A Qualitative Study to Identify Demand-Side Barriers and Outline Differentiated Solutions to Boost Covid-19 Testing and Vaccination

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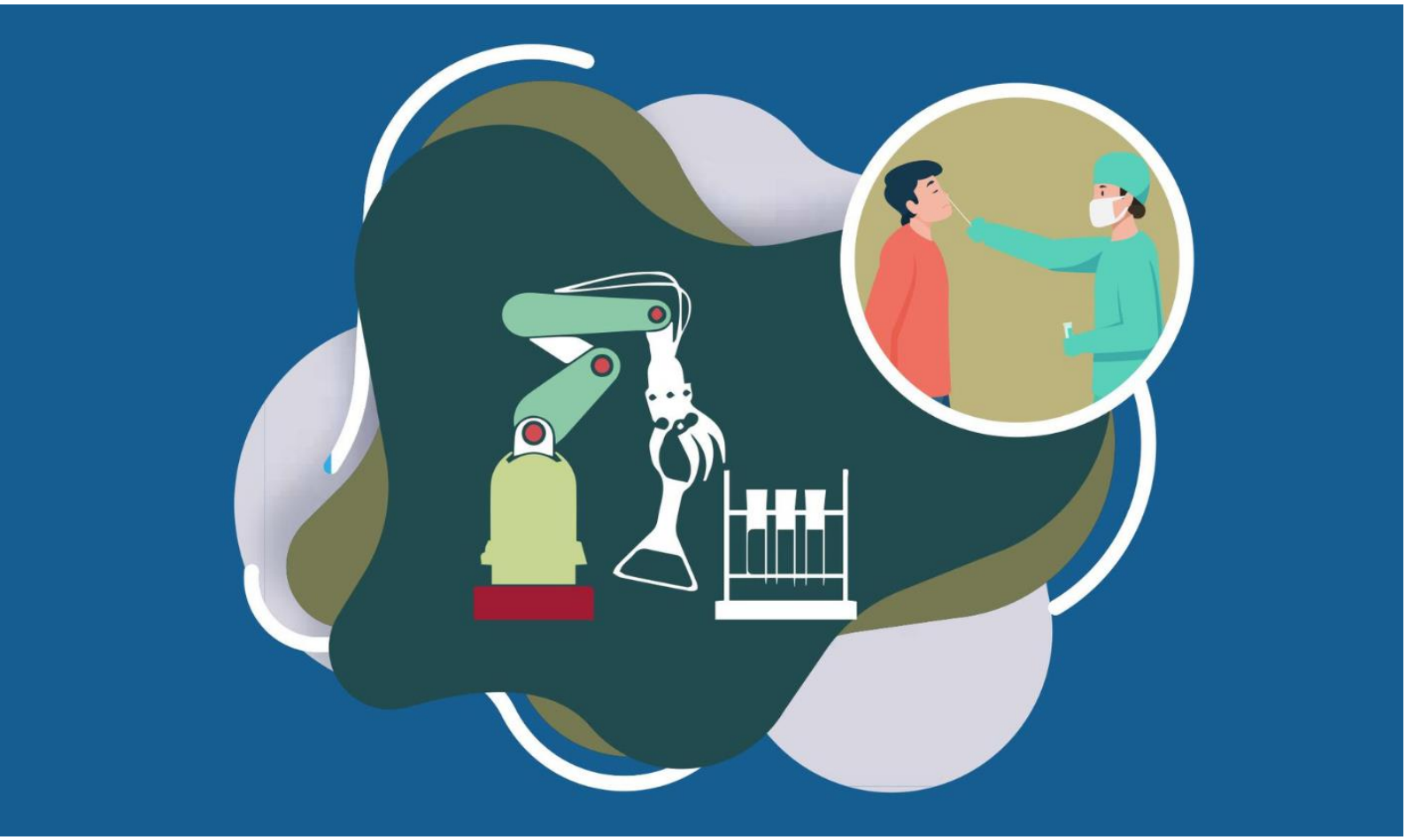

The study team was led under the guidance of Sarang Deo as the Principal Investigator and Ashish Sachdeva as the Co-Principal Investigator. The team comprised Pratima Jandhyala, Aniket Singh, and Samriddhi S. Gupte as Analysts.

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1 Background and Problem Statement

Since its initial clinical observations in Wuhan, China in December 2019, most nations in the world struggled to contain the SARS-CoV-2 virus. In India, there were significant resurgences of the disease after the initial outbreak and lockdown in March 2020. India was one of the world's worst-hit nations in terms of COVID-19 spread with around 33 million confirmed cases and 445,000 fatalities as on 3 September 2020. Yet, the country was testing less than 0.1% of its population at that time.[1]

In addition to activities to prevent one's own risk of infection, such as adherence to social distancing and the wearing of a face covering in public, two behaviors played a key role in curbing the incidence of COVID-19 in the long term – testing for and vaccination against the disease. Before vaccines became available in the market in 2021, testing at scale for the presence of infection was used to blunt the progress of the pandemic. Testing, in general, served two purposes: clinical purposes, which concentrated on identifying disease in symptomatic patients, and epidemiological purposes attempted to identify disease in patients who were asymptomatic as well, so that spread in the population could be assessed. India started a mass vaccination program in January 2021. As of May 4, 2021, about 29.1 million people, or 2.1% of the total population, were fully vaccinated against COVID-19.[2] The need for continuous testing and mass vaccination became even more important in slowing down the spread of the disease due to the rise of virulent virus variants, such as the Delta variant.
However, despite the ramp-up of testing capacity (with the aim of 45 lakhs daily Covid tests by end of June 2021)[3], the testing and vaccination rates remained low given the public's demand for testing and vaccination was low. Thus, as part of the PATH-funded project titled "Improving Access to COVID-19 Testing in India through Systems Strengthening", we conducted a qualitative study grounded in Economics and Behaviour Sciences in Maharashtra and Punjab with the following two objectives:

1. To understand the demand-side barriers that affect COVID-19 testing or vaccination.
2. Outline differentiated solutions to boost the uptake of COVID-19 testing or vaccination.

The rest of this paper is organized as follows: Section 2 discusses the methodology and theoretical concepts used to formally investigate the research objectives. Section 3 synthesizes the barriers to COVID-19 testing and vaccination uptake. Section 4 outlines differentiated solutions to boost COVID-19 testing and vaccination uptake followed by concluding remarks in Section 5.

2 Methodology

We approached this qualitative study using Design Thinking [4,5] – an iterative process to understand the barriers to COVID-19 testing and vaccination uptake. First, we defined the problem. Next, we gathered information through secondary research. We collected information through in-depth interviews with the general population and subject matter experts. Fourth, we analysed the problem using thematic analysis. Last, we ideated solutions to boost uptake. The primary data collection and analysis were grounded in two theories in the fields of Economics and Behavior Sciences, namely, the Theory of Demand[i] [6] , and the Health Belief Model[ii] [7]. The detail of each step is mentioned below.

Under secondary research, we reviewed the existing literature including journal papers, reports, and news articles that explore testing and vaccination uptake barriers for COVID-19 as well as other communicable diseases in India and abroad. This secondary literature helped us identifying some themes to guide the primary interviews.

[i] In economics, demand refers to the quantity of a good that consumers are willing and able to purchase at various prices during a given period of time.[6]
[ii] The health belief model proposes that the uptake of a vaccine will depend on the perceived susceptibility of the disease; severity of the disease; benefits of the vaccine; and risks of the vaccine.[7]

Themes identified through secondary research along with the Theory of Demand and the Health Belief Model, guided the primary research. We conducted in-person qualitative interviews with the general population in Maharashtra and Punjab in April-May 2021. We used convenience sampling to select 36 respondents for the interview. The interviews were unstructured, with a checklist to guide the discussion. In July 2021, we conducted telephonic interviews with six experts from the fields of (i) public health, (ii) medicine, (iii) academia, (iv) governance and surveillance, and (v) community health to seek a sharper understanding of ground realities and provide a comprehensive understanding of a community behavior about Covid-19 testing and vaccination uptake.[8] The experts were purposively selected to ensure a comprehensive understanding of the dimensionalities of the topic of interest. A pictorial representation of the steps followed is given in *Figure 1*.

Figure 1: Steps for gathering information

The data collected was transcribed verbatim and then translated into English. Native Marathi and Punjabi speakers were involved in the transcription and subsequent translation of the interviews. A deductive thematic analysis was used to analyze the collected data. The first step of thematic analysis is familiarization of the data. The research team read and re-read the transcripts to better understand the responses. This step was followed by generating the initial codes. The transcripts were coded to structure the information across transcripts. These codes were then collated into identified themes. Emerging themes were also identified. Post this, all themes were refined to narrate the overall story with clear definitions of the various themes.

A pictorial representation of the steps followed for analysis is presented in *Figure 2*.

Figure 2: Steps for thematic analysis

Step 1: Familiarise data (transcriptions and re-reading)

What are some of the challenges of COVID-19 testing and vaccination uptake observed among the general population?

We had many challenges, both for testing and vaccination.

Vaccination:

One problem in India, not only for Covid-19 but for other diseases and epidemics is vaccine hesitancy, a lot of people are hesitant to take vaccine. This was observed in the past, even with polio drops they had some apprehensions. Even with covid-19, there were a lot apprehensions. People felt that these vaccines were created suddenly without enough testing and trials, may not be good enough, would have side-effects. When vaccinations started even many healthcare workers were also hesitant to take vaccinations. If this is the case, imagine what would happen to general population. FLW were also hesitant initially. Some ***Drs. said, why should I take, I'm not convinced***. ***This had a multiplier effect on the general population***.

Step 2: Generate initial codes

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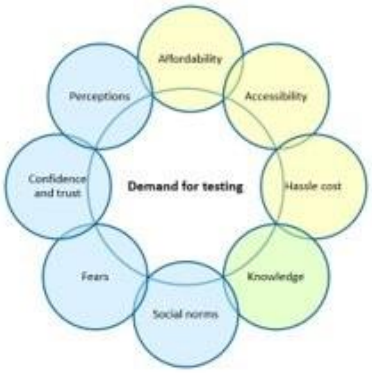
Steps 3 and 4: Search and review themes

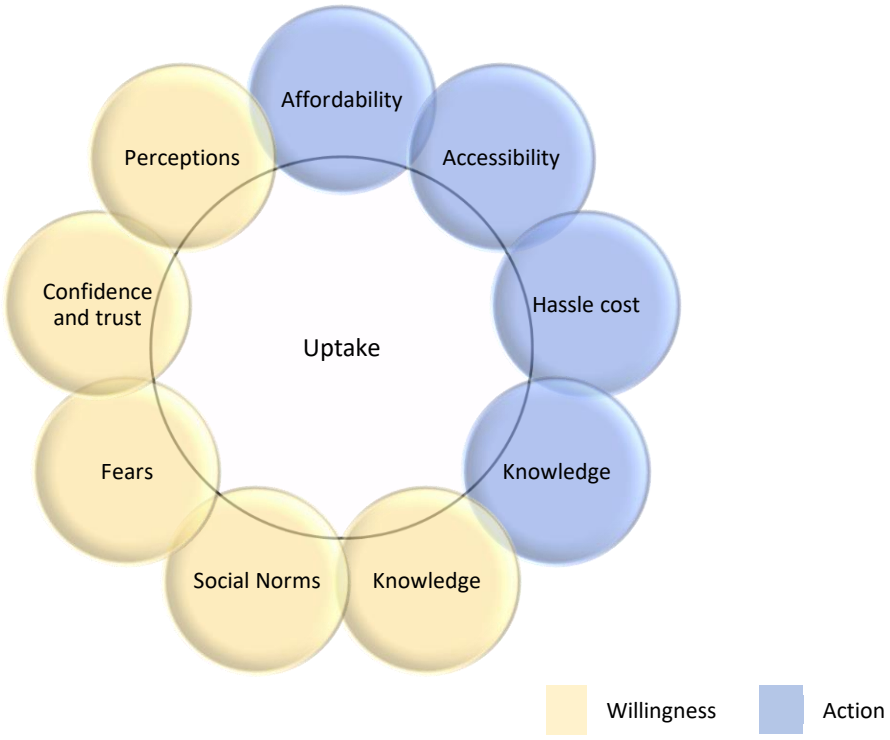
Step 5: Define and name themes



3 Factors Affecting Testing and Vaccination Uptake

The health belief model suggests that the decision to get tested or vaccinated is influenced by how likely one feels they are to get the disease, how severe they think the disease is, the advantages of testing or vaccine, and the potential risks it carries. Literature also indicates that various factors like cost, availability, personal views, and trust can affect the demand for testing or vaccines[9]. Through analysis, we also identified themes or factors that affect uptake for COVID-19 testing or vaccination. These themes were similar to those from the existing literature. We classified the themes into two sets– (a) those that affect the Willingness to test or vaccinate and (b) those that affect the Action to test or vaccinate (see *Figure 3*). Our analysis indicates that the Willingness to test or vaccinate is influenced by knowledge about the need for testing, perceptions, social norms, fears, and confidence and trust. Action to test or vaccinate is determined by knowledge about the process of testing or vaccine, affordability, accessibility, and hassle costs (i.e., non-monetary inconveniences).

Figure 3: Factors affecting demand for testing and vaccination



In the following sub-sections, we present the synthesized results of factors, i.e., barriers and facilitators for testing and vaccination uptake respectively.

3.1 Testing

3.1.1 Willingness

Lack of knowledge about disease dynamics, such as the seriousness of the disease spread and health consequences, and testing dynamics, such as COVID-19 symptoms, impeded Willingness to test. This knowledge barrier was prevalent especially during the initial period of the pandemic. Due to insufficient knowledge, people were susceptible to fake news. Indian media channels sensationalized that COVID-19 could have been fought by drinking cow urine and performing COVID-19 exorcisms by kissing patients' hands.[10,11]

Social norm is defined as a customary code of conduct in a group of people or a larger cultural context. This means that people tend to fit their actions to others' behaviour and expectations.[9] Social stigmatisation is one of the consequences for those who do not adhere to said norms. Testing was no exception. During the first

wave, there was stigma-induced fear that a doctor might tell people, and fear that those people will discriminate against the COVID-positive individual. However, this stigma was reduced in the subsequent waves.

Fear was an additional hindrance to testing, which took different forms for different people. In the first wave, people feared the nasopharyngeal and oropharyngeal swab collection method because it was either described as painful or the person in front of them cringed when the phlebologist collected the sample.

"If I get tested and get positive, then I would have to quarantine, and my life would get disrupted."

There was also a fear of consequences of a positive result such as institutional quarantine. This fear of institutional quarantine was eased when the Government of India allowed for home isolation. Other fears that were prevalent included job loss, lasting impairments, and death due to COVID-19. So, people developed an avoidant attitude toward testing to deny or not feel "guilty" about transmitting the virus to their near and dear ones.[12]

3.1.2 Action

Knowledge about testing logistics played a significant role in the demand for testing. This included the registration process, testing of location, test types, test costs, test administration, time taken to get tested and receive results, and other opportunity costs. During the first wave, there was uncertainty with respect to the information about COVID-19 testing, primarily due to the infodemic. There was a lack of awareness regarding the evolving testing guidelines that were outlined by the ICMR and the central and state governments.

"There was a lot of confusion. Which test is appropriate? Which is better?"

We found that in the first wave individuals were unaware that they could get tested of their own volition, i.e., without a doctor's prescription. We did find that knowledge about testing logistics was a barrier.

Lack of ease of access to the test location in terms of physical distance, mode of travel, and disability friendly were concerns that were raised.

Hassle costs, i.e., non-monetary inconveniences such as high waiting time and lack of proper protocols at the test location were barriers to testing. The opportunity cost of foregone wages for the day of testing and possibly during the period of quarantine also deterred testing.

On the flip side, we observed three major facilitators for testing, namely– (1) free testing at government facilities, (2) Allowing home isolation as opposed to mandatory institutional quarantine, and (3) introduction of the Rapid-Antigen-Test in June 2020 decreased turn-around-time (TAT) in rural and urban areas.

3.2 Vaccination

3.2.1 Willingness

While vaccination was seen as the panacea to COVID-19, the primary concerns were (a) anticipation and fear of being incapacitated due to the potential side effects, and (b) fear of adverse events following immunization (AEFIs).

> *"I've seen in Mumbai, vaccination centres were under probe for cheating the public with fake dose or wrong vaccine. When I see some private hospitals do it, naturally people will have hesitancy."*

Lack of transparency of severity of COVID-19 and the news about fake jabs were associated with reduced confidence and trust in vaccinations. The introduction of only digital registrations for vaccination also created a vote for lowered confidence and trust in the system which was driven by the fear of governments tracking individuals' movements and behaviours.

Further, the health belief model proposes that the demand for testing was directly correlated to perceived susceptibility and severity of the disease and perceived benefits of testing, and inversely correlated with the perceived risk of testing.[9] These perceptions might be significantly different from reality. Information about COVID-19, or any public health concern is conveyed with numbers and statistics. However, relating to numbers at an individual level is difficult. People make perceptions based on statistics, and at times fill the void of information with their own stories, and so fall prey to biases, such as confirmation bias (tendency to seek out information that supports something you already believe); availability bias (tendency to use the information we can quickly recall); in-group bias (people are more likely to support or believe someone within their social group than an outsider); and optimism bias (overestimating the chance of getting a favourable outcome, or underestimating the chance of getting an unfavorable outcome).[9]

> *"Every big media house has discussions with experts, specialised doctors and guests who bust prevalent myths related to vaccinations, thereby, clearing doubts of people. People can directly ask their questions."*

On a positive note, information about influencers taking the jab and hearing from expert sources about the benefits of taking the vaccine facilitated vaccinations. Getting vaccinated was also rewarded in terms of social appreciation thus creating a positive social norm.

3.2.2 Action

Similar to testing, lack of knowledge about vaccination logistics was a barrier. India offered vaccination alternatives to its citizens resulting in lack of clarity on its modality – which vaccine to take, what is the difference between the available vaccines, what is the efficacy level, etc. Further, we observed that the infodemic-induced uncertainty in urban areas acted as a hurdle to vaccination. Information about changing guidelines about the gap between two doses for a certain vaccination, and news about fake jabs deterred individuals from getting vaccinated.

> *"I can register myself at the vaccination centre. Why do I need an app for it?"*
>
> *"They (People) would come to the PHC for the jab but since they were not registered, they had to get behind the line and wait.""*

Lack of ease of access to the vaccination center in terms of physical distance, mode of travel, and disability friendliness were some of the barriers to vaccination. The introduction of digital portals for vaccination

registration also created a barrier for those who did not have access. The lack of user-friendly digital portals also hampered uptake.

Hassle costs such as high waiting time and lack of proper protocols at the vaccination center were other commonly expressed hurdles to vaccination.

4 Call for Action: The *Chawal-Dal-Achaar* Approach to Decision Making

Post synthesis of the data collected, we outlined solutions. The solutions were brainstormed by the study team based on the findings from analysis and secondary literature. These were a combination of centralized and decentralized solutions. We found that given the variability of challenges faced by the general population, one-shoe-fits-all solution would not be enough to tackle the demand related problems for healthcare related services such as testing or vaccination. We would need multi-pronged and differentiated solutions. A tiered approach with some base suggestions that are valid across different states, geographies, and demographics, along with suggestions that differ by state/region (urban/rural) due to political, educational, income, and cultural factors, and differentiated suggestions at a decentralized community level would be essential. We call this tiered approach a "*chawal–dal–achaar*" approach. Each of the elements of this approach is explained below.

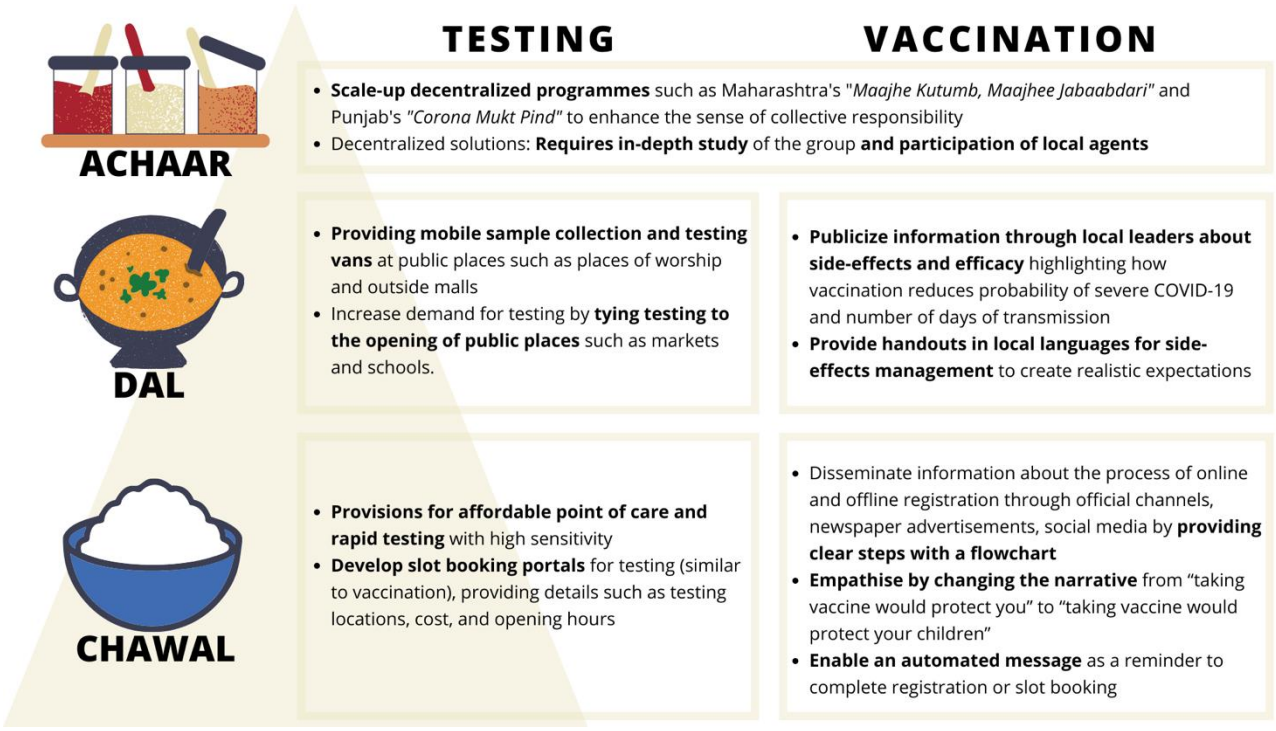
***Chawal**:* These are base suggestions valid across different states, geographies, and demographics. For example, (i) Testing – Make provisions for affordable point of care and rapid testing with high sensitivity, Comprehensive nationwide awareness campaigns regarding testing encompassing information about various types of test kits, their effectiveness, and related details and (ii) Vaccination – Disseminate information about the process of online and offline vaccination registration through official channels, newspaper advertisements, and social media by providing clear steps with a flowchart. Dissemination of valid and authentic information about the various vaccines available, their side effect, and a thorough pros-and-cons list to help the consumer make an informed decision.

***Dal**:* These form the essential suggestions that differ by state/region (urban/rural) due to political/ educational/ income/ cultural factors. For example (i) Testing – Provide mobile sample collection and testing vans at public places such as places of worship and outside malls, tailor-made information brochures about test kits, process to be followed, and knowledge about the disease in local language to be distributed at public places and (ii) Vaccination – Publicise information through local leaders and in regional languages about side-effects and efficacy highlighting how vaccination reduces the probability of severe COVID-19 and number of days of transmission.

***Achaar**:* These are differentiated suggestions at a decentralized community level. For example, scale-up decentralised programmes, such as Maharashtra's "*Maajhe Kutumb, Maajhee Jabaabdari*" to enhance the sense of collective responsibility.

Our proposed approach combines centralized and decentralized solutions to a healthcare problem while allowing multifaceted solutions to be incorporated. *Figure 4* is an infographic outlining the suggestions in detail.

Figure 4: Chawal-dal-achaar approach to package the solutions



5 Conclusion

Solving the supply side alone, or only a part of the issues affecting demand, may not be enough to increase testing or vaccination in India. Demand for testing and vaccination depends on Willingness and Action factors. Willingness to test or vaccinate is influenced by knowledge about the need for testing, perceptions, social norms, fears, and confidence and trust. Action to test or vaccinate is determined by knowledge about the testing process, affordability, accessibility, and hassle costs (i.e., non-monetary inconveniences). Barriers to Willingness and Action include (but are not limited to) testing hesitancy and operational inefficiencies. This qualitative study provides a holistic view of demand.

These factors affecting demand may change over time, and across demographics and geographies. For example, while overcrowding at test centers may impede testing in urban areas, a long commute to test centres without public transportation facilities may discourage testing in rural areas. The relationship between these factors and demand for testing can be explained and predicted by various economics and behavior sciences theories.

Further, these factors are not mutually exclusive. Both sets of barriers need to be addressed in order to boost uptake. Thus, we proposed a *"chawal-dal-achaar"* approach to improve uptake: Unified for all (like *chawal*) and differentiated to suit the needs of each homogenous group (like *dal* and *achaar*). Rigorously designed impact assessments are required to evaluate how the outlined suggestions apply over time, and across heterogeneous demographics and geographies of the nation. The framework mentioned here can guide the design of the impact assessments.

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