant contributions of this study. The high proportion of participants expressing concerns about switching underscores the importance of psychological factors in shaping treatment outcomes. The nocebo effect has been extensively documented in the context of biosimilars and is known to influence both perceived effectiveness and adverse events (Faasse & Petrie, 2013; Colloca *et al*., 2019). This highlights the need for communication strategies that not only provide information but also address patient expectations and concerns.

Overall, the findings suggest that improving biosimilar acceptance requires a multifaceted approach that integrates education, trust-building, and behavioral interventions. Healthcare professionals should be equipped with effective communication tools, while public health campaigns should focus on simplifying complex concepts and addressing misconceptions. Future research should explore targeted interventions to evaluate their effectiveness in improving public perception and treatment outcomes.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design limits the ability to establish causal relationships between awareness, trust, and acceptance of biosimilars. Second, data were collected through a self-administered online questionnaire, which may introduce response bias, including social desirability and recall bias. Third, the use of convenience sampling via social media platforms may limit the generalizability of the findings, as certain population groups, such as older adults or individuals with limited internet access, may be underrepresented. Additionally, although the questionnaire was carefully developed and validated, participants' understanding of complex concepts such as biosimilars and the nocebo effect may vary, potentially affecting response accuracy. Finally, the study relied on self-reported perceptions rather than actual clinical behavior, which may not fully reflect real-world decision-making regarding biosimilar use. Future research using longitudinal designs and more diverse sampling methods is recommended to further validate and extend these findings.

Conclusion

In conclusion, biosimilar acceptance among the general public in Saudi Arabia is influenced by a complex interplay of knowledge, trust, economic considerations, and psychological factors. Significant gaps in awareness and widespread misconceptions remain key barriers to adoption. Addressing these challenges through targeted educational strategies, enhanced communication by healthcare professionals, and evidence-based policy initiatives is essential to improve acceptance and optimize healthcare sustainability.

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