

Can Personalized Therapy Revolutionize COVID-19 Treatment Outcomes - Knowledge, Attitude & Practice Survey

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Abstract

Background: COVID-19 shows variability depending on ethnicity and environmental factors therefore one type of drug may not be effective in all the populations. Personalized medicine refers to tailoring the treatment in accordance with individual patients. In the current COVID-19 crisis can this therapy change the course of research and treatment? A study was conducted to investigate the number of physicians with knowledge about personalized medicine and if it was being applied into routine practice, to direct the use of P drug for COVID-19 treatment.

Methods: A cross-sectional survey was carried out at Khyber Girl's Medical College Hayatabad. Respondents included 100 doctors of various specialties who were interviewed regarding the knowledge of personalized therapy for various diseases and their impact on treatment outcomes. They were investigated if according to their experience of tailoring, it could bring about better treatment outcomes for COVID-19.

Results: Out of the total 100 89 (89%) doctors were routinely prescribing tailored treatment and believed that the COVID-19 research should be modified through personalization and genetics.

Conclusion: Personalized therapy is more targeted hence brings about therapeutic benefits and it would ensure better therapeutic outcomes in COVID-19 cases.

Keywords: COVID-19, Ethnicity, Disparity, Personalized therapy.

Introduction

COVID-19 is an ongoing global emergency. As high as 15% of the infected individuals, develop the severe form of the disease. Coronaviruses are RNA encoded genetically diverse viruses that can use several species as hosts. The aftermath is the infections of the respiratory tract mainly and intestines. The typical symptoms are pyrexia, cough, myopathy and breathlessness, however certain atypical symptoms such as vomiting and diarrhea have also been observed.¹ The symptoms, however, are affected by several confounding variables, most prominently the co-morbid ailments e.g. diabetes, hypertension, asthma, pneumonia, obesity, etc.^{2,3} Also a variety of environmental and genotypic factors influences the disease phenotype, severity as well as mortality rate and fatality⁴ including variations and polymorphisms in several host proteins including enterocytes, pneumocytes, renal epithelial cells, immune cells, as well as cerebral neuronal cells, ethnicity, race, and gender of the host. The contemporary narratives regarding the disease are being upgraded via the continuous research and are narrowing down the individuals that are more susceptible not only to disease acquisition but also to the severity and mortality related to it. The blacks and African Americans have been noted not only to contract the disease at a higher frequency but also likely to suffer higher mortality.⁵ Besides, the Asian population is prone to the severity of the disease as the frequencies of related co-morbidities that exacerbate COVID-19 are higher among this population.⁶ Angiotensin-converting enzyme-II acts as a receptor for the COV in the host cells. Its expression varies among different ethnic populations, warranting the differences in disease presentation among them.⁷ The data relative to ethnicity regarding COVID-19 needs to be expanded and further evidence is to be collected in this regard as the available evidence strongly shows a disparity in disease pattern and severity related to racial and ethnic differences. The concerns, however, go beyond just ethnicity and race. The type and locale of the residence, the socioeconomic backgrounds, cultures, and behaviors also matter as the lesser privileged individuals are prone to exposure as per their low immunity diets and the crowded residential arrangements.⁸ The research work is being carried out aiming several targets such as virulent factors of COV and the attachment sites and enzymes involved in the host. The data collected strongly suggests a more

individualized approach to formulate personalized therapy for COVID-19.

The personalized drug also known as a Preferred drug, Physician's drug or a P drug⁹, is a drug tailored according to the individual patient requirements based on the drug efficacy, safety, suitability for the patient as well as the affordability so that the best response of the therapy is achieved.¹⁰ There exists variability in drug response to the traditional treatment protocols among several patients as a result of a variety of factors including age, gender, nutrition, health status, comorbid conditions, ethnicity, environmental factors, psychological factors, drug resistance, idiosyncrasy as well as the genetic makeup.^{11,18} The successful treatment in all such cases thus depends on the modifications in the patterns of prescription and management regimens for medical practitioners. Personalized medicine is an extension of the commonly applied traditional strategies to understand and treat the diseases but offers a much greater therapeutic precision.^{12,13} Talking specifically about COVID-19 and the knowledge of phenotypic disparities, physicians need to work beyond the previous one-size-fits-all model of prescription and move forward to make more efficacious and effective clinical decisions for each patient depending on the genetic as well as environmental factors. These strategic changes for pharmaceutical and diagnostic research are going to bring about marked improvements in the treatment outcomes.^{14,15} P Drug therapy for COVID-19 would be focused to treat the disease not only based on the signs and symptoms but also combining the knowledge and judgment of the physician linking with the individual patient profiles that would improve the therapeutic outcomes, decrease morbidity and mortality and also reduce trial-and-error prescribing, implement the use of safer drugs, avoid adverse drug effects, increase patient compliance and reduce the overall cost of the health care.¹⁶

The main aim of this study was to hypothesize that there very ethnic and environmental disparities regarding COVID-19 and hence the individually targeted, personalized drug therapy would yield a reasonably predictive outcome, thus enhancing the widespread treatment benefits. To solidify the hypothesis a survey was carried out regarding the practice of personalized drug therapy among medical practitioners, and the benefits to the patients to incorporate clinical experience and opinions of these doctors on the implementation of personalized therapy for COVID-19 treatment.

Materials and Methods

An international internet-based cross-sectional survey with online and in-person interviews was carried out from 1st Feb 2020 to 1st May 2020 in Khyber Girl's Medical College Hayatabad after the approval from the ethical board postgraduate medical education block, Khyber Girl's Medical College. The sample size was calculated using Cochran's formula keeping $p=0.89$, 90% confidence interval with $Z=1.645$, and a precision of 0.05. The sample population was selected through a random sampling technique. The sample population consisted of a total of 100 doctors from Pakistan, India, UAE, UK, and USA. The doctors included general physicians as well as specialists. The inclusion criterion was practicing physicians while the non-practicing doctors were excluded from the study. Consent was taken from all the participants. Interviews were taken either directly or through phone prescribing practices, the experience with personalization of treatments, the probable role of personalization in COVID-19 therapeutic outcome and, their ideology regarding the need for this therapy and the benefits of personalization which would direct towards the benefit in cases of COVID-19 therapeutics.

Statistical Analysis: The entry and analysis of the data were one via the 23rd version of SPSS. The frequency of knowledge, attitude, and practice of personalized drug therapy was calculated as percentages and represented as tables.

Results

The assessment was made based on three parameters, the knowledge of P drug, the practice of P drug in prescribing, and the attitude towards the benefits of personalized therapy and its probable role for COVID-19 therapeutics.

Knowledge of P Drug:

Out of the total 100 doctors, 89 (89.00%) knew about personalized therapy, its importance, and its utility in Table 1.

Table 1: Number of participants with the knowledge of P Drug

<i>P Drug Knowledge</i>	<i>Aware Number (Percentage)</i>		<i>Unaware Number (Percentage)</i>	
Definition	89	89%	11	11%
Rationale	84	84%	16	16%

Objectives	84	84%	16	16%
Components	80	80%	20	20%
Importance	89	89%	11	11%

The practice of Personalized Therapy:

A total of 89 (89 %) of the doctors were prescribing personalized therapy in routine prescribing in Table 2.

Table 2: Number of participants practicing personalized therapy

<i>P Drug Practice</i>	<i>Prescribing P Drug</i>	
	<i>Number</i>	<i>Percentage</i>
Currently prescribing P Drug	89	89%
Prescribing P Drug as per knowledge	87	87%
Prescribing P Drug just following other senior physicians without knowledge	03	3%

Attitude towards P Drug Therapy:

A total of 89 (89%) physicians tailoring the therapy commented that personalizing the treatment has shown massive improvements in the treatment outcomes, uncomplicated recoveries and improved the overall therapeutic efficacy, therefore, the research of COVID-19 therapeutics needed to be individualized in Table 3.

Table 3: Attitude of the participants towards Personalized Medicine for COVID-19 treatment

<i>Attitude Towards Personalized Medicine</i>	<i>Number</i>	<i>Percentage</i>
P Drug important in good therapeutic outcome	89	89%
Interested in practicing P Drug	89	89%
Ready to learn the principals of personalized therapy for COVID-19	80	80%
Agree that the P Drug therapy is the need of the hour for COVID-19	88	88%

Ready to disseminate other physicians in the P Drug practice	84	84%
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The 89 participants were inquired about the type of personalization to be followed that could prove to be beneficial for COVID-19 management to which different parameters were suggested by them in accordance with the knowledge of their routine prescribing outcomes in Tables 4 & 5.

Table 4: Suggestions about Tailoring COVID-19 Therapy

<i>Suggestions for Personalization</i>	<i>Aware</i>	
	<i>Number</i>	<i>Percentage</i>
FDA guidelines should be modified based on ethnicity	45	50.56%
Drugs should be chosen in accordance with socioeconomic background & comorbidities	10	11.23%
Drugs should be tailored according to individual patient needs	20	22.47%
Drugs should be chosen in accordance with the genetic makeup	12	13.48%
Drug dosages need to be verified in accordance with the individual patients	2	2.24%

Table 5: Most important factor for COVID-19 P Drug

<i>Most important factor for Personalization</i>	<i>Number</i>	<i>Percentage</i>
Affordability	03	3.37%
Safety	10	11.23%
Maximum practice outcome data	14	15.73%
Physician's experience	20	22.47%
Experience plus affordability	05	5.61%
Genetics	35	39.32%

Discussion

The personalized drug therapy has evolved as the genomic information is being exceedingly utilized by the physicians not only in their research but also in the clinical work. The application of pharmaco-genetics

for COVID-19 would be one step towards the goal of improved pharmaco-therapeutic management. To put the personalized therapy into use for routine practice, several hurdles lie ahead, however, that include the attitudes of the physicians towards tailoring of the treatment, lack of research directed towards the genetic makeup, the lack of knowledge and experience regarding the positive implications of personalization, and deficiency of data related to ethnic and genetic variations in the severity and pathophysiology of COVID-19. One of the main challenges is a lack of data representing the variations in the disease patterns based on genetic as well as environmental factors. Of the doctors inquired, 11% were unaware of personalized therapy. The previous studies have also shown unsatisfactory knowledge of P drug therapy among physicians.¹⁷ This warrants the need to familiarize the healthcare professionals with personalization of the therapy so that they can bring about related modifications in their current practice routine and research.

Several physicians are comfortable with their routine prescribing practices. They believe it brings about an acceptable response so are unwilling to bring personalization into practice. It could either be the result of a lack of knowledge or being unaware of the therapeutic advantages that tailoring the treatment in accordance with the individual needs brings forth. However, majority of the doctors (who were not personalizing the therapy already) agreed that they need to their current practices and that the personalization is going to improve the treatment and hence the COVID-19 research needs to be directed this way as personalized therapeutics will be beneficial to both the patient and the healthcare system. The P Drug therapy has brought about remarkable improvements in the treatment outcomes for most of the diseases as per the experience and practice survey of the physician therefore, it most definitely is going to revolutionize the research regarding COVID-19 management.^{19,20} The researchers have to apply the knowledge in their ongoing experiments and research. The respondents showed a good response to their utility of P Drug. Out of the 89% who were prescribing P drug, stated that the correct personalization based on genetics, safety, affordability, and environmental factors brings about marked improvement in therapeutic outcomes. The results from this survey indicate that researchers need to focus on the factors producing variability in COVID-19 responses, social interactions and discussions should be arranged frequently to ensure educational communications and learning for

clinicians, certain tools should be adopted that can direct the medical professionals towards gaining knowledge and therefore applying the personalized therapy. These may include workshops, seminars, educational discussions, and continuous knowledge update through events accredited by continuing medical education (CME). Furthermore, modern innovative systems and resources of knowledge of medical education including online, point-of-care tools should be encouraged, which ultimately leads to an improved and more effective utilization of not only the genetic information but also the other variables of tailoring the drug therapy for COVID-19.

In regards to COVID-19 therapeutics, genetic polymorphisms should be the mainstay of the research. The first step could be the study and comparison of plasma samples from various patients who have recovered from the illness.²¹ The variations in their antibody profiles and immunity studies can reveal important parameters suggesting the requirement of an individualized approach for the ongoing research. The personalization will not only provide maximum benefits to the patients but will open new routes for the development of better therapeutic measures for COVID-19. The disease progression and severity also needs to be studied and compared among genetically variable populations, variable cultures, and social constructs as well as behavioral patterns to look for variations of the disease pattern and pathophysiology. Also, immunity profiles and co-morbidities need attention as they are known to enhance the severity and mortality of pandemics in the past.²² Coordinated efforts must be done to collect data regarding COVID-19 variability and in accordance to the knowledge already in hand, the ongoing work must be directed based on the ethnicity and environmental factors as the cure for one type of genetically similar individuals might not be as effective or effective at all in the other ethnically and environmentally different population. Last but not the least the knowledge based on the lines of polymorphisms should be communicated so it can be brought into consideration on a worldwide scale.

Conclusion

The results suggest a need for better strategies and guidelines for enhanced awareness of personalized medicine among researchers. Tailoring the therapy according to the patient's age, sex, co-morbidities, ethnicity, and genetics would be a leap forward. Most of the doctors agreed that improving the

understanding of P Drug for COVID-19 would lead to better therapeutic outcomes as variability is noted in the disease pattern based on ethnicity and environmental factors. All the healthcare professionals who had seen the positive outcomes of personalizing treatments were of the view that P drug therapy has to be the mainstay for COVID-19 therapy and it will improve and revolutionize the treatment outcomes. The physicians should be encouraged to carry out researches keeping in view the genetic variations. There is an urgent need collection of prospective data of various factors causing disease variability and awareness programs regarding personalized therapy and its predicted applicability to COVID-19 infections.

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