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ASSESSMENT OF PREVALENT PERCEPTIONS REGARDING EFFICACY OF VARIOUS COVID-19 TREATMENTS IN THE POPULATION OF PUNJAB, PAKISTAN

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ABSTRACT

Coronavirus disease or COVID-19, caused by SARS-CoV-2, was the most recent pandemic in world history. The total cases worldwide exceeded 547M with global death toll exceeding 6.34M. The unprecedented infection rates were coupled with panic and misinformation that altered public perceptions regarding treatment options. The present study was aimed at assessing the factors that modulated public reliance on various treatments, ranging from non-pharmaceutical, herbal options to modern medicines and vaccines. The methodology employed was of qualitative analysis using survey tool and SPSS, focusing on perceived efficacy, safety, availability, cost-effectivity and immune modulation of treatments. The results exhibit a trend within responders in favor of vaccines and herbal medicines. Moreover, a general hesitation has been expressed in regards to pharmaceutical treatment. The results indicate the highest positive perceptions in people regarding efficacy of herbal treatments (56.3% in agreement), safety (59.4% in agreement), availability (63.2% in agreement), cost-effectiveness (47.2% in agreement) and immunity-boosting activity (63.9% in agreement). Such an indication can be attributed to ancient Ayurvedic practices that serve as a recourse, during emergency situations. Moreover, the least positive perceptions were indicated for pharmaceutical drugs regarding efficacy, safety, availability, cost-effectivity and immune modulation activity. The trends observed in this resource can be utilized to design policy, with enhanced understanding of people’s beliefs and norms. Moreover, the communications and awareness endeavors during a global pandemic can be catered to existing biases and uncertainties in Pakistani population.

Keywords: SARS-CoV-2; COVID-19; Therapeutic drugs; Herbal remedies; Anxiety.
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Highlights
The aim of study was

➢ To study the non-experimental quantitative strategies for COVID-19.

➢ To Assess Pakistani people attitudes towards vaccines, drugs, and herbal treatments.

1. INTRODUCTION
An outbreak constitutes a pandemic when it spreads to more than one continent, in an uncontrolled manner (Li et al., 2020). Although initially considered a form of pneumonia, the Coronavirus disease (COVID-19) was declared a global pandemic by World Health Organization (Li et al., 2003; Huang et al., 2019). The causative agent was identified as 2019-nCoV, or novel coronavirus, previously known as SARS-Cov-2 or severe acute respiratory syndrome corona virus 2 (World Health Organization, 2019). The coronaviruses, of the Coronaviridae family, constitute the largest RNA enveloped viruses with crown-like bristly structures (Morens et al., 2009). These zoonotic viruses were important pathogens to vertebrates (Holshue et al., 2019) that transferred to human hosts (Shereen et al., 2020). Broadly, these viruses can be classified as CoVs causing respiratory ailments resembling flu (229E, HKU1, NL63 and OC43) and the CoVs causing severe pathogenicity (SARS-CoV2 and MERS-CoV) (Zu et al., 2020). There have been previously recorded epidemics caused by human CoVs, such as Severe Acute Respiratory-Syndrome (denoted as SARS) during 2002. This HCoV exhibited a 10% fatality rate (Cucinotta & Vcanelli, 2020). Moreover, the Middle East Respiratory Syndrome (denoted as MERS) epidemic, occurred with a 39% fatality rate, during 2012 (Khan et al., 2021).

The most recent epidemic, initially identified in Wuhan (China) and declared a global pandemic in 2019, was caused by SARS-CoV-2 (severe acute respiratory coronavirus 2) (Dhama et al., 2020). The characteristic symptoms of the ailment included dry cough, high fever, high levels of fatigue, breathing difficulties, sore throat and nausea (Haider et al., 2020). The etiology emerged due to spiked surface transmembrane glycoprotein, also known as S-glycoprotein (Chang et al., 2019). The pandemic and its prevalent proliferation caused a global death toll of 2,327,012 people, leaving 50,874,625 people ailing (Zhang et al., 2020). The prevalence was particularly high in densely populated countries like Pakistan (204 million population) (Jiang, 2020). Several containment and management policies were aimed at reducing the spread of disease (Ruan et al., 2020). Several studies reported an emergence of information pandemic (or infodemic) that caused widespread panic (Bhattacharya et al., 2021), causing “vaccine hesitancy” (Khan et al., 2023). Simultaneously, a rise in demand for herbal supplements against COVID-19 was observed (Onyeaghala et al., 2023). This study aims to simultaneously assess the hesitancy and reliance attitudes of Pakistani population in Punjab, on various treatment options such as vaccines, pharmaceutical drugs and herbal treatments.

2. METHODOLOGY
The study employed non-experimental quantitative strategies, as there was no intention of modifying any factors as is customary for experimental approaches. The aim was to recognize patterns and linkages in data and measurements. Before commencement of the study, clearance from the institutional research ethics committee at University of Central Punjab, was obtained. A prior consent was obtained from each participant to ensure their
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voluntary participation in survey. The survey did not collect any personal or identifiable information. Data was collected through online platforms, circulated over the Punjab Province, over a period of 3 months. The data collected was processed and plotted using SPSS.

3. RESULTS

Sample Background Demographics
The sample consisted of 451 adults, participating in an anonymous survey fielded using Google Forms. The preliminary questions assessed the demographic diversity of sample. Females were slightly higher within respondents at 51.4% (n=232) than males (48.6%, n=219). Young adults of 18-24 years constituted the highest number (74.7%, n=337), followed by 25-34 years old adults (15.5%, n=70) and adolescents of 12-17 years old (6.2%, n=28). The least prevalent were adults of age 35-44 years (3.1%, n=14). The educational backgrounds exhibited diversity, with 65% (n=294) having attained a bachelor’s degree, 4.9% (n=22) with a PhD, 20.8% (n=94) with a Master’s Degree. Moreover, 7.3% (n=33) indicated no formal schooling. Out of the sample, 79.6% (n=359) reported to never have been infected by COVID-19, whereas 20.2% (n=91) reported to have fallen victim to the ailment (Table 1). The responders that did not indicate any infection were considered due to reports of symptom-less forms of infection and possibility of fears of social disenfranchisement, causing a false negation by respondents. Owing to the social stigma associated with disease, there was a general hesitation within people to identify themselves as victims. Moreover, all factions of society participate in shaping prevalent perception, regardless of validity of opinions.

Availability of Pharmaceutical Drugs (Perceived)
A substantial number of participants reported a general shortage of availability of pharmaceutical medicines during COVID-19. Results indicated that, 78.5% of respondents agreed with the lack of availability of medicines, 24.1% (n=109) in strong agreement and 54.4% (n=246) in agreement. Only 21.3% [2.7% (n=12) in strong disagreement and 18.6% (n=84) in disagreement] respondents reported no shortage of drugs (Figure 1). This data showed that most people did not assume pharmaceutical medicines as their main deterrent of COVID-19 due to its low availability. As people perceived them to be low in availability, their reliance on it was low (Table 1).

![Figure 1: Availability of pharmaceutical drugs pertinent to COVID-19. (Survey prompt: “There was a shortage of pharmaceutical medicines during COVID-19”)](image-url)
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**Availability of Herbal Remedies (Perceived)**

Among respondents, 74.8% reported sufficient availability of herbal medications [11.5% (n=52) in strong agreement and 63.3% (n=286) in agreement]. Only 25% of the participants reported a lack of availability of herbal treatments [1.3% (n=6) in strong disagreement and 23.7% (n=107) in disagreement] (Figure 2). A significant marker for people's reliance on any form of treatment, is availability and perceived availability. Therefore, a greater reliance on herbal medicines was observed, in comparison to pharmaceutical drugs. This can be attributed to the historical association of people in subcontinent with herbal/Ayurvedic remedies.

![Figure 2: Availability of herbal remedies pertinent to COVID-19.](Survey Prompt: "Herbal medicines were easily available during COVID-19"

**Availability of Vaccines (Perceived)**

This prompt generated a similar result to herbal medicines, with 68.6% indicating agreement with ample availability of vaccines [12.4% (n=56) in strong agreement and 56.2% (n=254) in agreement]. On the other hand, 31.2% of respondents exhibited insufficient availability [5.1% (n=23) in strong disagreement and 26.1% (n=118) in disagreement] (Table 1; Figure 3). The disagreement area indicates a policy and implementation gap that can be remedied.

**Comparative Availability (Perceived)**

The comparison of availability results brought to fore, an interesting observation. The perception regarding vaccines were a result of governmental efforts, but herbal remedies generated a similar graph without any intervention. The policy strategies can make use of this data, to amplify the perceptions of availability in public. The preceding prompt was related to a comparative assessment of availability of herbal treatment in comparison with vaccines. The result indicated that 77.2% overall agreed that vaccines were more readily available, compared to herbal treatments (Table1; Figure 4). Although a significant percentage is attained, the results point towards a gap in percentage that can be focused on in subsequent efforts.
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Figure 3: Availability of vaccines pertinent to COVID-19.
(Survey Prompt: “Vaccines were easily available during COVID-19”)

Figure 4: Comparative availability of vaccines & herbal remedies.
(Survey Prompt: In Pakistan, getting vaccinated is easier than getting herbal remedies”)

**Most Reliable Treatment**

The most significant question within survey was regarding preference between vaccines, pharmaceutical medicines and herbal treatment. Within participants, 57.5% (n=260) indicated vaccines as the most reliable treatment against COVID-19. Herbal remedies constituted the second most preferred treatment method, selected by 29.2% (n=132) participants. The least preference was given to pharmaceutical medicines, with only 13.1% (n=59) selecting them as a reliable treatment against COVID-19 (Table 1; Figure 5). The highest percentage preferred vaccines, but the study recorded a considerable public preference for herbal remedies, that can be exploited, utilized by policy makers to create partiality towards approved treatment methods.
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Figure 5: Most reliable treatment method for COVID-19. (Survey Prompt: Which of the following is the most reliable treatment against COVID-19)

Subsequent-Preferred Option

The upcoming prompts assessed their preferred treatment in case of unavailability of vaccines. A total of 72.8% [18.6 (n=84) in strong agreement and 54.2 (n=245) in agreement] (Figure 6) participants indicated herbal remedies to be the next preferred option, in case vaccines are not available. Approximately 27% of respondents were in disagreement. In comparison, only 38.3% [10% (n=45) in strong agreement, and 28.3% (n=128) in agreement] (Figure 7) respondents selected pharmaceutical drugs to be the preferred option, in case of inaccessibility of vaccines. Approximately 62% were in disagreement of drugs being the second-best treatment of choice (Table 1).

Figure 6: Preferred alternative, in case of unavailability of vaccines (herbal remedy). (Survey Prompt: “If vaccines are unavailable, herbal treatments are the second-best option”)
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Figure 7: Preferred alternative, in case of unavailability of vaccines (pharmaceutical drugs).
(Survey Prompt: “If vaccines are unavailable, pharmaceutical drugs are the second-best option”)

Comparative Analysis of Vaccines, Herbal and Pharmaceutical Treatments

Side Effects (Herbal Remedies versus Pharmaceutical Treatments)

A considerable percentage of participants (85.6%) believed that pharmaceutical drugs elicit greater side effects than herbal treatments [26.3% (n=119) in strong agreement and 59.3 (n=268) in agreement]. Only 14.1% (n=64) believed pharmaceutical drugs pose lesser side effects than herbal remedies (Table 1; Figure 8).

Preference (Herbal Remedies versus Pharmaceutical Treatment)

When prompted regarding their preference among the two, 62.6% of respondents chose herbal medicines [18.1% (n=82) in strong agreement and 44.5 (n=201) in agreement]. Alternatively, 37.1% preferred pharmaceutical drugs [6.6% (n=30) in strong disagreement and 30.5 (n=138) in disagreement] (Table 1) (Figure 9).

Preference (Vaccines versus Herbal Remedies)

A surprisingly equivalent result was obtained for this prompt, necessitating a need for better policy design for vaccines. The result showed that 42.3% (n=191) considered herbal remedies to be better than vaccines, while 57.5% (n=260) considered vaccines to be better than herbal medicines (Figure 10). The near equivalence was an indication of the pre-conceived notions of preference for herbal/ayurvedic traditions that people recourse to, in times of pandemic (Table 1).

Immune Modulation (Herbal Remedies versus Pharmaceutical Drugs)

A substantial percentage of respondents (59.3%) did not consider pharmaceutical drugs to elicit a strong immune response against COVID-19 [15.3% (n=69) in strong disagreement and 44% (n=199) in disagreement], when viewed in comparison with herbal remedies (Figure 11). Only 40.5% considered pharmaceutical drugs to be better at eliciting a stronger immune response than herbal remedies (Table 1).
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**Figure 8:** Side Effects caused by herbal treatments in comparison with that of pharmaceutical medicines. (Survey Prompt: Herbal Medicines have lesser side effects than pharmaceutical medicines)

**Figure 9:** Preference of treatment method for COVID-19. (Survey Prompt: “Would you prefer herbal treatment instead of modern medicines to cure COVID?”)

**Risk Assessment (Vaccines contrast versus Herbal Treatments)**

An interestingly equivalent results were obtained when evaluations of risk were made regarding vaccines and herbal medicines. A total of 55.5% of respondents agreed that vaccines pose a higher risk, while 44.2% believed the risk was not higher (Table 1; Figure 12). This observation indicates the impact of non-scientific notions prevalent in the region, caused by widespread hysteria. A policy formulation focused on, clearing uncertainties through concentrated efforts would increase public confidence on vaccine usage.
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![Figure 10: Preference (Vaccines vs Herbal Remedies).](image)
(Survey Prompt: "Do you think herbal treatments are better than vaccines?")

![Figure 11: Immune modulation caused by pharmaceutical medicines in comparison with that of herbal remedies.](image)
(Survey Prompt: "Pharmaceutical Medicines are better at boosting immunity than herbal treatment")

**Cost Effectiveness of Pharmaceutical Drugs in Contrast with Herbal Remedies**

Vaccines were excluded from this prompt as vaccination efforts were costless and financed by the government and international funding. This facet showed similar trend as availability, with a substantial number of participants reporting lack of cost-effectiveness in pharmaceutical drugs. A total of 79.6% of participants reported COVID-19 drugs to be more expensive than herbal remedies [32.4% (n=146) in strong agreement and 47.2% (n=213) in agreement] (Figure 13). Only 19.7% of respondents reported the drugs to not be expensive (Table 1). The amount of people strongly agreeing with costly nature of pharmaceutical drugs showed that they assumed to be out of
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their financial reach during pandemic. This can be a reason why people rely on alternate means, such as herbal medicines.

Figure 12: Risk assessment of vaccines in comparison with that of herbal treatments. (Survey Prompt: "Are Vaccines riskier for you than herbal treatments?")

Figure 13: Cost-effectiveness of pharmaceutical drugs in contrast with herbal remedies, during COVID-19. (Survey Prompt: "Pharmaceutical medicines were more expensive than herbal remedies, during COVID-19 period")

Time Taken to Elicit an Immune Response (Herbal)

A lesser significant, but still pertinent factor for preferring a treatment is the perceived time it takes to elicit an immune response. Our question was aimed to assess the delay in immune modulation caused by herbal treatments. A total of 73.3% respondents mentioned that herbal medicines take a longer duration to cure a disease [24.3% (n=110) in strong agreement and 60.0% (n=271) in agreement]. Alternatively, only 15.5% perceived the herbal
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treatments to work rapidly [12.6(n=57) in disagreement and 2.2(n=10) in strong disagreement] (Table 1; Figure 14).

**Perception Analysis Regarding Efficacy of Herbal Remedies**

The concluding prompts assessed the perceptions regarding efficacy of herbal remedies alone. A total of 64.6% (n=292) perceived COVID-19 to be treatable by usage of herbal remedies alone (Table 1; Figure 15).

![Figure 14: Time taken to elicit an immune response.](image)
(Survey Prompt: “Herbal therapy takes a longer time to cure any disease”)

![Figure 15: Recovery from COVID-19 by herbal remedies alone.](image)
(Survey Prompt: “Did you hear anyone recover from Corona disease by only taking herbal remedies?”)
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In a related prompt, 86.9% (n=393) participants expressed that people with mild symptoms of COVID-19 can recover at home using herbal or natural remedies. Moreover, 83.9% (n=379) respondents agreed that herbal remedies can improve immunity against viral diseases. Alternatively, only 38.7% (n=175) expressed that herbal remedies pose an allergic reaction (61% believed them to cause no allergic reaction in body) (Table 1).

4. CONCLUSION

The trends observed in results showed that the sample from Pakistani population showed a greater confidence on the reliability of herbal treatments compared to pharmaceutical options. The perception estimates vaccines as the most potent protection against COVID-19, following by herbal medicines and then pharmaceutical medicines. The perceptions indicate the rate of success of policies and scientific efforts, and highlights the gaps caused by misinformation and panic. The future directions for the research include a cross-sectional study of all over Pakistan, as well as a survey to assess the causative agents of the lack of reliance upon vaccines. Moreover, the pharmaceutical companies can utilize this data to market their products keeping in mind the centuries old Ayurvedic traditions and their lasting impacts on Pakistani perception. Lastly, herbal treatments should be developed commercially so that future pandemics can be tackled effectively.

Table 1: COVID-19 Treatment Perceptions in Punjab, Pakistan (N=451).

<table>
<thead>
<tr>
<th>Survey Prompt</th>
<th>Strongly Agree n (%)</th>
<th>Agree n (%)</th>
<th>Disagree n (%)</th>
<th>Strongly Disagree n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of Pharmaceutical Drugs Pertinent to COVID-19</td>
<td>109 (24.1)</td>
<td>246 (54.4)</td>
<td>84 (18.6)</td>
<td>12 (2.7)</td>
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<tr>
<td>Availability of Herbal Medicines Pertinent to COVID-19</td>
<td>52 (11.5)</td>
<td>286 (63.3)</td>
<td>107 (23.7)</td>
<td>6 (1.3)</td>
</tr>
<tr>
<td>Availability of Vaccines Pertinent to COVID-19</td>
<td>56 (12.4)</td>
<td>254 (56.2)</td>
<td>118 (26.1)</td>
<td>23 (5.1)</td>
</tr>
<tr>
<td>Comparative Availability of Vaccines &amp; Herbal Remedies</td>
<td>96 (21.2)</td>
<td>253 (56)</td>
<td>88 (19.5)</td>
<td>14 (3.1)</td>
</tr>
<tr>
<td>Vaccines</td>
<td>260 (57.5)</td>
<td>59 (13.1)</td>
<td>132 (29.2)</td>
<td></td>
</tr>
<tr>
<td>Pharmaceutical Medicines</td>
<td>84 (18.6)</td>
<td>245 (54.2)</td>
<td>107 (23.7)</td>
<td>15 (3.3)</td>
</tr>
<tr>
<td>Herbal Treatments</td>
<td>45 (10)</td>
<td>128 (28.3)</td>
<td>219 (48.5)</td>
<td>59 (13.1)</td>
</tr>
<tr>
<td>Side Effects Caused by Herbal Treatments in Comparison with that</td>
<td>119 (26.3)</td>
<td>268 (59.3)</td>
<td>57 (12.6)</td>
<td>7 (1.5)</td>
</tr>
</tbody>
</table>
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| Preference of Treatment Method for COVID-19 | 82 (18.1) | 201 (44.5) | 138 (30.5) | 30 (6.6) |
| Immune Modulation Caused by Herbal Remedies in Comparison with that of Pharmaceutical Medicines | 45 (10) | 138 (30.5) | 199 (44) | 69 (15.3) |
| Risk Assessment of Vaccines in Comparison with that of Herbal Treatments | 63 (13.9) | 188 (41.6) | 176 (38.9) | 24 (5.3) |
| Cost-Effectiveness of Pharmaceutical Drugs in Contrast with Herbal Remedies, during COVID-19 | 148 (32.7) | 214 (47.3) | 79 (17.5) | 10 (2.2) |
| Time Taken to Elicit an Immune Response | 111 (24.6) | 267 (59.2) | 57 (12.6) | 10 (2.2) |
| Yes | | | | |
| No | | | | |

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovery from Covid’19 by Herbal Remedies Alone</td>
<td>292 (64.6)</td>
<td>159 (35.2)</td>
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<tr>
<td>Recovery of Mild Symptoms of COVID-19 using Herbal Remedies Alone</td>
<td>148 (32.7)</td>
<td>245 (54.2)</td>
<td>51 (11.3)</td>
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<tr>
<td>Herbal Medicines for Improvement of Immunity Against Viral Diseases</td>
<td>92 (20.4)</td>
<td>287 (63.5)</td>
<td>64 (14.2)</td>
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<tr>
<td>Yes</td>
<td></td>
<td></td>
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<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Allergic Reactions of Herbal Remedies | 175 (38.7) | 276 (61.1) |

Conflict of Interest
The authors declare no competing interests.

Acknowledgement
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Authors Contribution
Aamina Batool: Data collection & tabulation, write-up; Ruqia Arif: Writing, editing, proofreading; Samman Ikram: Writing, editing, proofreading; Namrah Anwar: Data tabulation; Nimra Asif: Data collection

5. REFERENCES

Perceptions of COVID-19 Treatments in Punjab, Pakistan

doi: 10.3390/v12030254


doi.org/10.3390/diseases8020017


doi.org/10.1080/09583157.2015.1086311


doi.org/10.1111/j.1574-6968.2006.00217.x


doi: 10.1016/j.tmrv.2020.02.003


https://doi.org/10.1016/j.cegh.2020.02.018

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doi: 10.23750/abm.v91i1.9397

doi: 10.1016/j.tmaid.2020.101830

doi.org/10.2147/IDR.S289741


doi:10.1056/NEJMoa2001191

doi:10.1016/S0140-6736(20)30183-534


doi:10.1002/jmv.25708

doi: 10.4103/JLP.JLP_98_18
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