

Patient Client Consumer Behavior in Physical and Online Pharmacies. A Comparative Analysis of Pharmaceutical Care and Artificial Intelligence

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Abstract - This study highlights distinct consumer behaviors in physical versus online pharmacies, revealing critical insights into the evolving landscape of pharmaceutical care. Findings indicate that online pharmacy users are more likely to make impulsive purchasing decisions driven by promotional offers, spending an average of only 50 seconds on websites. In contrast, consumers in physical pharmacies engage in more deliberate decision-making, heavily influenced by personal interactions with pharmacists. The implications of these findings suggest that consumer behavior in the pharmaceutical sector is significantly shaped by the purchasing environment. The integration of artificial intelligence (AI) in online pharmacies enhances operational efficiencies and personalization but raises concerns regarding the loss of human interaction and emotional intelligence, both crucial for building trust. This highlights the need for further research into balancing technology and personal care in e-health environments. From a practical standpoint, pharmacies must adapt to these evolving consumer preferences by adopting hybrid models that leverage the strengths of both physical and online settings. This includes enhancing the online shopping experience through personalized AI-driven recommendations while maintaining robust patient-pharmacist interactions in physical locations. Implementing tele pharmacy services can bridge the gap, facilitating access to pharmacist consultations without sacrificing personal connection. Ultimately, the study emphasizes the necessity for pharmacies to prioritize the human elements of care that foster trust and loyalty among patients, especially as the industry increasingly incorporates digital solutions. By doing so, pharmacies can improve patient satisfaction and adherence while ensuring a competitive advantage in a rapidly changing healthcare landscape. These insights are vital for pharmacy practitioners, healthcare policymakers, and researchers

navigating the complexities of consumer behavior in the digital age.

Keywords - *Artificial Intelligence, Consumer Behavior, Online Pharmacy, Physical Pharmacy.*

I. INTRODUCTION

The pharmaceutical industry is undergoing a significant transformation driven by technological advancements, particularly the rise of online pharmacies and the increasing integration of artificial intelligence (AI). As consumers increasingly turn to digital solutions for their healthcare needs, the landscape of pharmaceutical care is evolving rapidly. The COVID-19 pandemic has further accelerated this trend, with many patients preferring the convenience and accessibility of online pharmacies (Deloitte, 2021) [2]. This shift necessitates a thorough re-evaluation of traditional pharmacy models, as patients seek not only greater convenience but also competitive pricing and improved access to health information (Miller & Davis, 2021) [8].

Recent data from multiple sources, including a comprehensive analysis of pharmacy behaviors and trends from various studies (Miller & Davis, 2021; Heller et al., 2020) [4, 8] alongside Phoenix Pharma Bulgaria (2024) [7], highlight key behavioral trends in pharmacy usage. For online pharmacies, the analysis shows an average click-through rate of 2.5% on Facebook, with users spending an average of just 50 seconds on the site. This brevity suggests a tendency towards impulsive purchasing behaviors driven by promotional content, as noted by Bagali (2021) [1]. Additional studies corroborate these findings, indicating that such quick decision-making is

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common in digital environments, where users are often exposed to targeted marketing (Thompson & Reid, 2022) [15]. In contrast, visits to brick-and-mortar pharmacies are characterized by intentionality; the data indicates that random visits are virtually non-existent. Customers typically plan their visits around prescriptions, checks, prevention, or maintenance of chronic conditions, leading to a more deliberate purchasing process. Furthermore, the personal interaction with pharmacists plays a crucial role in shaping consumer decisions, as recommendations from pharmacists foster trust and loyalty. In many cases, the absence of such interaction may deter customers from making a purchase or returning to the pharmacy altogether.

The application of consumer behavior theory is critical in understanding these dynamics. The Theory of Planned Behavior (Ajzen, 1991) suggests that consumer intentions guide their actions, influenced by attitudes, subjective norms, and perceived behavioral control. In the context of pharmacy settings, consumers' attitudes towards online and physical pharmacies are shaped by their experiences, the perceived ease of use of digital platforms, and the relationship with pharmacists, which affects their purchasing decisions (Kumar & Reinartz, 2016) [16].

Numerous studies have examined the dynamics of consumer behavior in pharmacy settings. Miller and Davis (2021) [8] highlight that online pharmacies have gained popularity due to their ease of use, allowing consumers to compare prices and access a wider range of products. Conversely, Heller et al. (2020) [4] emphasize the importance of personal interactions in physical pharmacies, where trust and loyalty are built through relationships with pharmacists. This sentiment is echoed by Huh et al. (2021) [5], who found that personal consultations significantly enhance patient confidence in medication choices, especially for those managing chronic conditions. Additionally, Dimova (2021) [3] discusses the broader influence of digitalization on consumer behavior in retail, noting that the shift to online platforms has fundamentally changed how consumers interact with products and services. Costa et al. (2020) [18] also highlight the evolving consumer behavior in e-pharmacies, emphasizing the need for a systematic understanding of these changes. According to Statista (2023) [12], the increasing number of online pharmacies in Bulgaria illustrates the growing trend towards digital solutions in the pharmaceutical sector.

The integration of AI technologies is reshaping customer interactions in online pharmacies. Raza (2021) [10] notes that AI-driven tools, such as chatbots and predictive analytics, have the potential to personalize the shopping experience, thus enhancing customer satisfaction. Specific AI solutions, such as virtual health assistants and automated prescription refills, streamline customer interactions and provide tailored recommendations based on user behavior and preferences (Fischer et al., 2020) [17]. However, while these technologies improve operational efficiency, they raise concerns about the loss of human interaction and the

emotional intelligence that pharmacists provide (Smith & Jones, 2019) [11]. According to a study by Khan (2021) [6], the reliance on AI can create a gap in trust, particularly among older consumers who may prefer personal interactions over automated services. Alshahrani et al. (2021) [19] further support this notion by exploring consumer behaviors towards online pharmacies in Saudi Arabia.

Furthermore, Kuo (2022) [13] explores consumer trust in online pharmacies, highlighting the critical role that AI plays in shaping perceptions and influencing user confidence. Similarly, Johnson and Taylor (2022) [14] review the impact of e-pharmacy on medication adherence, identifying both the benefits and challenges posed by digital pharmacy models in maintaining patient engagement and compliance. Additionally, Patel et al. (2023) [9] discuss the influence of digital health technologies on consumer behavior, emphasizing the need for pharmacies to adapt their strategies to meet evolving consumer expectations in a digital landscape. The impact of COVID-19 on consumer behavior in the online pharmacy market is also noted by Alharthi (2021) [20], underscoring the urgency of understanding these dynamics.

Despite the growing body of literature on online pharmacies and AI integration, there remains a gap in understanding the comparative consumer behavior between physical and online pharmacy settings. The nuances of how trust and loyalty are built in these different environments require further investigation, particularly as consumer preferences continue to evolve. A comparative analysis of consumer behavior in physical versus online pharmacies is essential for identifying effective strategies that pharmacies can adopt in this changing landscape. This publication aims to explore the differences in consumer behavior among patients in both physical and online pharmacy settings, focusing on the influence of pharmaceutical care and AI on patient experiences and decision-making processes. By analysing these dynamics, this study seeks to provide insights into how pharmacies can effectively adapt to the evolving landscape of healthcare delivery.

II. MATERIALS AND METHODS

This research adopts a mixed-methods approach, combining quantitative data analysis with qualitative insights to comprehensively understand consumer behavior in both physical and online pharmacies. For online pharmacies, web analytics tools, particularly Google Analytics, were employed to gather data on user behavior. Key metrics such as click-through rates and time spent on-site were analyzed. For example, one of the leading online pharmacies in Bulgaria reported a click-through rate of 2.5% on Facebook and an average site visit duration of 50 seconds over the past six months (Phoenix Pharma Bulgaria, 2024) [7]. Additional studies have verified this average time spent, confirming that online users tend to browse quickly due to the abundance of choices available (Thompson & Reid, 2022) [15].

Physical pharmacies were analysed through point-of-sale (POS) data and customer feedback interviews, focusing on sample sizes that included 200 participants across various demographics. The demographic characteristics of the participants were as follows:

- Age: 18-65 years
- Gender: 52% female, 48% male
- Socioeconomic Status: 30% low income, 40% middle income, 30% high income
- Health Conditions: 25% with chronic conditions, 75% without chronic conditions

The data collection method involved structured questionnaires administered during interviews, ensuring a representative cross-section of the population. To address potential confounding variables, the study employed multiple regression analysis to control for factors such as age, gender, socioeconomic status, and frequency of pharmacy visits. This analytical procedure allows for a clearer understanding of how these variables influence consumer behavior, providing robust insights into the differences between physical and online pharmacy settings.

Significance Testing: Statistical analyses included significance values, effect sizes, and 95% confidence intervals for key metrics. For example, the regression analysis indicated a significant effect of online shopping frequency on impulsive purchasing behavior ($p < 0.05$), with an effect size (Cohen's d) of 0.4, suggesting a moderate relationship.

III.RESULTS AND DISCUSSION

The findings reveal significant differences in consumer behavior between physical and online pharmacies. Online pharmacy users tend to make quicker, more impulsive purchasing decisions, as evidenced by the short average time spent on sites. This suggests a convenience-driven behavior, where promotional offers heavily influence purchases. Research indicates that the promotional share online is significantly higher compared to physical pharmacies, where decisions are often based on prescriptions and pharmacist recommendations (Miller & Davis, 2021) [8].

In contrast, visits to physical pharmacies are generally more planned and deliberate. According to Heller et al. (2020) [4], a negligible percentage of visits to physical pharmacies are random; these interactions are typically driven by specific health needs or prescriptions. Patients visiting physical pharmacies tend to deliberate longer on their purchasing decisions, and the presence of a pharmacist encourages them to seek information and ask questions, leading to a more informed decision-making process.

The role of pharmacists in physical pharmacies is critical in shaping consumer decisions. Personal interactions significantly influence trust and loyalty. A study by Huh et al. (2021) [5] found that 70% of patients reported feeling more confident in their medication choices when receiving guidance from a pharmacist. This

trust is particularly vital for patients managing chronic health conditions, where ongoing support and education are essential for adherence and health outcomes.

To further illustrate the influence of pharmacists on consumer trust and decision-making, Table 1 outlines the contrasting roles that pharmacists play in physical and online pharmacy settings.

TABLE 1: CONTRASTING ROLES OF PHARMACISTS IN PHYSICAL AND ONLINE PHARMACIES

| Influence Factor | Online pharmacies | Physical pharmacies | Source |
|----------------------------------|---|--------------------------------------|---------------------------|
| Interaction with pharmacists | Minimal interaction | High interaction | Heller et al. (2020) [4] |
| Confidence in medication choices | Lower confidence | 70% of patients feel more confident | Huh et al. (2021) [5] |
| Role in decision-making | Limited role | Critical role in shaping decisions | Dimova (2021) [3] |
| Patient education | Limited to AI-assisted tools | Continuous support and education | Raza (2021) [10] |
| Trust level | Lower due to lack of personal interaction | Higher due to personal consultations | Miller & Davis (2021) [8] |

Adapted from Huh et al. [5] and other cited sources.

AI technologies are increasingly influencing decision-making processes in online pharmacy settings. The integration of AI allows for personalized experiences, where algorithms analyze user behavior to deliver tailored product recommendations and enhance customer interactions (Patel et al., 2023) [9]. Specific AI solutions, such as virtual health assistants and automated prescription refills, streamline customer interactions and provide tailored recommendations based on user behavior and preferences (Fischer et al., 2020) [17]. However, the reliance on AI also presents challenges. While AI can improve efficiency and reduce wait times, it cannot replicate the emotional intelligence and empathy that human pharmacists provide (Smith & Jones, 2019) [11]. Striking a balance between leveraging AI and maintaining the human touch in pharmaceutical care is essential for maximizing patient satisfaction and improving health outcomes.

The shift towards online pharmacies creates both challenges and opportunities for the pharmaceutical industry. A primary challenge is ensuring that the quality of care provided through online platforms remains high. As pharmacies increasingly adopt AI and digital solutions, they must also prioritize the human elements of care that foster trust and loyalty among patients. Opportunities exist for developing hybrid models that combine the strengths of both physical and online pharmacies. For instance, telepharmacy services can provide patients with access to pharmacist consultations without compromising the personal connection that many consumers value. Additionally, leveraging AI to enhance in-store

experiences can bridge the gap between digital and physical interactions.

IV. CONCLUSIONS

This study highlights the distinct consumer behaviors exhibited in physical versus online pharmacies, revealing critical insights into the evolving landscape of pharmaceutical care. The findings indicate that online pharmacy users are more likely to make impulsive purchasing decisions driven by promotional offers, spending an average of only 50 seconds on websites. In contrast, consumers in physical pharmacies engage in more deliberate decision-making processes, heavily influenced by personal interactions with pharmacists.

The theoretical implications of these findings suggest that consumer behavior in the pharmaceutical sector is significantly shaped by the environment in which products are purchased. The integration of artificial intelligence (AI) in online pharmacies enhances operational efficiencies and personalization, yet it raises concerns regarding the loss of human interaction and emotional intelligence that are crucial for building trust. This underscores the need for further research into the balance between technology and personal care in e-health environments.

From a practical standpoint, pharmacies must adapt to these evolving consumer preferences by adopting hybrid models that leverage the strengths of both physical and online settings. This includes enhancing the online shopping experience through personalized AI-driven recommendations while maintaining robust patient-pharmacist interactions in physical locations. Additionally, implementing telepharmacy services can bridge the gap, facilitating access to pharmacist consultations without sacrificing personal connection.

Ultimately, the study emphasizes the necessity for pharmacies to prioritize the human elements of care that foster trust and loyalty among patients, particularly as the industry increasingly incorporates digital solutions. By doing so, pharmacies can not only improve patient satisfaction and adherence but also ensure a competitive advantage in a rapidly changing healthcare landscape. These insights are vital for pharmacy practitioners, healthcare policymakers, and researchers aiming to navigate the complexities of consumer behavior in the digital age.

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