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Awareness and Perceptions Regarding E-Pharmacies among the General Population Aged above 18 Years in Madurai City- A Cross Sectional Study

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Abstract:-

- ***Background***

E-pharmacies are rapidly transforming the way people access medications. This study will identify evolving patterns in e-pharmacy utilization and analyze the factors influencing consumer choice, such as convenience, cost, product variety, and trust in online platforms.

- ***Aim***

To comprehensively understand the level of awareness and perceptions regarding e-pharmacies among the general population.

- ***Methods***

It was a questionnaire-based cross-sectional study. The study sample includes general population residing in and around Madurai. A self-administered questionnaire was designed from previously conducted studies and distributed to 270 participants. The questionnaire was divided into 3 parts. Demographic inquiries encompassing gender, age, income, occupation, and professional background. Participants' awareness of E-pharmacy services and Evaluation of participants' attitudes towards E-pharmacy usage.

- ***Results***

Totally 79.4% participants were aware of online pharmacy. The awareness was more in males and that too in urban population. Among the respondents, majority of the users prefer to buy medicines offline (93.2%) which can be due to poor quality of medicines and lack of trustworthy websites. The utmost reason for buying the medicine online was deficiency of availability in the market and differences in the prices. The most preferred drugs respondents were willing to buy online were prescription drugs followed by dietary supplements.

- ***Conclusion***

Despite widespread awareness of e-pharmacy services, a notable level of hesitancy persists among potential users, indicating a need for targeted strategies to address concerns and encourage adoption.

Keywords:- *E-Pharmacy, Awareness, General Population, Madurai City.*

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I. INTRODUCTION

The Indian pharma industry has grown at a Compound Annual Growth Rate of (CAGR) of 11% in the domestic market and 16% in exports over the last two decades. While the domestic market has grown at a similar pace to the Gross Domestic Product (GDP), the overall growth has been driven by the industry's leadership in supplying generic formulations to markets across the globe.

In the 2020-2030 period, we expect Indian pharma industry to grow at a CAGR of 12% to reach at US$130 billion by 2030 from US$41.7 billion in 2020. Though the pharmaceutical industry has grown at a CAGR of approx. 13% over the two decades, in the last decade, the CAGR has been 8.5% and it has currently been 6.2% over the past five years [1].

This surge can be attributed to the technological revolution brought about by the internet, which has profoundly transformed nearly every sector of modern life, including business, communication, and healthcare services. Internet technology has reshaped consumer behavior, particularly in the way people purchase everyday items such as groceries, furniture, clothing, electronics, and books. With the convenience of single-click technologies, consumers are increasingly shifting from traditional brick-and-mortar stores to online platforms. A notable emerging trend among Indian consumers is the growing preference for purchasing medicines through online portals, including websites and smartphone applications [2].

The primary reason for this issue is that medicine costs, which constitute approximately 70% of total healthcare expenses in India, are seldom reimbursed due to minimal insurance coverage. Although government initiatives like the Jan Aushadhi scheme have improved affordability, medicine availability in the public sector remains inadequate, compelling most people to rely on the more expensive private sector. To address this public health challenge, India requires a more efficient pharmaceutical system. The rising burden of chronic diseases in urban areas is expected to further drive the growth of the online pharmacy market, surpassing traditional retail pharmacies. Significant price reductions and the broad selection of brands offered by e-pharmacies have already positioned them as a promising solution to this crisis [3]. The global expansion of online pharmacies has only accelerated, particularly in the aftermath of the COVID-19 pandemic [4].

The adoption and utilization of e-pharmacies can vary significantly across different regions and demographic groups. In Madurai city, a rapidly developing urban area in Tamil Nadu, India, understanding the awareness and perceptions of the general population towards e-pharmacies is crucial. The aim of the study is to comprehensively understand the level of awareness and perceptions regarding e-pharmacies among the general population residing in Madurai city.

II. MATERIALS AND METHODS

This is a cross-sectional study conducted among the general population aged 18 years and above in Madurai city. The nature and purpose of the study was explained to the Institutional Ethical Committee at Best Dental Science College and ethical clearance was obtained to conduct the study (BDSC-IEC/2024/MAY/P-19). Anonymity was maintained by not collecting personally identifiable information. Data was kept confidential and used solely for research purposes.

A pilot study involving 30 subjects was carried out to identify any challenges encountered while completing the questionnaire and to estimate the necessary sample size. The time taken to complete the questionnaire was also recorded during the pilot phase. Based on the pilot data, where the prevalence was estimated to be 79%, the sample size was calculated using the formula $n = Z^2 P (1 - P) / d^2$, resulting in a total required sample size of 270.

The study enrolled participants aged 18 and above, residing in Madurai, who were capable of understanding and completing the survey in either Tamil, the native language, or English. Individuals who were unwilling to participate or were healthcare professionals were excluded from the study.

Voluntary response sampling was used. Posts with the survey link were shared on Facebook, WhatsApp, Twitter, Instagram, and other social media platforms, targeting groups and communities specific to Madurai residents and E mails containing the survey link were sent to local community. The survey was open for responses for a period of two months. Interested participants accessed the survey via the provided link and submitted their response.

A self-administered questionnaire comprising three parts has been developed. The first part includes demographic details, while the second part focuses on participants' awareness of E-pharmacy services. The third part delves into participants' attitudes towards E-pharmacy usage. There are a total of 15 close-ended questions in the second and third parts. The questionnaire is available in both English and the native Tamil language. Face validity and content validity were done by experts from Department of Public Health Dentistry and modified according to their recommendations. The Content Validity Index value for 15 item questionnaire was estimated to be 0.98 which represents high content validity. Test -retest reliability was assessed by Cohen's kappa which is estimated to be 0.96.

The questionnaire will be distributed via Google Forms to participants, and their responses were recorded. Data gathered from the participants were carefully compiled and subjected to statistical analysis using statistical package for social sciences (SPSS) statistical version 20. Descriptive statistics and Chi square test were used to analyse the data.

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III. RESULTS

In our study 47.8% were males and 52.2% were females. It was found that there is a significant association between Sociodemographic characteristics like Gender, Age, Education, Occupation, Income, Area and E pharmacy awareness with p Value <0.05. There is no association between chronic illness in family members and e-Pharmacy awareness (Table 1). Almost 90% of the participants prefer physical pharmacy, with only 4.4% of the population favors online pharmacies, while the remaining 5.6% of participants opt for herbal shops and also that 78.9% of the respondents were aware about e-pharmacy, whereas the remaining 21.1% lacked awareness. Majority of participants identified convenience as the primary advantage (43.7%), followed by discounts (33.8%) and low prices (23.9%). Other reported benefits included customer support, doctor and pharmacist consultations, refill reminders, availability of substitute medicines, and doorstep delivery (Graph 1). Almost 77.5% of the participants uses e-pharmacy occasionally and only 15.5% of people were likely to recommend e-pharmacy (supp table 1).

Table 1: Association between Sociodemographic Characteristics and E-Pharmacy Awarness

Socio demographic characteristics		Total, n(%)	Yes	No	P Value
Gender	Male	129(47.8%)	84	45	0.00*
	Female	141(52.2%)	129	12	
Age (Years)	18-25	84(31.1%)	72	12	0.00*
	26-35	120(44.5%)	108	12	
	36-45	24(8.9%)	12	12	
	46-55	30(11.1%)	18	12	
	56 and above	12(4.4%)	3	9	
Education	Primary	3(1.1%)	0	3	0.00*
	Middle	12(4.2%)	3	9	
	High	48(17.2%)	30	18	
	Diploma	9(3.3%)	9	0	
	Graduate	132(48.9%)	111	21	
	Professional	66(24.4%)	60	6	
Occupation	Unemployed	54(20%)	42	12	0.00*
	Unskilled	3(1.1%)	3	0	
	Semiskilled	27(10%)	24	3	
	Clerk/Shop/Farmer	30(11.1%)	12	18	
	Semi professional	99(36.7%)	87	12	
	Professional	57(21.1%)	48	9	
Income	No income	54(20%)	42	12	0.00*
	<10,000	17(6.2%)	12	5	
	10,100-20,000	48(17.8%)	36	12	
	20,100-30,000	108(40%)	92	16	
	30,100-40,000	35(13.0%)	31	4	
	40,100-50,000	5(1.9%)	0	5	
	50,100 and above	3(1.1%)	0	3	
Area	Rural	105(38.9%)	75	30	0.01*
	Urban	165(61.1%)	138	27	
Chronic illness	Yes	63(23.3%)	54	9	0.09
	NO	207(76.7%)	54	48	

Chi square test, * p value<0.05

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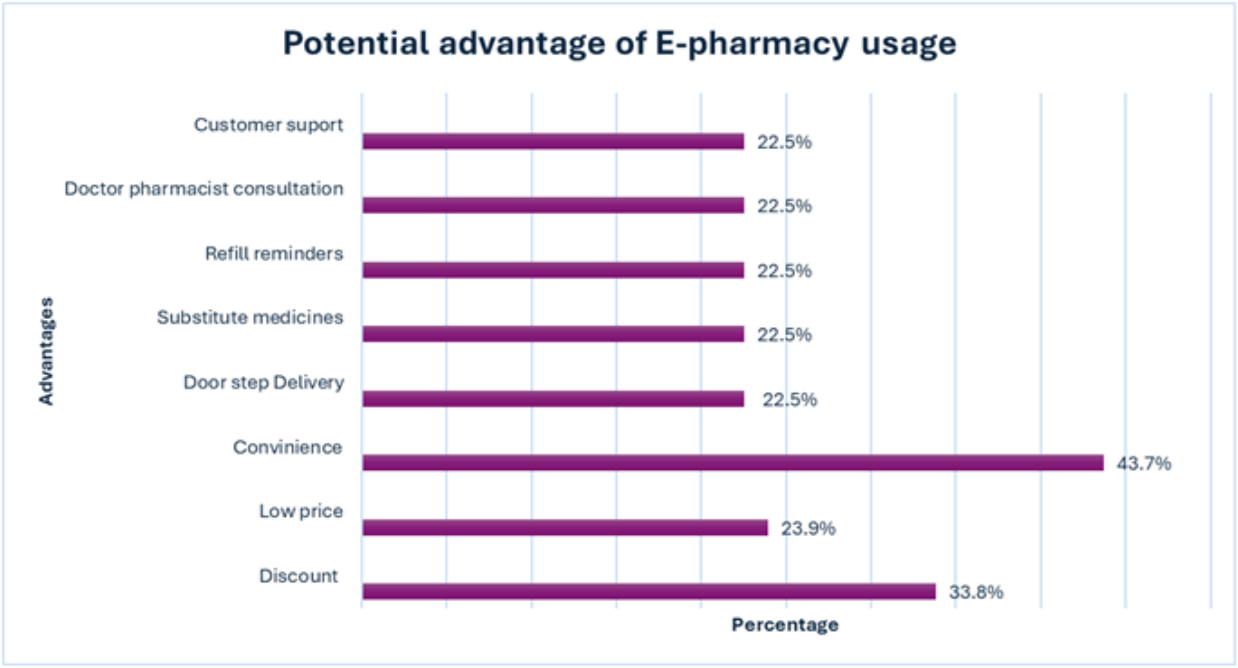
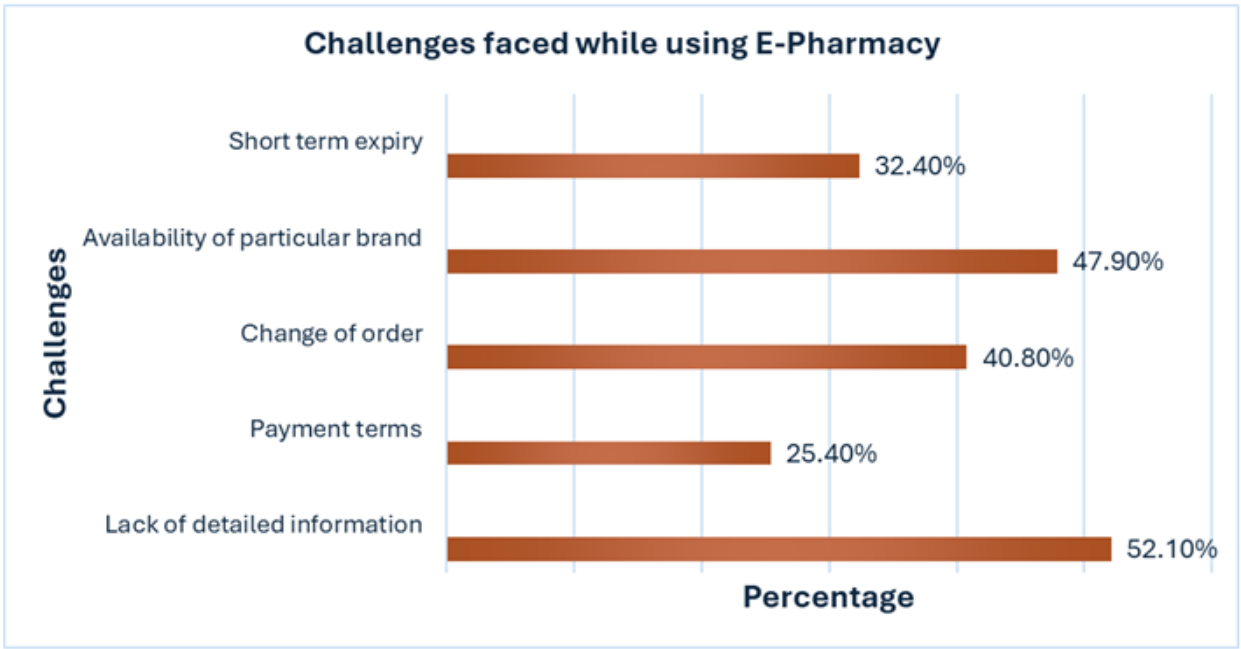


Graph 1: Potential Advantage of E-Pharmacy Usage

The most common challenge faced by respondents was a lack of detailed information (52.10%), followed by the availability of specific brands (47.90%), order changes (40.80%), short-term expiry dates (32.40%), and payment terms (25.40%) (Graph 2).



Graph 2: Challenges Faced While Using E-Pharmacy

Among the participants 66.2% of respondents preferred Apollo e-Pharmacy for purchasing medicine. Medplus e-Pharmacy was favored by 36.6%, while 33.8% chose Netmeds e-Pharmacy. Additionally, 26.8% of respondents preferred Pharmeasy e-Pharmacy, and 21.1% opted for 1mg e-Pharmacy (Graph 3).

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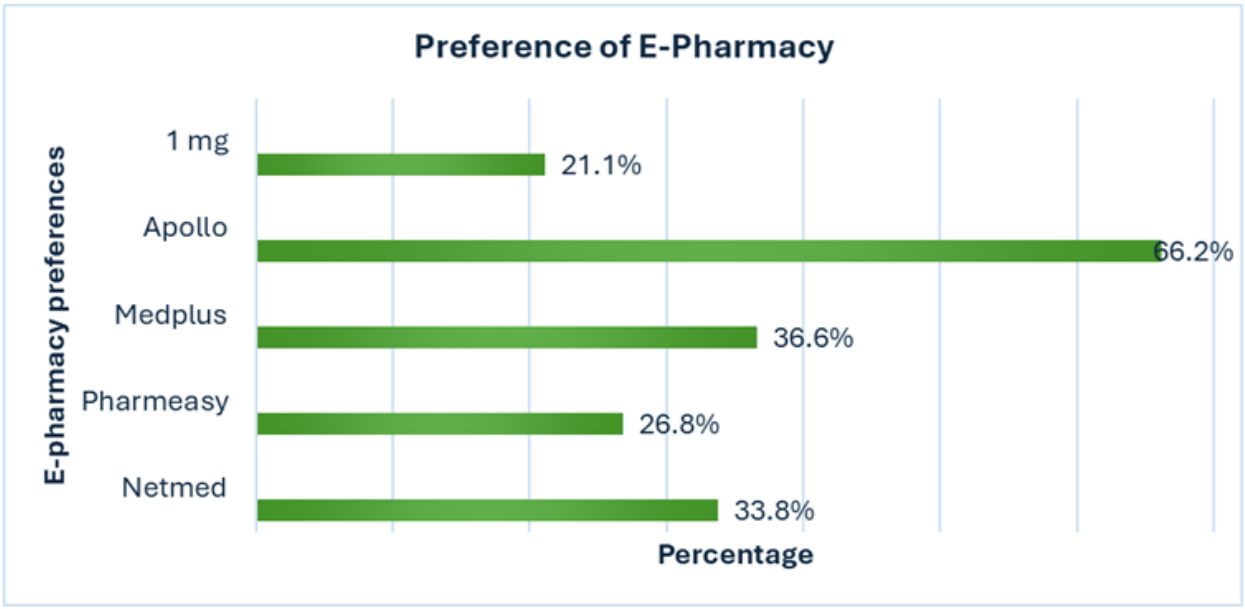
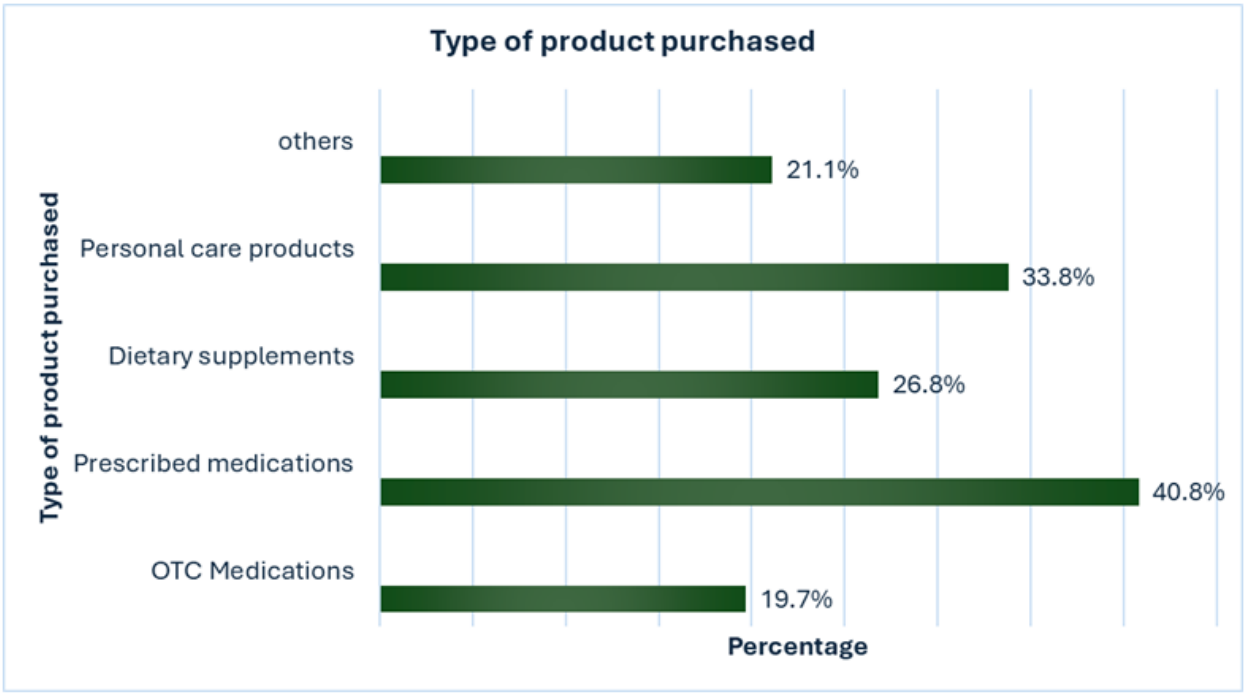


Graph 3: Preference of E-Pharmacy

Almost 40.8% of respondents purchased prescribed medicines, 33.8% bought personal care products, 26.8% acquired dietary supplements, 21.1% purchased other products like cosmetics, and 19.7% bought OTC medications (Graph 4). The overall experience of the participants while using e-pharmacy was represented in graph 5.



Graph 4: Types of Products Purchased

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Graph 5: Overall Experience with E-Pharmacy

IV. DISCUSSION

The latest online trend in India among consumers is to purchase medicines through e-pharmacies. In order to match-up the trend, number of online pharmacies is increasing rapidly. But unfortunately, there is dearth of studies conducted to assess and analyse consumer 's knowledge and behaviour towards online pharmacies. With regard to such lack of literature in Indian context, the present study particularly evaluates the level of awareness and their perception towards online pharmacies.

The awareness was more in females (52.2%) and that too in urban population (61.1%). Among the respondents, the majority of the users prefer to buy medicines offline (90%). The utmost reason for buying the medicine online was convenience (43.7%) and differences in the prices (33.8%). The most preferred drugs respondents were willing to buy online were prescription drugs followed by Personal care products.

It was observed that more than half of the participants were aware of the online purchase of medicines (78.9%). Age, gender, and educational qualification have significant effect on the purchasing behaviour of individuals toward online pharmacy as also demonstrated by Fittler et al[5] and Bansal S et al[6]. Our research has shown most respondents (78.9%) are aware medicinal products can be purchased via the internet. However, 90% of these individuals still prefer to purchase medicines traditionally (offline). These were in line with the study conducted by Fittler A et al in 2022[7], Bansal S et al[6]. This might be attributed to the reason that many individuals citing concerns about the authenticity of medications (60.6%). A study by Erasto Akbar Adjie et al [8] showed a higher percentage of the United States population using e-pharmacies which is not in line with our study this could be due to better regulatory frameworks and higher trust in online services in those regions. Additionally, North America represented chief portions of the worldwide E-drug store market because of the rise of programming innovation in the clinical sector. High users of app-based pharmacies, increasing presence of online retail pharmacies and increasing web dependent population are the significant factors that fill the worldwide E-drug store market [9]. This discrepancy can be attributed to regional differences in digital literacy, trust in online systems, and the availability of robust e-commerce infrastructures.

In terms of education level Afahad et al [10]. reported that nearly two-third of respondents were done either diploma or graduation holders which is similar finding of our study. This observation might be because that highly educated consumers were comfortable in using internet to find about new products, search of products information and purchase of products.

In this current study, 47.9% participants reported positive impacts of COVID-19 on e-pharmacies which is in line with a study conducted by Das R et al [11] This was attributed to increased reliance on online services due to lockdowns and social distancing measures, which drove more consumers to opt for the convenience of e-pharmacies.

The present study found that the most frequently ordered products were prescribed medications (40.8%) followed by personal care products (33.8%), dietary supplements (26.8%), cosmetics (21.1%) and OTC medications (19.7%). These results were in contrast to the studies conducted by Alwhaibi M et al [12] and Almohammed OA et al [13]. The differences in the most ordered products compared to previous studies reflect variations in the demographics of the participants and their needs.

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This current study shows that 66.2% of respondents preferred Apollo e-Pharmacy for purchasing medicine which is in congruous with the study conducted by Singh R et al [14] were Apollo e-Pharmacy as the most preferred platform among users, with 48% of respondents favoring it for its extensive product range and reliable service. This is because of trust in a well-known brand and the convenience of integrated services significantly influence consumer choices [15]. Similarly, Medplus and Netmeds were the next choices, echoing the preferences observed in Madurai. Our results were in contrast to study by Senthilkumar [16] where 1mg emerged as the most favored e-pharmacy, with 55% of respondents choosing it over others. Additionally, a study by Mansi Garg et al [17] highlighted a different preference pattern were Pharmeasy is the most preferred platform. This discrepancy could be attributed to regional marketing strategies, local partnerships, and specific consumer experiences.

Our present study found that convenience was the primary reason for e-pharmacy use. Discounts and low prices were also significant factors which is analogous with the studies conducted by Bansal et al [6] and Gupta MS et al [18]. This similarity suggests that the perception of convenience and cost-effectiveness is a common driver for e-pharmacy adoption in India. This highlights a consistent global trend where ease of access and financial savings are pivotal in encouraging online pharmacy usage [19]. Contrastingly, a study by Liu et al [20]. in China revealed different primary advantages that 50% of participants emphasized the importance of a wide range of products available online as the top benefit. This difference could be attributed to the well-established and diverse e-commerce ecosystem in China, where product variety plays a more significant role.

In this current study lack of detailed information is the top challenge faced by e-pharmacy users which is comparable to study conducted by Soboleva MS et al [21]. This similarity suggests that these challenges are pervasive in the Indian context, likely due to inconsistent information provided on e-pharmacy platforms. Our result was contrary to the study conducted by Almohammed OA et al [13]. This contrast might be due to the stringent regulations on expiry dates, different payment systems and brand availability.

A. Limitations

- The study is confined to Madurai city, limiting the generalizability of the findings to other regions with different socio-economic and cultural contexts.
- The reliance on self-reported data may introduce response bias, with participants possibly overestimating their awareness or usage of e-pharmacies.
- While the study provides quantitative data on awareness and preferences, it lacks qualitative insights into the reasons behind the strong preference for offline pharmacies despite high awareness of e-pharmacies.

B. Recommendation

Future studies should be aimed to include a larger and more diverse sample size that represents various age groups, socio-economic statuses, and educational backgrounds. Cost-benefit analyses has to be conducted to evaluate the economic impact of using e-pharmacies compared to traditional pharmacies.

V. CONCLUSION

Purchasing medicines from online pharmacies was not a common practice among the respondents. A significant majority of the population is aware of e-pharmacies, indicating a high level of general awareness about online pharmacy services. However, despite this awareness, a substantial 90% of participants still prefer physical pharmacies over e-pharmacies. This preference suggests that while the concept of e-pharmacies is well-known, factors such as trust, convenience, personal interaction, and immediate accessibility play crucial roles in the continued dominance of physical pharmacies.

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Supplementary Table 2: Summary of the Responses of the Participants to the Questionnaire

S. NO	Question	Responses (n%)
1	**Frequency of buying medicine through E-Pharmacy**	Once a week -4.2% Once in a two week- 0 % Once in a month- 18.3% Occasionally- 77.5%
2	**Time spend in online**	1-2 hours a day -33.8% 3-4 hours a day-19.7% 5-6 hours a day -33.8% More than 6 hours a day -12.7%
3	**Purchase of medicine before COVID 19**	Never -1.4% I have used only once -7% Occasionally -70.4% Regularly -21.2% (majority of medicine purchase is from the internet)
4	**Impact of COVID-19 on E-pharmacy**	Negatively-8.4% No Change-43.7% Positively-47.9%
5	**How likely are you to recommend online pharmacies to others?**	Likely-15.5% Neutral-53.5% Unlikely-31%
6	**Concern about the safety and authenticity**	Not concerned-39.4% Somewhat concerned-43.7% Very concerned-16.9%