Knowledge and Acceptance of Medical Devices Used at Home During Covid-19 Pandemic in Tier 1 Cities of India

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Introduction

- The Food and Drug Administration's Home Health Care Committee defines a home medical device as "a device intended for use in a nonclinical or transitory environment, [that] is managed partly or wholly by the user, requires adequate labelling for the user, and may require training for the user by a health care professional in order to be used safely and effectively".
- As part of the fourth industrial revolution, evidence-based healthcare has recently been transformed into precision medicine employing artificial intelligence. Patients are increasingly able to receive care at home because of the advances in digital health technology.
- As per the IBEF report the Indian medical device industry is expected to rise by a staggering growth rate of 37% to USD 50 billion in 2025, from USD 10.36 billion in 2020.

Introduction

- The most common NCD is cardiovascular disease, which kills 17.9 million people each year, followed by cancer, respiratory disorders, and diabetes.
- The population in low and middle-income countries (LMIC) face constraints and challenges in availing and accessing healthcare services even normally, the pandemic made the situation worse.
- Home healthcare is more comfortable and convenient for patients than hospital-based care. Patients receiving care can now remain mobile and self-sufficient thanks to technological advancements .
- Another significant contributor to this transition is rising health-care expenses and hospital stays, as well as shortages of health-care facilities, nurses, and other competent professionals, which have pushed the medical system to deliver more outpatient care.

Objectives

Key objectives:

- To gauge the knowledge of the existence of use of medical devices at home during the pandemic in tier 1 cities of India.
- To gauge the acceptance of the use of medical devices at home during the pandemic in tier 1 cities of India.

Sub-objectives:

- To gauge the awareness of the names of specific medical devices used at home during the pandemic in tier 1 cities of India.
- To gauge the awareness of the use of medical devices used at home during the pandemic in tier 1 cities of India.
- To ascertain the willingness to adopt the use of medical devices at home during the pandemic in tier 1 cities of India.
- To ascertain the reasons for unwillingness to use the devices at home if any at home during the pandemic in tier 1 cities of India.
- To compare the willingness to buy medical devices for home use, pre-covid and currently during the pandemic in tier 1 cities of India.

Study Framework

Objectives	Indicators	Tools
To gauge the awareness of the existence of use of medical devices at home.	Awareness (yes/no) of the names of the medical devices Awareness (yes/no) of the use of medical devices	Structured online questionnaire
To ascertain the willingness to use medical devices at home (collective)	10-point visual analogue scale	
To ascertain the reasons for unwillingness to use the devices at home, if any.	Reasons cited by survey respondents	
To compare the willingness to buy medical devices for home use, pre-covid and currently.	Self-declared score on 10-point visual analogue scale	

Review of literature

- Kario, K et al believed that adopting the use of ambulatory blood pressure monitoring could provide information for stratification of cardiovascular and cerebrovascular risk better than what would be obtained through office BP measurements.
- Mondal H and Mondal S suggested that medical devices used at home are usually low-cost and easily procurable, and they can be operated by patients or their caretakers with minimal training.
- According to Chemweno, P., & Pintelon, L. it is critical to take a methodical approach to identifying and assessing hazards in the dialysis treatment process at home, and then developing effective solutions to limit their negative effects on patient safety.
- Kario, K., Tomitani, N. et al the statistics reported for India suggested that white coat hypertension is a significant problem, seen in approximately 25% of the study participants.

Research Methodology

Study design: A cross-sectional study

Sample size: 179

Sampling method: Convenience sampling

Tools Used: Online structured questionnaire

Study population

Inclusion criteria:

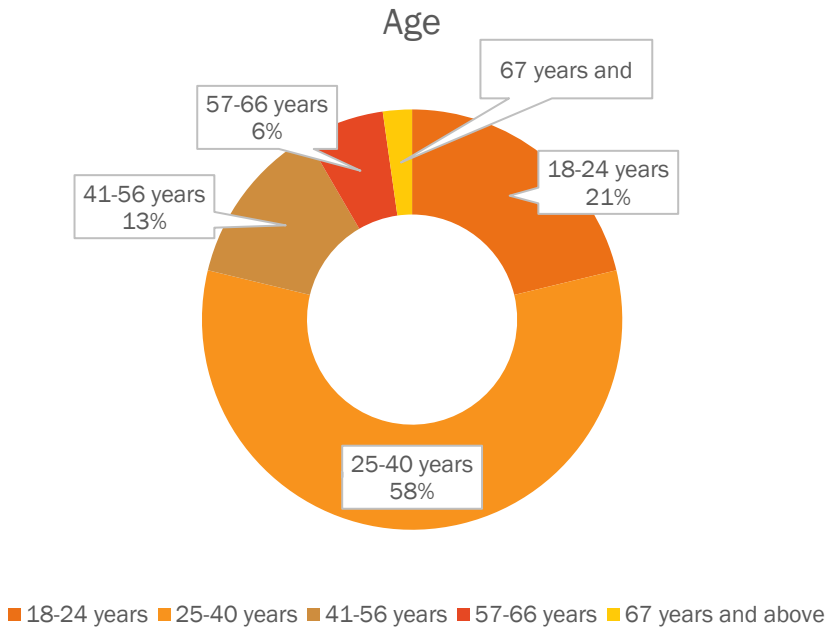
- Adults aged 18 years and above.
- Residents of tier 1 cities of India

Exclusion criteria:

- Individuals aged below 18 years.
- Individuals residing in non-tier 1 cities.
- Individuals with intellectual or neurocognitive impairment

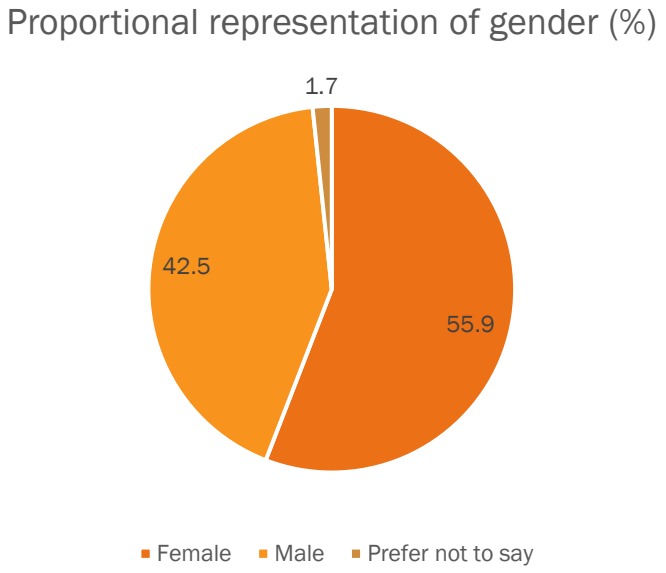
RESULTS

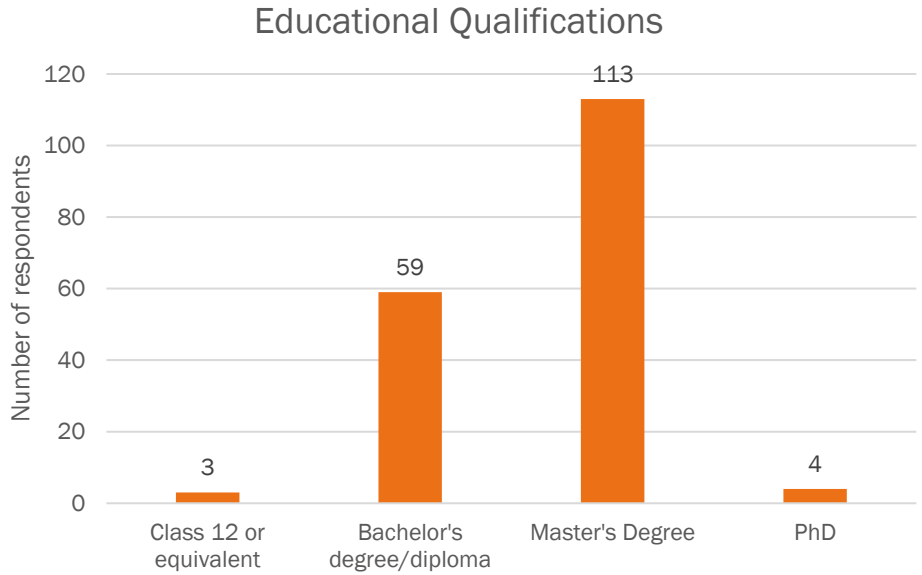
Demographic data of the respondents (1/2)



Interpretation: The highest represented demographic in this survey was that of individuals between the ages of 25 and 40 years (57.5% of respondents). The other groups had proportionally lower representation as follows: ages 18-24 years (21.2%), ages 41-56 years (12.8%), ages 57-66 years (6.1%) and those aged 67 years and above (2.2%).

Demographic data of the respondents (2/2)

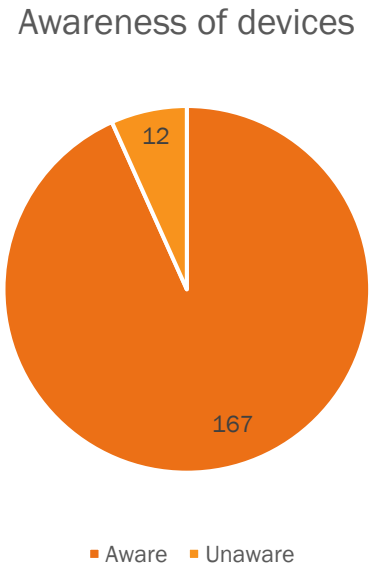




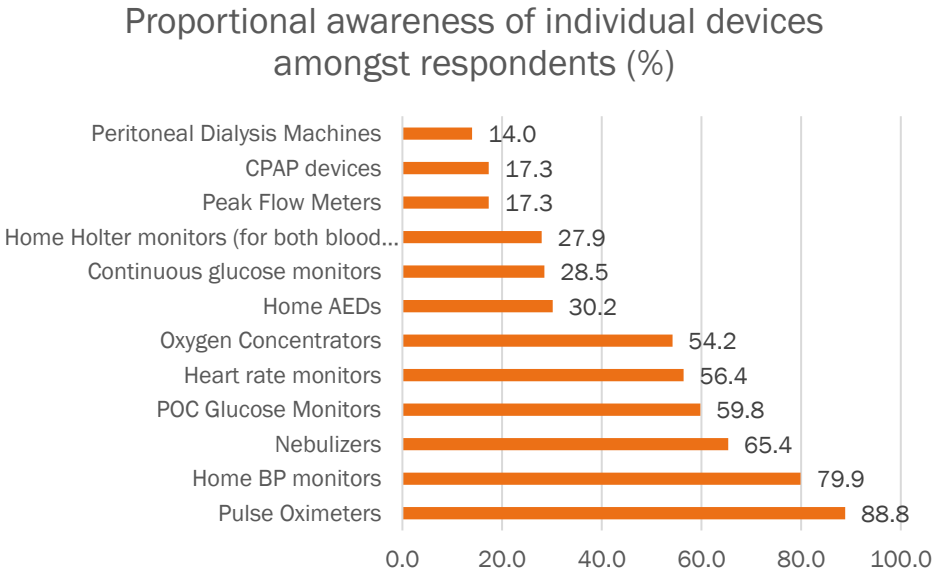
Interpretation: the survey received 100 responses from individuals who identified as female (55.9%) and 76 responses from males (42.5%). 3 respondents preferred not to specify their gender (1.7%)

Interpretation: A majority of the respondents possessed a master's degree (63.1%), followed by individuals with a bachelor's degree (33%), a PhD (2.2%) and a class 12 education or its equivalent (1.7%).

Awareness of medical devices used at home

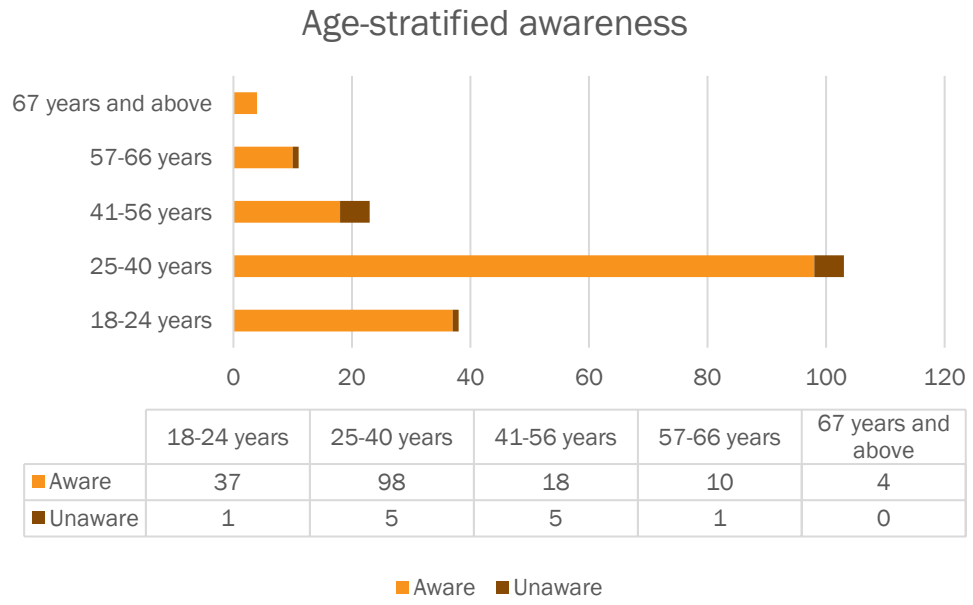


An overwhelming majority of the respondents were aware that healthcare devices were available for home use (93.3% vs 6.7%).

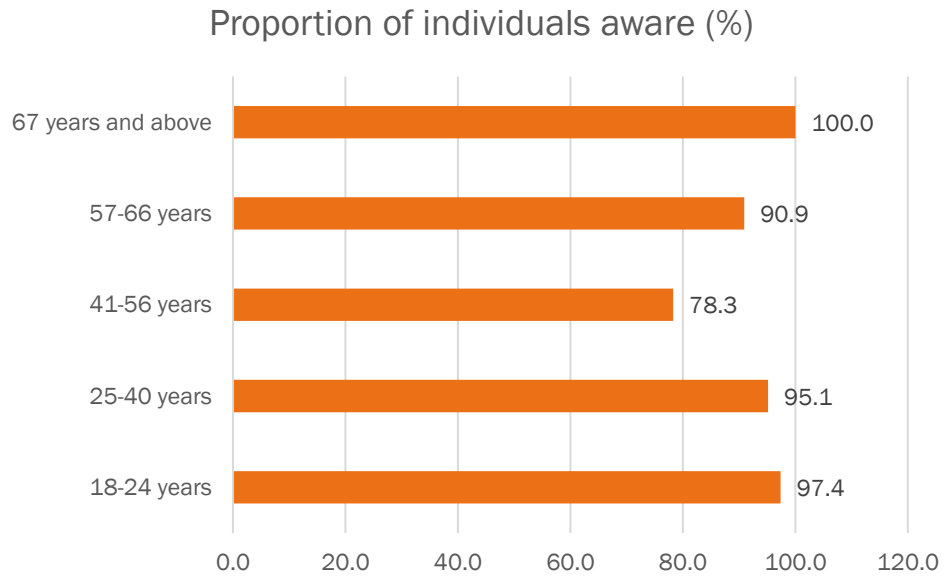


The five most known devices were pulse oximeters, home BP monitors, nebulizers, point-of-care glucose monitors, and heart rate monitors.

Awareness was influenced by demographic factors



	18-24 years	25-40 years	41-56 years	57-66 years	67 years and above
Aware	37	98	18	10	4
Unaware	1	5	5	1	0



Age distribution influenced the proportional awareness, with a drop noted in individuals between the ages of 41-56 years. To assess the differences for this categorical data chi-square test was used. This difference in proportions, assessed by chi-square, was statistically significant: $X^2(4, N=179) = 11.176$, $p = 0.02$

Gender:

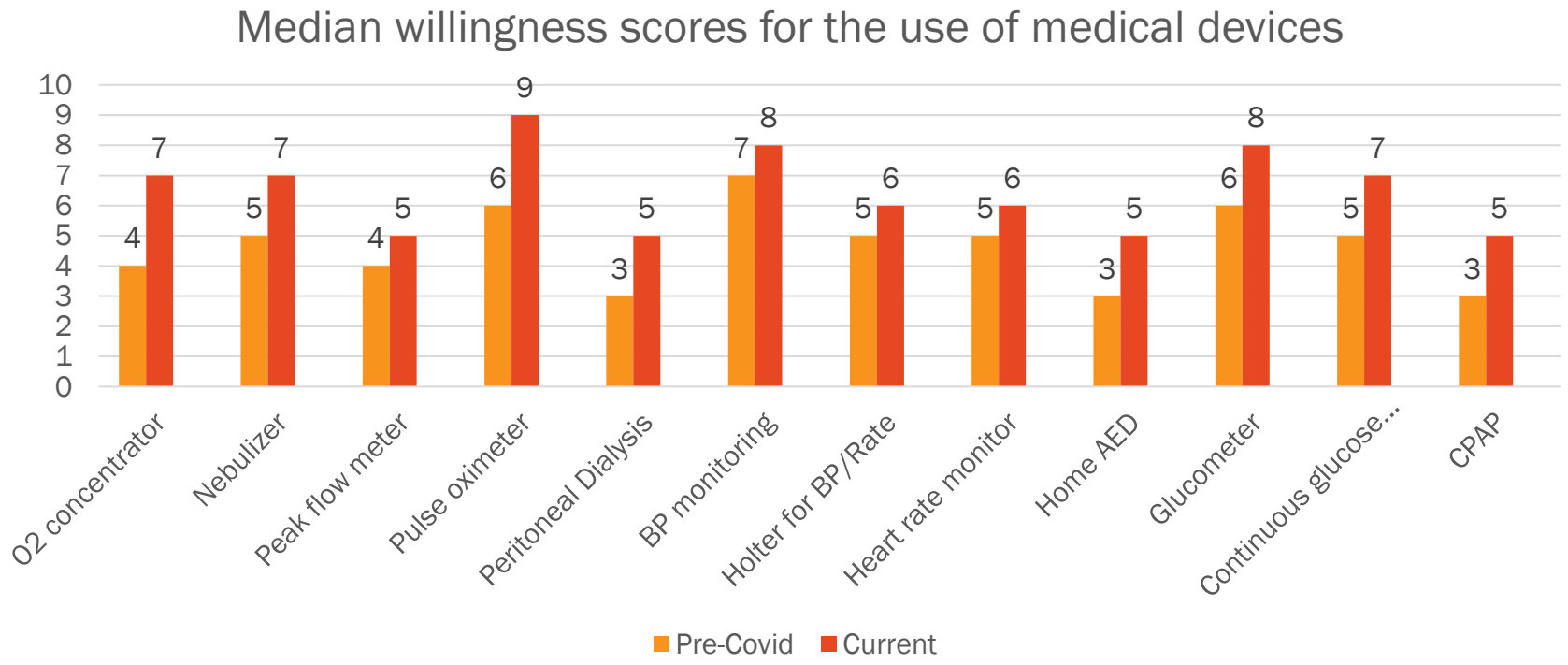
Gender did not have a significant influence on levels of awareness: $X^2(2, N=179) = 3.482$, $p = 0.175$

Education:

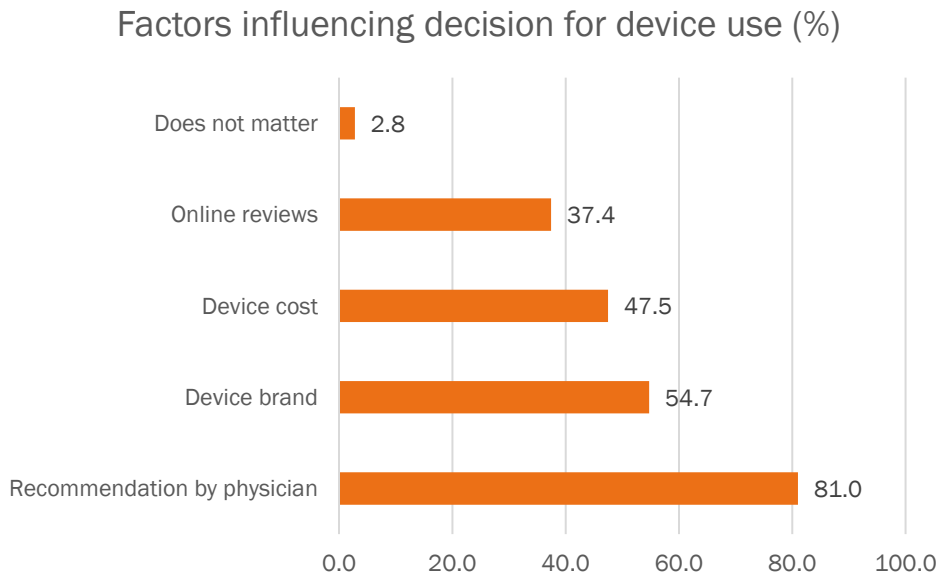
The level of education significantly influenced the proportional level of awareness (94.3% with a bachelor's degree or higher vs 33.3% with upto 12 standard education). Having a bachelor's degree/diploma or higher was associated with 33-fold increased odds of being aware of these devices (Odd's ratio: 33.2, 95% confidence intervals: 2.7-397.9)

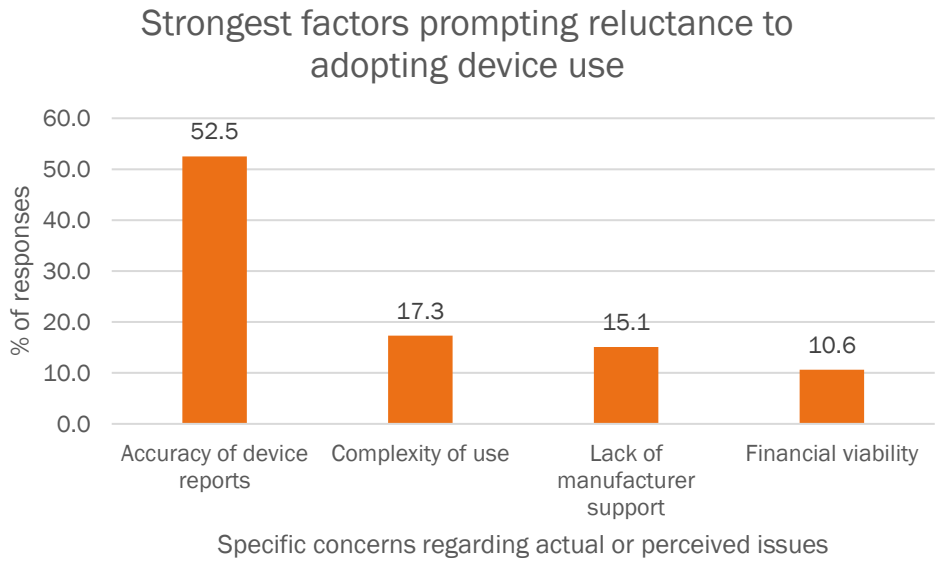
Occupation/profession:

Individuals working in the healthcare industry were more likely (97.1%) to be aware of these devices than individuals not from healthcare backgrounds (88.2%); Odd's ratio: 4.47, 95% confidence intervals: 1.16-17.14, $p = 0.028$)



Interpretation: A statistically significant increase in the median score for assessing the willingness to adopt medical devices for home use was observed (6 pre-covid vs 10 currently, $p<0.0001$).

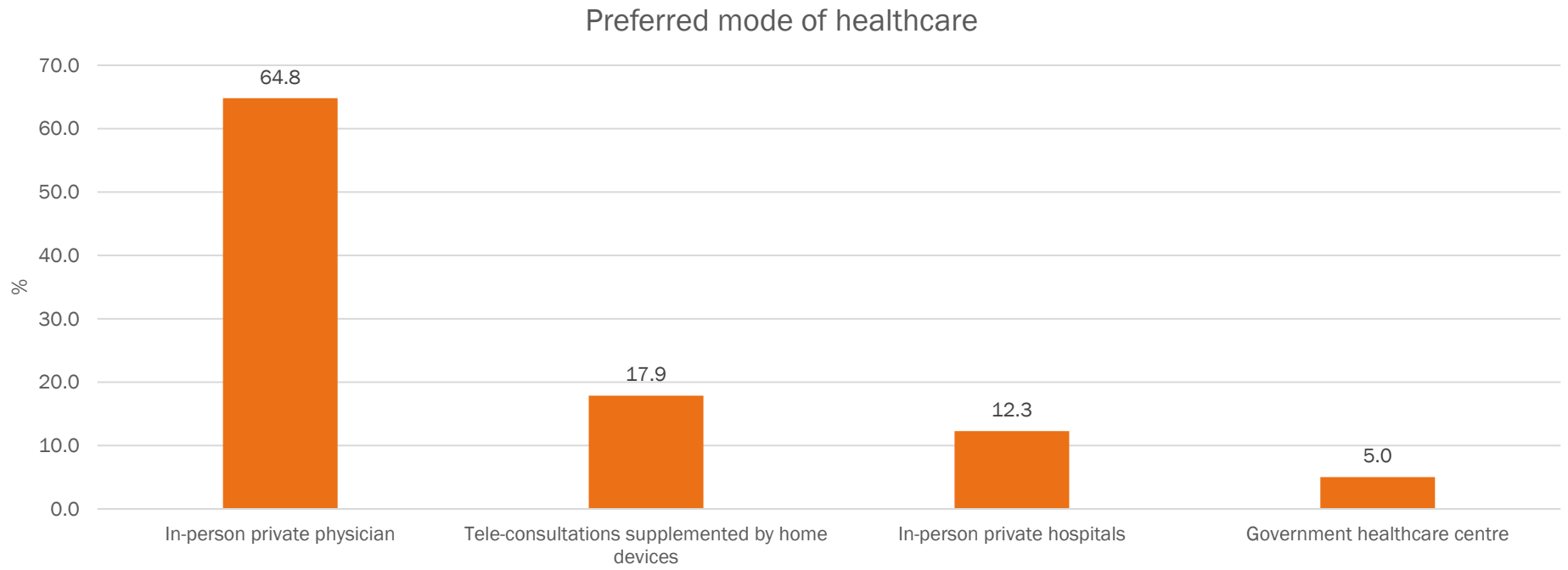




The most frequently listed influencing factor was a recommendation by the treating physician, cited by 81 %. device brand (54.7%), device cost (47.5%) and online reviews (37.4%) were other important considerations. The strong influencing role of device brand suggests that, given the high capital investment required, patients would be willing to spend a little bit extra to ensure a well-functioning, reliable medical device.

Accuracy of devices was the strongest factor influencing the reluctance to buy a medical device for home use followed by complexity of use and lack of manufacturer support. Unsurprisingly cost was not a barrier to the use of these devices as the investment in such devices can help monitor health at home and saves the recurrent cost of travel to the physician, lab tests, consultation fees etc.

Preferred mode of healthcare post pandemic



It was observed from the responses that a vast majority (64.8%) would like to continue the conventional mode of in-person visits to the doctor. But a high proportion of respondents (17.9%) would prefer teleconsultation with medical device usage. This represents an important area of growth.

Conclusion

- The study demonstrated that the nature of increased awareness was influenced significantly by device profile in the context of its role in the management of specific diseases, as well as characteristics of the target demographic.
- Greater awareness was noted in younger, more educated individuals as well as those employed in the healthcare sector.
- The most commonly known medical devices were: the pulse oximeter, home BP monitors and nebulizers.
- The pandemic has resulted in a significant increase in the willingness to adopt the use of such devices at home –use of medical devices coupled with tele-medicine consults emerged as the second-most preferred modality of seeking future healthcare.
- Respondents identified reservations about device accuracy as the major concern regarding adoption of these devices – a key area on which device manufacturers would benefit from focusing.
- Summarily, the younger age representation of the respondents of this study and their patterns of preferences suggests that the use of medical devices is likely to become a significant driver of change in the healthcare model of our country, going forward.

Recommendation

Introductory education about names of devices and their basic functions at the school level itself.

Utilizing mass media such as radio, television and social media to propagate information about home healthcare devices targeting individuals without a medical background.

Manufacturers should invest in research and testing to reassure potential consumers that accurate information is provided by medical devices used at home.

Medical regulatory bodies can include home device usage for doctors at Continued Medical Education (CMEs) seminars to get family doctors to increase the utilization of such devices by patients in need.

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TOOL USED

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