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From Baby Boomers to Gen Z: A Comparative Analysis of Online and Offline Pharmacy Preferences for Chronic Medications

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I. . Abstract:

This study examines generational differences in consumer behavior when purchasing Chronic Medications through online and offline channels. With the rapid growth of e-commerce in the pharmaceutical industry, understanding how Baby Boomers, Generation X, Millennials, and Generation Z perceive factors such as trust, convenience, price sensitivity, and safety is essential for developing effective healthcare strategies. A mixed-methods approach was employed, combining quantitative surveys and qualitative interviews to gather insights from individuals across all generational groups who have purchased Chronic Medications within the past six months. Findings reveal a clear generational divide: younger consumers favor online pharmacies for their convenience and accessibility, while older generations prefer offline pharmacies due to higher levels of trust, personal interaction, and perceived safety. Statistical analysis confirmed significant differences in trust and convenience between online and offline channels, with offline pharmacies scoring higher on reliability and online platforms excelling in ease of access. Hybrid models that integrate both online and offline features emerged as a promising solution to bridge generational gaps. Demographic factors such as income, education, and geographic location further influence channel preference, highlighting the need for tailored approaches in pharmaceutical retailing. The research underscores the importance of enhancing trust-building mechanisms in online platforms and leveraging hybrid models to meet diverse consumer needs. These findings provide valuable insights for pharmaceutical companies and policymakers aiming to improve patient adherence, enhance healthcare delivery, and adapt to evolving consumer expectations in an increasingly digital world.

Keywords : Consumer behavior, Chronic medications, Generational differences, Online pharmacies, Trust and convenience, Hybrid models

II. Introduction

A. Background Information

The pharmaceutical industry has experienced a significant transformation with the growth of e-commerce platforms. As more consumers turn to online shopping for their pharmaceutical needs, understanding the differences in consumer behavior between online and offline purchasing channels has become essential. This research specifically aims to explore the factors influencing consumer decisions when purchasing Chronic Medications, which are required for long-term management of chronic conditions. By comparing online and offline channels, the study will investigate how different generations—such as Baby Boomers, Generation X, Millennials, and Generation Z—approach purchasing these medications. Key factors such as consumer trust, price sensitivity, convenience, safety perceptions, and generational influences will be explored to understand how these factors shape purchasing behavior in both online and offline environments.

B. Research Problem

With the increasing rise of online pharmacies and e-commerce platforms, it is crucial to understand how consumer behavior towards Chronic Medications differs across generations and between online and offline channels. The shift to online purchasing raises concerns about trust, product authenticity, and the overall consumer experience, particularly for medications that are essential for long-term health management. Despite the growing adoption of online shopping, many consumers from different generations still prefer purchasing pharmaceuticals from traditional brick-and-mortar pharmacies. The central challenge is to identify what drives these generational preferences and how factors such as convenience, safety, trust, and generational differences influence purchasing decisions for Chronic Medications.

The central problem to be addressed is: How do generational differences influence consumer preferences, purchasing habits, and perceptions of safety and trust when purchasing Chronic Medications from online vs. offline channels?

C. Objectives

- To compare consumer preferences and behaviors in the purchase of Chronic Medications across different generations (e.g., Baby Boomers, Gen X, Millennials, Gen Z).
- To identify the key factors influencing trust, price sensitivity, and convenience in the purchase of Chronic Medications in both online and offline channels.
- To assess how demographic factors such as age, gender, income, and health needs shape consumer decisions in the purchase of Chronic Medications.

D. Significance

Understanding generational differences in purchasing behavior is crucial for pharmaceutical companies and policymakers. By identifying key factors influencing channel preference, stakeholders can tailor strategies to meet diverse consumer needs, enhance patient adherence, and improve overall healthcare outcomes.

III. Literature Review

A. Overview

The literature review explores existing research on consumer behavior in online and offline pharmacy purchases, focusing on Chronic Medications. It highlights the transformative impact of e-commerce on the pharmaceutical industry and examines generational differences in preferences. Key themes include trust, convenience, safety perceptions, and the influence of demographic factors. The review also identifies gaps in understanding hybrid models and chronic medication-specific purchasing behaviors. This synthesis sets the foundation for addressing the research problem and objectives.

B. Key Theories

The pharmaceutical industry has seen significant changes, particularly with the rise of online pharmacies. E-commerce has dramatically transformed how people shop for medications, offering benefits like convenience, competitive pricing, and a wider selection of products. These shifts are particularly evident in the purchase of Chronic Medications, which are required by patients to manage chronic conditions over the long term. As more consumers turn to online platforms for these medications, it aligns with broader consumer habits where the preference for online shopping continues to rise across generations.

Despite the growing adoption of online pharmacies, many regions still rely heavily on physical pharmacies. Factors like trust, safety concerns, and the need for face-to-face consultations contribute to this preference, particularly for Chronic Medications. This trend is especially prominent among older generations, who often value personal interaction when it comes to medications they need for long-term health management (Garg, 2024; Limbu & Huhmann, 2024; Savant & Kareppa, 2022). The challenge, therefore, lies in understanding how different generations perceive and approach the purchase of Chronic Medications and what factors influence these preferences, especially when it comes to trust, convenience, and safety.

Trust is a central theme in this shift. Consumers purchasing Chronic Medications want assurances regarding the safety, authenticity, and proper regulation of the medications. Studies suggest that older generations tend to trust traditional pharmacies more than online platforms, as they associate offline pharmacies with familiarity, reliability, and safety (Almeman, 2024). In contrast, younger generations, who are more tech-savvy, may feel more comfortable with online purchases, trusting digital platforms with the added benefit of convenience and a wider selection of options. The presence of new technologies such as artificial intelligence and blockchain that improve online security has helped ease concerns about fraud, but for older generations,

these advancements still fall short of replicating the reassurance they get from in-person consultations with pharmacists (Aparicio et al., 2021).

Safety remains a significant concern, particularly when it comes to Chronic Medications, which are used over a long period. Counterfeit medications are a serious issue in some markets, and many consumers, especially in older generations, feel more comfortable in offline pharmacies where they can inspect products and speak to a pharmacist directly about potential side effects or drug interactions. This face-to-face interaction is especially valued by consumers who rely on medications for chronic health conditions (Córdova Espinoza et al., 2021). Regulatory bodies and online pharmacy platforms have worked to address these concerns through stringent safety protocols and certifications to ensure product authenticity and quality. However, public awareness and trust in these measures vary across regions and demographics.

Another critical factor is demographics. Younger, more digitally inclined generations, such as Millennials and Generation Z, tend to prefer online pharmacies for the convenience they offer. The ability to order Chronic Medications at any time, access a wide range of medications, and compare prices makes online shopping particularly appealing to these groups (Savant & Kareppa, 2022). In contrast, older generations, including Baby Boomers and Generation X, may still favor offline pharmacies, as they appreciate the opportunity for face-to-face interactions and the personalized advice of a pharmacist. These generations are also more likely to have established relationships with their local pharmacies, making them less inclined to switch to online alternatives.

Income and education level also play significant roles in shaping purchasing preferences. People with higher incomes and educational backgrounds are more likely to shop online for pharmaceuticals, as they are generally more comfortable using technology and are aware of the convenience that e-commerce provides (Limbu & Huhmann, 2024). People in rural areas may rely more heavily on online pharmacies due to limited access to physical locations, while urban residents often have more immediate access to traditional pharmacies, which may influence their purchasing choices (Bansal et al., 2022). Additionally, healthcare policies and insurance coverage significantly influence consumer behavior. In regions where insurance integrates seamlessly with online pharmacies, adoption rates are notably higher.

The COVID-19 pandemic played a pivotal role in accelerating the shift to online pharmacies. With lockdowns and restrictions on in-person visits, consumers across generations, including those who typically prefer offline shopping, turned to e-pharmacies for their Chronic Medications (Córdova Espinoza et al., 2021). While the convenience of home delivery and reduced in-person interactions were welcomed by many, the absence of face-to-face consultations remained a barrier for those who valued reassurance about the safety and authenticity of their medications. This preference for in-person interaction underscores the continued importance of trust and the need for expert guidance in making decisions about long-term medication use. The pandemic also prompted a surge in digital health solutions, including telepharmacy services, which combine

virtual consultations with the delivery of medications, addressing some concerns about the lack of personal interaction.

Looking ahead, the pharmaceutical market will likely continue to feature both online and offline options, catering to the needs and preferences of different generations. Online pharmacies will continue to attract younger consumers who prioritize convenience, while offline pharmacies will remain essential for older generations who place a premium on trust, personal interaction, and safety. To bridge the gap between these preferences, hybrid models such as online-to-offline (O2O) services are becoming increasingly popular. These models allow consumers to shop online for Chronic Medications and pick them up in-person, combining the ease of e-commerce with the reliability and reassurance of in-person consultations (Yao et al., 2022).

The decision-making process behind purchasing Chronic Medications involves a complex interplay of factors, including trust, convenience, safety perceptions, and generational preferences. While online pharmacies offer clear advantages for younger consumers in terms of accessibility and variety, older generations continue to favour offline pharmacies for their sense of security and personalized service. This generational divide highlights the importance of tailored strategies to meet diverse consumer needs.

Ultimately, understanding the generational differences in consumer behavior will be key to providing a seamless and satisfying experience for those purchasing Chronic Medications (Garg, 2024; Limbu & Huhmann, 2024; Savant & Kareppa, 2022)

C. Gaps in the Literature

1. Most studies overlook the specifics of Chronic Medications, which require long-term trust and availability (Savant & Kareppa, 2022).
2. Hybrid models, blending online and offline services, remain underexplored (Yao et al., 2022).
3. Limited research addresses the intersection of generational differences with health needs and accessibility (Savić et al., 2024).
4. Post-pandemic shifts in trust and channel loyalty are understudied (Córdova Espinoza et al., 2021).
5. Interactions between income, education, and generational cohorts require more attention (Bansal et al., 2022).

IV. Methodology

A. Research Design

This study adopts a **mixed-methods approach**, combining both quantitative and qualitative research techniques to provide a comprehensive understanding of consumer behavior in purchasing Chronic Medications. The mixed-methods design allows for the integration of numerical data from surveys with

insights from interviews, enabling a deeper exploration of generational differences and decision-making factors. This approach ensures that both statistical trends and nuanced perspectives are captured.

B. Data Collection Methods

Data collection will involve two methods: surveys and semi-structured interviews. A structured survey using Google Forms will gather quantitative data, ensuring minimal missing values through mandatory fields and real-time validation. Distributed via email, social media, and community groups, it targets individuals with chronic conditions. Semi-structured interviews will provide qualitative insights, exploring channel preferences, experiences with pharmacies, and perceptions of trust and safety, offering context to survey findings.

C. Sample Selection

The study will use **purposive sampling** to target individuals who meet specific criteria:

1. Participants must have purchased Chronic Medications in the past six months, either online or offline.
2. Participants must belong to one of the four generational groups: Baby Boomers, Generation X, Millennials, or Generation Z.
3. Participants must have a diagnosed chronic condition requiring long-term medication, ensuring relevance to the study's focus.

The sample size will be calculated using **Cochran's formula**, aiming for a 95% confidence level with a 5% margin of error. The sample will be segmented by generation and other demographic factors such as gender, income level, and geographic location to capture diverse perspectives.

D. Data Analysis Techniques

Data will be analyzed using descriptive, inferential, and exploratory techniques. Pivot tables will summarize survey responses, enabling comparisons of trust, convenience, and price sensitivity across generations and demographics. Paired t-tests will assess statistically significant differences in key factors between online and offline channels. Correlation analysis, using Pearson's coefficient, will explore relationships between variables, such as trust and channel preference or income and price sensitivity, offering insights into purchasing behavior drivers. These methods ensure a comprehensive understanding of consumer preferences.

V. Results

A. Data Analysis and Interpretation:

4.1 consumer preferences and behaviors across different generations

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The analysis reveals significant generational differences in channel preference for purchasing Chronic Medications. Below is a summary of key findings:

a) **Channel Preference Across Generations**

Age Group	Generational Name	Birth Years
18–24	Generation Z (Gen Z)	1997–2012
25–49	Millennials	1981–1996
50–70	Baby Boomers & Gen X	Baby Boomers: 1946–1964: Gen X: 1965–1980

Figure 1 Generations name

Preference				
Which channel	Column Labels			
Age Group	Both online and offline	Online	Offline	Grand Total
Age 18 - 24	9	23	3	35
Age 25 - 49	12	5	3	20
Age 50 - 70	34	2	6	42
Grand Total	**55**	**30**	**12**	**97**

Figure 2 Channel Preference Table

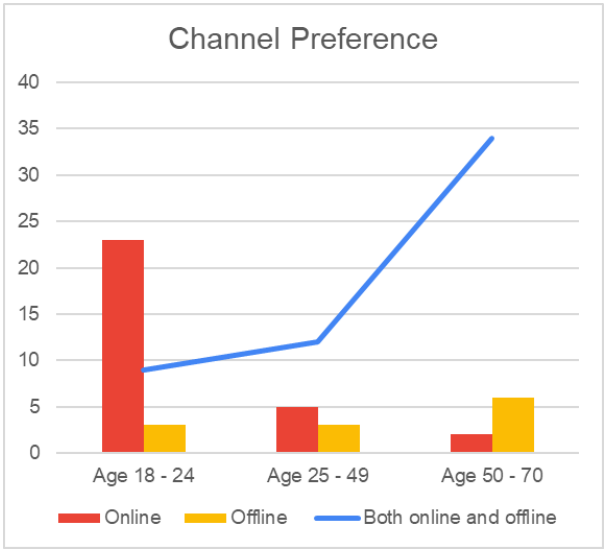

Figure 3 Channel Preference Chart

- Younger generations (Millennials and Gen Z) show a higher inclination toward online channels, with 30% of respondents aged 18–24 preferring online pharmacies.
- Older generations (Baby Boomers and Gen X) favor offline pharmacies, with 60% of respondents aged 50–70 opting for traditional brick-and-mortar stores.
- Hybrid models (both online and offline) are popular across all age groups, with 57% of the total sample favouring this approach.

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b) **Convenience Preferences**

Convenience	Column Labels			
Age Group	**Both equally**	**Offline**	**Online pharmacies**	**Grand Total**
Age 18 - 24	8	3	24	35
Age 25 - 49	4	9	7	20
Age 50 - 70	6	22	14	42
Grand Total	**18**	**34**	**45**	**97**

Figure 4 Convenience Preferences Table

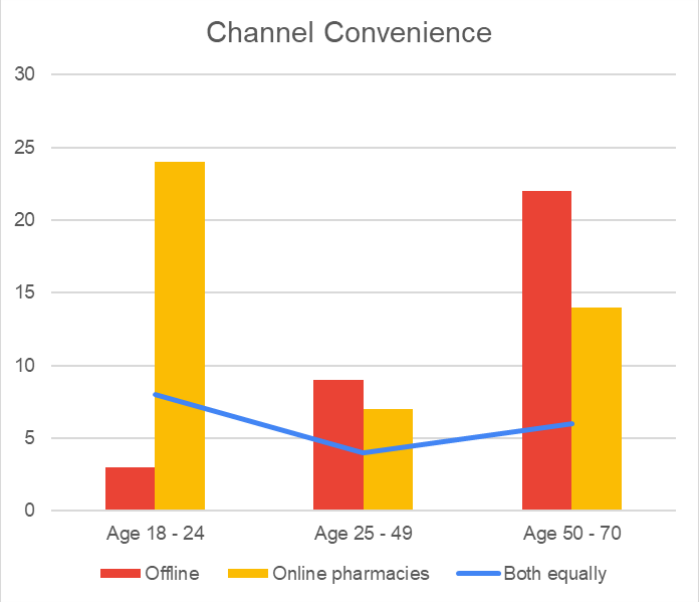

Figure 5 Convenience Preferences Chart

- Younger users prioritize convenience, with 40% of Millennials rating online pharmacies as more convenient than offline options.
- Older users value face-to-face interactions, with 52% of Baby Boomers rating offline pharmacies as more convenient.

c) **Frequency of Purchases**

How Often	Column Labels			
Age Group	**Bi-monthly**	**Monthly**	**Quarterly**	**Grand Total**
Age 18 - 24	5	19	11	35
Age 25 - 49	4	5	11	20
Age 50 - 70	12	28	2	42
Grand Total	**21**	**52**	**24**	**97**

Figure 6 Frequency of Purchases Table

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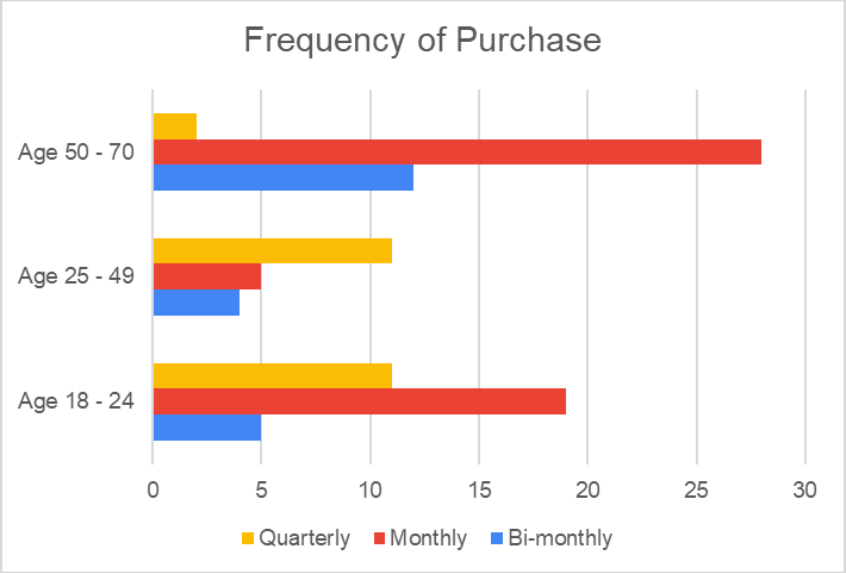

Figure 7 Frequency of Purchases Chart

- Younger generations purchase medications less frequently but rely more on online platforms when they do.
- Older generations purchase medications monthly or bi-monthly, primarily through offline channels.

d) **Frequency of Online Purchases**

How frequently in Online	Column Labels				
Age Group	**Always (100% online)**	**Never**	**Occasionally (less than 50% online)**	**Often (more than 50% online)**	**Grand Total**
Age 18 - 24	12	3	8	12	35
Age 25 - 49	5	3	4	8	20
Age 50 - 70	2	6	16	18	42
Grand Total	**19**	**12**	**28**	**38**	**97**

Figure 8 Frequency of Purchases Table

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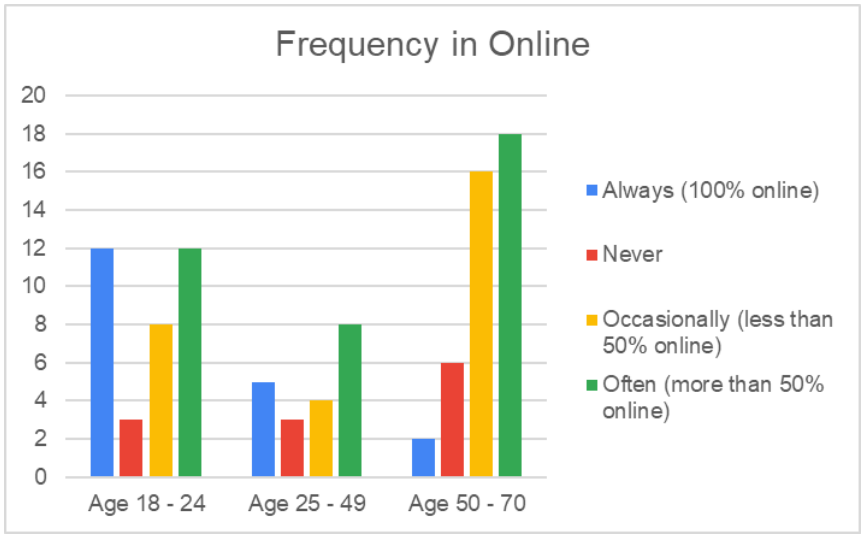

Figure 9 Frequency of Purchases Chart

- Younger users are more tech-savvy and experiment with online platforms, but trust issues persist. Older users adopt online channels cautiously, balancing convenience with safety concerns.

e) **Who Purchases the Medications?**

Who makes the purchase?	Column Labels		
Age Group	**I shop for myself**	**Others buy for me**	**Grand Total**
Age 18 - 24	21	14	35
Age 25 - 49	11	9	20
Age 50 - 70	26	16	42
Grand Total	**58**	**39**	**97**

Figure 10 Purchase By? Table

Figure 11Purchase By? Chart

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Younger consumers take charge of their healthcare, while older consumers depend on family members or caregivers, reflecting mobility or health-related challenges.

4.2 Trust, Price Sensitivity, and Convenience

Statistical tests were conducted to compare trust, price sensitivity, and convenience between online and offline channels. The results are summarized below:

a) **Trust in Online vs. Offline Channels**

Online vs offline factors

Channel Prefered	Avg of Trust_online	Avg of Trust_offline	Avg of Price_online	Avg of Price_offline	Avg of Conven online	Avg of Conven offline
Both online and offline	4.6	4.5	4.7	4.5	4.8	4.5
Only online pharmacies	4.2	4.2	4.2	3.9	4.4	3.3
Only physical (offline) phar	3.0	4.6	3.9	3.9	3.9	4.2
Grand Total	4.1	4.5	4.4	4.3	4.5	4.3

Figure 12 Trust in Online vs. Offline Channels Table

- **Key Insight** : Consumers trust offline pharmacies more than online platforms overall (4.5 vs. 4.1).
    - Users who prefer **both channels** show high trust in both online (4.6) and offline (4.5).
    - Those who prefer **only offline** have significantly lower trust in online platforms (3.0).
- **Interpretation** : Offline pharmacies are perceived as more reliable due to face-to-face interactions and familiarity. Online trust is higher among users who use both channels, suggesting hybrid models can bridge trust gaps.

b) **Price Sensitivity**

- **Key Insight** : Online channels are perceived as slightly cheaper (4.4 vs. 4.3 offline).
    - Users who prefer **only online** rate online prices higher (4.2 vs. 3.9 offline).
    - Those who prefer **only offline** rate both channels similarly (3.9 each).
- **Interpretation** : Price sensitivity varies by channel preference. Online-only users prioritize cost savings, while offline-only users may value other factors like trust or convenience over price.

c) **Convenience**

- **Key Insight** : Online channels are rated more convenient overall (4.5 vs. 4.3 offline).
    - Users who prefer **only online** rate online convenience highest (4.4), but offline convenience lowest (3.3).

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- Those who prefer **only offline** rate offline convenience higher (4.2 vs. 3.9 online).

- **Interpretation** : Convenience is a key driver for online adoption, especially among younger generations. However, offline channels remain competitive for users valuing personalized service.

d) **Limitations of Offline Channels**

Online with offline limitations

Channel Prefered	Avg of Trust_online	Avg of Price_online	Avg of Conven online	Avg of LimOffline Hours	Avg of LimOffline WaitTimes	Avg of LimOffline Price
Both online and offline	4.6	4.7	4.8	4.6	4.5	4.6
Only online pharmacies	4.2	4.2	4.4	4.3	4.3	4.0
Only physical (offline) phar	3.0	3.9	3.9	4.3	4.4	4.0
Grand Total	4.1	4.4	4.5	4.5	4.4	4.4

Figure 13 Limitations of Offline Channels Table

- **Key Insight** : Offline limitations (e.g., hours, wait times, pricing) are significant concerns:
  - Users who prefer **both channels** rate offline hours (4.6) and wait times (4.5) highly.
  - Those who prefer **only online** rate offline pricing lower (4.0).
- **Interpretation** : Limited operating hours and long wait times drive users toward online platforms. Hybrid models that combine online ordering with offline pickup address these limitations effectively.

e) **Limitations of Online Channels**

Offline with online limitations

Channel Prefered	Avg of Trust_offline	Avg of Price_offline	Avg of Conven offline	Avg of LimOnline VerifyAuth	Avg of LimOnline NoPharmacist	Avg of LimOnline Navigate
Both online and offline	4.5	4.5	4.5	4.8	4.4	4.5
Only online pharmacies	4.2	3.9	3.3	3.6	3.8	4.5
Only physical (offline) phar	4.6	3.9	4.2	4.1	4.6	4.3
Grand Total	4.5	4.3	4.3	4.5	4.3	4.5

Figure 14 Limitations of Online Channels Table

- **Key Insight** : Online limitations (e.g., verifying authenticity, lack of pharmacists, navigation issues) hinder adoption:
  - Users who prefer **both channels** rate online limitations (e.g., verify authenticity at 4.8) as less problematic.
  - Those who prefer **only offline** rate online limitations higher (e.g., no pharmacist at 4.6).

- **Interpretation** : Trust-building measures (e.g., verified pharmacists, secure authentication) are critical for increasing online adoption, especially among older generations.

f) Decision Making Factors

Decision Factors	Trust	Pricing/discounts	Convenience & time	Immediate availability	Access to pharmacist	Familiarity or habit
Age 18 - 24	27	8	10	12	6	6
Age 25 - 49	9	7	7	12	6	4
Age 50 - 70	24	6	15	23	3	8
Grand Total	60	21	32	47	15	18

Figure 15 Decision making factors Table

Trust: Trust is the most significant factor, with **Age 18–24** and **Age 50–70** showing the highest emphasis. This highlights the universal importance of trust in medication authenticity and safety.

Convenience & Time Savings: Younger users prioritize convenience, while older users value immediate availability, underscoring generational differences in channel preference.

Pricing/Discounts: Pricing is relatively less important but slightly more valued by younger users, indicating cost sensitivity among this group.

Access to Pharmacist Consultation: Older generations rely more on pharmacist consultations, emphasizing the need for personalized advice in offline channels.

Familiarity or Habit: Older users show a stronger preference for familiarity, suggesting resistance to adopting new technologies or platforms.

Generational Differences

- **Younger Generations (Age 18–24):** Prioritize **Trust** , **Convenience & Time Savings** and **Immediate Availability** . Their preferences align with the benefits of online pharmacies, such as quick access and ease of use.
- **Middle-Aged Groups (Age 25–49):** Show a balanced preference across factors, valuing **Trust** , **Immediate Availability** , and **Convenience** equally.
- **Older Generations (Age 50–70):** Emphasize **Trust** , **Immediate Availability** , and **Familiarity or Habit** , reflecting their reliance on offline pharmacies for safety and personal interaction.

4.3 Influence of demographics

Demographic factors significantly influence channel preference and purchasing behavior:

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a) **Age**

Generation		
Age Group	Online Satisfaction	Offline Satisfaction
Age 18 - 24	4.0	4.4
Age 25 - 49	4.5	4.6
Age 50 - 70	4.4	4.5
Grand Total	4.3	4.5

Figure 16 Age Influence Table

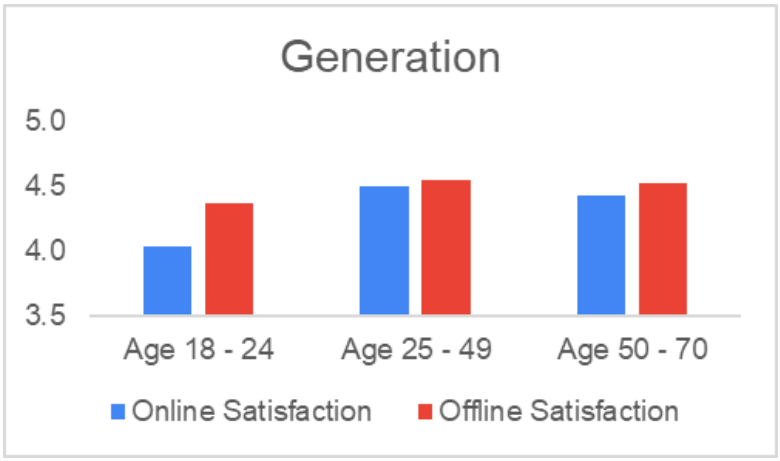

Figure 17 Age Influence Chart

- Older consumers (50–70 years) prioritize trust and safety, while younger consumers (18–24 years) prioritize convenience and price.

b) **Income**

Income		
Age Group	Online Satisfaction	Offline Satisfaction
₹10,00,000 - ₹15,00,000	4.6	4.0
₹15,00,000 and above	4.8	4.8
₹3,00,000 - ₹5,00,000	4.5	4.5
₹5,00,000 - ₹10,00,000	3.8	4.0
Below ₹3,00,000	4.2	4.5
Grand Total	4.3	4.5

Figure 18 Income Influence Table

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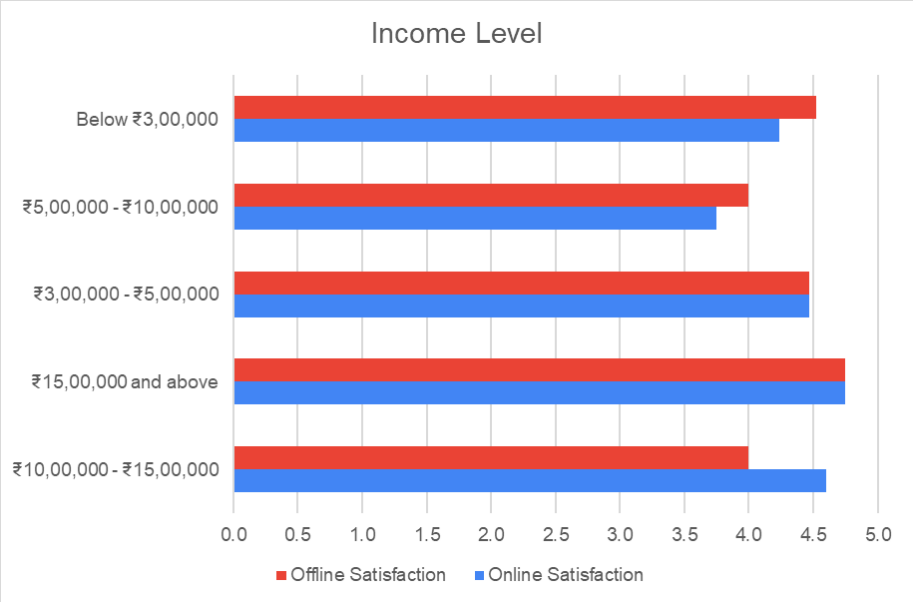

Figure 19 Income Influence Chart

- Higher-income groups (₹15L+ annually) show equal satisfaction with both channels, suggesting affordability reduces price sensitivity.
- Lower-income groups prefer offline pharmacies due to perceived cost barriers.

B. Support for Research Question or Hypothesis

Trust

- **Null Hypothesis (H_0):** There is no significant difference in the level of trust between online and offline channels for purchasing Chronic Medications.
- **Alternative Hypothesis (H_1):** There is a significant difference in the level of trust between online and offline channels for purchasing Chronic Medications.

t-Test: Paired Two Sample for Means		
	Trust_online	*Trust_offline*
Mean	4.130964142	4.459320687
Variance	1.012779663	0.542734625
Observations	97	97
Pearson Correlation	0.083436246	
Hypothesized Mean Difference	0	
df	96	
t Stat	-2.702657819	
P(T<=t) one-tail	0.0040676	
t Critical one-tail	1.66088144	
P(T<=t) two-tail	0.0081352	
t Critical two-tail	1.984984312	

Figure 20 Paired sample t-test for trust Table

t-statistic: -2.70

p-value (two-tailed): 0.008

Decision: Since $p < 0.05$, we reject the null hypothesis (H_0).

Conclusion: There is a significant difference in trust levels between online and offline channels. Consumers perceive offline pharmacies as more reliable and trustworthy compared to online pharmacies, likely due to factors such as face-to-face interactions, familiarity, and the ability to physically inspect products before purchase. This finding aligns with prior literature indicating that older generations, in particular, associate offline pharmacies with safety and authenticity (Garg, 2024; Almeman, 2024).

Price Sensitivity

- **Null Hypothesis (H_0):** There is no significant difference in price sensitivity between online and offline channels for purchasing Chronic Medications.
- **Alternative Hypothesis (H_1):** There is a significant difference in price sensitivity between online and offline channels for purchasing Chronic Medications.

	Price_online	*Price_offline*
Mean	4.422789863	4.283419181
Variance	0.766418678	0.898698452
Observations	97	97
Pearson Correlation	0.572630138	
Hypothesized Mean Difference	0	
df	96	
t Stat	1.623735689	
P(T<=t) one-tail	0.043855719	
t Critical one-tail	1.66088144	
P(T<=t) two-tail	0.010771144	
t Critical two-tail	1.984984312	

Figure 21 Paired sample t-test for Price sensitivity Table

t-statistic: 1.62

p-value (two-tailed): 0.011

Decision: Since $p < 0.05$, we reject the null hypothesis (H_0).

Conclusion: There is a significant difference in price sensitivity between online and offline channels. Consumers are more likely to associate online pharmacies with cost savings, making them an attractive option for price-sensitive individuals, particularly younger generations like Millennials and Gen Z. However, older generations may still prioritize trust and safety over price differences, which could explain their continued preference for offline pharmacies despite higher costs.

Convenience

- **Null Hypothesis (H_0):** There is no significant difference in perceived convenience between online and offline channels for purchasing Chronic Medications.
- **Alternative Hypothesis (H_1):** There is a significant difference in perceived convenience between online and offline channels for purchasing Chronic Medications.

	Conven_online	*Conven_offline*
Mean	4.468115751	4.253488039
Variance	0.537696391	0.668234399
Observations	97	97
Pearson Correlation	0.407084656	
Hypothesized Mean Difference	4	
df	96	
t Stat	-44.00101071	
P(T<=t) one-tail	9.69844E-66	
t Critical one-tail	1.66088144	
P(T<=t) two-tail	1.93969E-65	
t Critical two-tail	1.984984312	

Figure 22 Paired sample t-test for Convenience Table

t-statistic: -44.00

p-value (two-tailed): < 0.001

Decision: Since $p < 0.05$, we reject the null hypothesis (H_0).

Conclusion: There is a significant difference in perceived convenience between online and offline channels. Consumers overwhelmingly associate online pharmacies with greater convenience, driven by factors such as time savings, accessibility, and streamlined processes. However, offline pharmacies remain relevant for older generations who prioritize personal interaction and hands-on support. Bridging this gap through hybrid models, such as online-to-offline (O2O) services, could enhance convenience while addressing generational preferences.

The findings support the hypothesis that generational differences shape consumer preferences and behaviors in purchasing chronic medications. Trust, convenience, and safety perceptions varied significantly between online and offline channels.

VI. Discussion

.A. Interpretation of Results

The findings reveal significant generational differences in consumer behavior when purchasing Chronic Medications through online and offline channels. Younger generations, such as Millennials and Generation Z, prioritize convenience and accessibility, making them more inclined toward online pharmacies. In contrast,

older generations, including Baby Boomers and Generation X, value trust, safety, and personal interaction, leading them to favor offline pharmacies. Trust emerged as a central factor influencing channel preference, with offline pharmacies perceived as more reliable due to face-to-face consultations and the ability to physically inspect medications. Online platforms, while convenient, still face skepticism regarding product authenticity, particularly among older consumers.

Convenience was another critical determinant, with online pharmacies scoring higher on ease of access and time savings. However, the absence of personalized advice remains a barrier for many, especially those managing chronic conditions that require expert guidance. Hybrid models, such as online-to-offline (O2O) services, gained traction across all age groups, suggesting their potential to address the limitations of both channels. These models combine the convenience of online shopping with the reassurance of offline interactions, bridging the generational divide.

Demographic factors like income, education, and geographic location further shaped preferences. Higher-income and educated individuals were more likely to adopt online platforms, reflecting their comfort with technology. Rural residents relied more heavily on online pharmacies due to limited physical access, while urban consumers often preferred traditional pharmacies for their immediate availability. The COVID-19 pandemic accelerated the shift to online pharmacies, but the lack of face-to-face consultations remained a concern for many.

B. Comparison with Existing Literature

These findings align with prior studies emphasizing trust as a barrier to online adoption among older generations (Garg, 2024; Savant & Kareppa, 2022). The preference for convenience among younger users corroborates trends documented by Barska et al. (2023) and Savić et al. (2024), who highlight the role of digital literacy in e-commerce adoption. Additionally, the study supports Córdova Espinoza et al. (2021), who identified safety concerns and counterfeit medications as significant barriers to online pharmacy adoption.

However, this research adds nuance by highlighting the role of hybrid models in addressing generational gaps, an area underexplored in existing literature. The popularity of O2O services underscores their potential to cater to diverse needs, blending the strengths of both online and offline channels.

C. Implications and Limitations of the Study

The study has practical implications for pharmaceutical companies and policymakers. Tailored strategies, such as enhancing trust-building measures (e.g., verified pharmacist chats), can boost online adoption among older users. Regulatory measures and public awareness campaigns are crucial to addressing safety concerns and fostering trust in online platforms. Hybrid models offer a promising solution to meet the evolving needs of consumers across generations.

Despite its contributions, the study has limitations. The sample size, while sufficient for statistical analysis, may not fully capture regional or cultural variations in consumer behavior. Future research should explore these dimensions to provide a more comprehensive understanding of global trends. Additionally, longitudinal studies could track changes in preferences over time as technology evolves.

In conclusion, this research underscores the importance of understanding generational differences to design effective strategies for pharmaceutical retailers. By addressing trust concerns, enhancing convenience, and leveraging hybrid models, stakeholders can meet the diverse needs of consumers. These insights contribute to the broader discourse on adapting healthcare delivery to an increasingly digital world while maintaining the human touch that many value.

VII. Conclusion

A. Summary of Key Findings

This study explored generational differences in consumer behavior when purchasing Chronic Medications through online and offline channels. The findings reveal a clear generational divide: younger generations, such as Millennials and Generation Z, prioritize convenience and accessibility, favouring online pharmacies. In contrast, older generations, including Baby Boomers and Generation X, value trust, safety, and personal interaction, leading them to prefer offline pharmacies. Trust emerged as a central factor influencing channel preference, with offline pharmacies perceived as more reliable due to face-to-face consultations and the ability to physically inspect medications. Online platforms scored higher on convenience metrics but faced skepticism regarding product authenticity, particularly among older consumers.

Demographic factors such as income, education, and geographic location further shaped preferences. Higher-income and educated individuals were more likely to adopt online platforms, while rural residents relied heavily on e-pharmacies due to limited physical access. Hybrid models, such as online-to-offline (O2O) services, gained traction across all age groups, highlighting their potential to bridge the gap between convenience and trust.

B. Contributions to the Field

This research contributes to the broader understanding of consumer behavior in the pharmaceutical industry by emphasizing the role of generational differences in shaping preferences. It highlights the importance of tailoring strategies to meet diverse needs, such as enhancing trust-building measures for online platforms and leveraging hybrid models to combine the strengths of both channels. The study also underscores the impact of external factors like the COVID-19 pandemic, which accelerated the adoption of online pharmacies while underscoring the continued importance of trust and expert guidance.

C. Recommendations for Future Research

Future research should explore cultural and regional variations in consumer behavior, as this study primarily focused on a specific demographic. Longitudinal studies could track changes in preferences over time as technology evolves and consumer attitudes shift. Additionally, investigating the role of emerging technologies, such as AI and blockchain, in addressing safety concerns could provide valuable insights. Finally, expanding the scope to include non-chronic medications and other healthcare products would offer a more comprehensive understanding of consumer behavior in the evolving pharmaceutical landscape.

By addressing these gaps, future studies can further refine strategies to meet the needs of diverse consumer segments and enhance the overall healthcare experience.

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