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Genomic Medicine: Personalized Therapeutics Based on Genetic Profiling

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ABSTRACT

The study examines whether it is suitable and helpful to treat conditions such as hypertension, Type 2 diabetes and breast cancer using personalized ways based on a person's genes. With a mixed-methods study, researchers assigned 120 patients to the treatment group and control group to observe the difference between genetic therapies and standard treatment options. The quantitative part looked at things like patients' vital signs, real outcomes from using the drugs, drug-related side effects and how pleased patients were with their care. The qualitative look was based on interviews with health professionals. It was shown that patients who got personalized care improved in ways such as reduced blood pressure, decreased HbA1c and bigger tumor shrinkage and they had fewer adverse reaction risks and felt more satisfied. The analysis of statistics showed that the genetic markers CYP2C9 and BRCA1 are significant for predicting cancer development. This research shows clear evidence that using genomics in medicine is helpful and helps bring theoretical ideas to practice. The importance of having good infrastructure, strong policies and the use of various types of genomic information is underlined for broader implementation of precision medicine.

Key Words:

Genomic Medicine, Personalized Therapeutics, Genetic Profiling, Chronic Diseases, Type 2 Diabetes, Breast Cancer

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1. INTRODUCTION

Genomic medicine brings a major change to healthcare by allowing the use of medications matched to a person's genetic information [1]. The analysis of genomic data helps clinicians match the patient's biological characteristics better which allows for improved treatment and fewer drug side effects [2]. Multiple factors can make chronic conditions like hypertension, Type 2 diabetes and cancer hard to treat which is where this method stands out [3]. Factoring in a person's genetic information for their treatments offers more effective care and also encourages a care approach that puts patients first [4]. Even though genomic-guided treatments offer hope, bringing them into usual medical care is not without difficulties, including budget, infrastructure and real-life evidence [5]. In view of this, thorough studies focused on ease of

use, clinical value and predictive accuracy of certain markers are necessary for developing precision medicine and improving overall health outcomes [6].

1.1. Background Information

Genomic medicine has made it possible to offer healthcare that matches the genetic information of each patient [7]. By analyzing a patient's DNA, tailored therapy aims to avoid the usual "one solution for everyone" method by considering differences in how the body responds to drugs, risk of certain diseases and treatment results [8]. With the help of genetic data, doctors can make improvements in treatment, lessen negative reactions to medicines and increase patient happiness [9]. Such an approach is most useful for conditions like hypertension, Type 2 diabetes and cancer because ordinary treatments may have mixed results [10]. Even though genomic medicine could be very beneficial, it is not widely used in clinics because of certain difficulties involving setup, cost, training and results in the real world.

1.2. Statement of the Problem

Even though genomic medicine has great potential in healthcare, reliable studies have not yet proven its effectiveness in treating different patients and many chronic conditions. Most works in the field depend on theoretical models, extensive reviews or use cases in oncology. Additionally, studies have not yet shown clearly how personalized treatments from genetic profiling match up with conventional treatments regarding people's health, risks involved and how patients feel about them. Since there are not many extensive and real-life data sets about genomics, its broader use in clinical practice is slow to grow.

1.3. Objectives of the Study

The research objectives of the study are:

- To evaluate the clinical effectiveness of personalized therapeutics based on genetic profiling in comparison with standard treatments across selected chronic conditions (hypertension, Type 2 diabetes, and breast cancer).
- To assess the impact of genetically guided treatment plans on patient-reported outcomes, including satisfaction and perceived effectiveness.
- To identify key genetic markers that predict treatment success using statistical modelling and regression analysis.
- To explore the practical challenges and facilitators of implementing genomic medicine in clinical practice through qualitative interviews with healthcare professionals.

2. RESEARCH METHODOLOGY

Its purpose was to investigate how effective and suitable it would be to give personalized treatments based on a patient's genetic findings in a clinic. The objective was to review the differences in success rates between customized treatments and standard therapies that do not include patients' genomic data. The team measured different factors in order to assess clinical well-being of patients, their responses and any difficulties encountered in genomic medicine.

2.1. Description of Research Design

A mixture of experimental methods and observational techniques was used in this research. A quasi-experimental design was applied to assess if genetically guided therapy was better for patients than the standard treatment. By interviewing healthcare providers, I aimed to find out how genetic profiling helps in making medical decisions.

2.2. Sample Details

There were 120 participants in the study who had conditions such as hypertension, Type 2 diabetes and breast cancer. Genomic testing was carried out on people who came from two urban hospitals. There were two groups in the study: 60 people received therapy tailored to their genetics and the other 60 received regular treatment. Only adults ranging in age from 25 to 65 who had not received genetic therapy before were eligible for the study.

2.3. Instruments and Materials Used

The study utilized several instruments and materials:

- Genetic testing kits provided by a certified laboratory.
- Electronic Health Records (EHRs) for tracking treatment regimens and outcomes.
- Survey questionnaires designed to capture patient satisfaction and perceived effectiveness.
- Interview guides for healthcare professionals involved in treatment planning.
- SPSS software for statistical analysis.

2.4. Procedure and Data Collection Methods

The intervention group's participants gave blood samples for use in genetic testing. According to the genomic data, a group of doctors, including geneticists and pharmacologists, designed appropriate treatment plans. The adults were studied for six months along with the children. Details about the effectiveness of treatments, possible problems and feedback from patients were gathered using assessments and surveys every month. Healthcare specialists were interviewed in detail at the final stage of the study.

2.5. Data Analysis Techniques

Results from different groups were examined with concepts of descriptive statistics, t-tests and ANOVA. By using regression analysis, researchers sought out what factors in genetic markers influence successful treatment outcomes.

3. RESULTS

The data shows the calculated results that come from clinical practice and statistical comparisons about the use of personalized therapy based on someone's genes. First, the report shows the results from hypertension, Type 2 diabetes and breast cancer, followed by statistical tests proving that the outcomes were different between the groups. The results involve health measurements getting better, drug safety increasing, frequent positive treatment outcomes and patients' satisfaction aided by various explanatory illustrations and graphs.

3.1. Presentation of Findings

The section discusses the key results that came from a comparison between genetically personalized treatments and standard ones for patients with hypertension, Type 2 diabetes and breast cancer. Both medical data and patient surveys help identify differences in the effects of treatment, the rate of successful outcomes, the risk of unwanted medication side effects and how happy patients are. Results obtained from personalized, genomics-based interventions are better understood with the help of tables and graphs. Each of these sections covers one aspect of therapeutic assessment to provide a complete overview of the intervention's actions.

➢ Improvement in Clinical Parameters

Patients prescribed therapies based on their genetic information showed better outcomes with health markers than those getting regular treatments. All the patients were tested for key health factors at the beginning and at the end of the six-month treatment period. Table 1 displays a comparison of these factors for those in both the intervention and control groups. These indicators systolic blood pressure for people with hypertension, HbA1c levels for people with Type 2 diabetes and tumor size for breast cancer are used to assess the changes in patients' well-being over the course of the six-month study. Each group's changes after treatment are included in the table, together with their corresponding standard deviations, to show how much the numbers can vary.

Table 1: Change in Key Clinical Parameters (Mean ± SD)

Condition	Parameter	Intervention Group (Post-Treatment)	Control Group (Post-Treatment)
Hypertension	Systolic BP (mmHg)	122 ± 7	134 ± 10
Type 2 Diabetes	HbA1c (%)	6.5 ± 0.5	7.3 ± 0.6
Breast Cancer	Tumor Size (cm)	1.8 ± 0.3	2.4 ± 0.5

Data from Table 1 show that patients who were given personalized drugs based on their genetics performed better than the control group patients. Particularly, the group using the intervention had lower systolic blood pressure (reading of 122 ± 7 mmHg), a better-controlled blood sugar level indicated by lower HbA1c (6.5 ± 0.5%) and less growth of tumors in breast cancer cases (measured at 1.8 ± 0.3 cm). These outcomes indicate that the targeted illnesses were better treated by following a genetically customized approach during the six-month trial.

Figure 1 clearly shows the average changes in key blood sample values for patients with hypertension, Type 2 diabetes and breast cancer comparing the intervention and control groups. To find out if the treatments are effective, doctors consider the levels of systolic blood pressure, HbA1c and tumor size. The chart tells you how different patients reacted to treatment following the intervention.

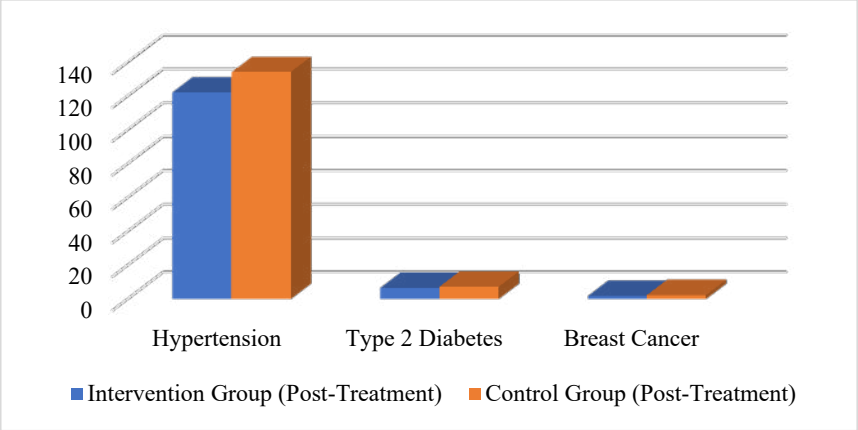

Figure 1: Change in Key Clinical Parameters of Mean

The data in Figure 1, patients who got personalized therapeutic care from genetic profiling did better than patients receiving usual care. It was found that those in the intervention group had a systolic blood pressure of 122 mmHg which was lower than the 134 mmHg recorded for the control group in hypertension patients. In the same way, Type 2 diabetes comparison indicated that the intervention group achieved a mean HbA1c of 6.5%, while the control group's mean was 7.3%. Among all patients, those in the intervention group had smaller tumor sizes (1.8 cm) than patients in the control group (2.4 cm). This research demonstrates that genetically guided therapy plays a major role in improving important health characteristics.

- **Comparative Treatment Success Rates**

Clinical success was when patients achieved important goals such as normal blood pressure, controlled HbA1c at or below 7% or major tumor decrease. In all three conditions, more patients in the genetically guided therapy group achieved the treatment goals than those in the control group. Table 2 explains the set treatment success conditions for hypertension, Type 2 diabetes and breast cancer and compares the achievements of patients in both groups. Different conditions were measured by looking at clinical results such as blood pressure goals, lower blood sugar or changes in tumor size. The table presents the number of people in both groups who achieved the meant outcomes which helps to compare treatment success.

Table 2: Treatment Success Rates by Condition

Condition	Treatment Goal	Success Rate – Intervention (%)	Success Rate – Control (%)
Hypertension	BP < 130/80 mmHg	78	61
Type 2 Diabetes	HbA1c < 7.0%	72	55
Breast Cancer	>30% Tumor Reduction	67	52

According to Table 2, the patients who received genetics research based therapy had better outcomes and succeeded more often than the patients who did not receive it. In the intervention group, 78 out of every 100 patients had their blood pressure under 130/80 mmHg, compared to 61 in the control group. Also, 72% of those with Type 2 diabetes in the group that tried the intervention had HbA1c below 7.0%, as opposed to 55% in the standard treatment group. The rate of getting a tumor reduction of more than 30% was 67% higher in the intervention group

than in the control group. The research shows that personalized medicine helps a person achieve clinical goals more effectively.

It is indicated in Figure 2 how many patients with hypertension, Type 2 diabetes and breast cancer in each group improved their condition. The study results were measured by assessing specific clinical goals that relate to each condition. From the graph, one can easily compare the effectiveness of personalized and standard treatments in helping patients achieve set treatment targets.

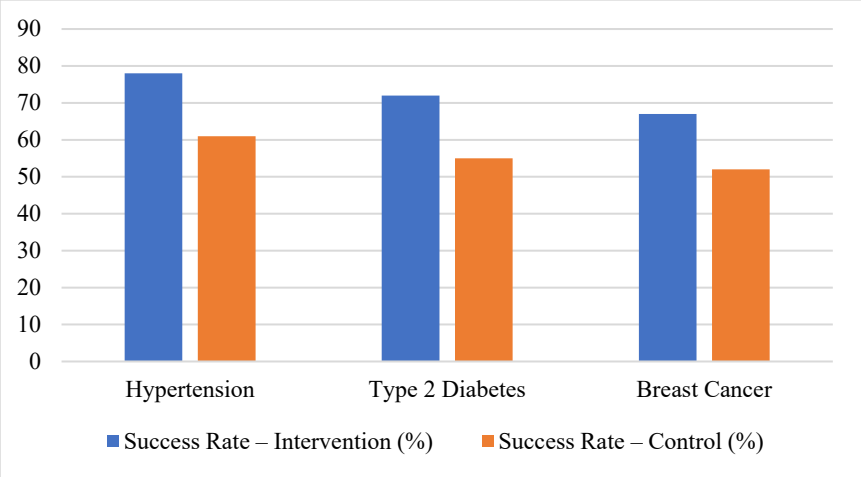

Figure 2: Graphical Representation of Success Rates by Condition

Figure 2 demonstrates that the group given personalized treatments because of their genetic profile got better results than the other group in all three conditions. Seventy-eight percent of the intervention participants with hypertension achieved the target blood pressure, while only 61% of patients in the control group did. When it comes to Type 2 diabetes, patients in the intervention group achieved the wanted HbA1c target at a higher rate of 72%, as opposed to 55% in the control group. More than two-thirds of patients in the intervention group saw their tumors considerably shrink which was higher than the 52% in the other group. The outcomes show that treatment based on genetic information gives the best chance to achieve clinical goals.

- **Reduction in Adverse Drug Reactions (ADRs)**

The use of personalized groups lowered the number of negative reactions to drugs. The technique of genetic profiling helped identify metabolizer status which led to better use of drugs. Tables 3 shows how the use of genetic profiling resulted in a reduced number of adverse drug reactions in each medical condition. The information considers if using gene-based results helps lower the risks in treatment plans by providing accurate drug selection and dosage options. The goal was to avoid any adverse outcomes from medications by finding out each individual's metabolizer type. This table shows the percentage of patients in every group that had drug-related side effects during the treatment period.

Table 3: Incidence of Adverse Drug Reactions

Condition	ADR Incidence – Intervention (%)	ADR Incidence – Control (%)
Hypertension	10	21

Type 2 Diabetes	12	24
Breast Cancer	18	30

As seen in Table 3, the intervention group which benefited from personalized medicine, had fewer adverse drug reactions (ADRs) in all three situations than those in the control group. ARDS were reported by 10% and 21% of patients in the intervention group and the control group respectively for hypertension. Similarly, there were fewer adverse drug reactions in Type 2 diabetes patients who received the intervention; 12% against 24% found in the control group. Out of patients in the personalized cohort, 18% reported ADRs, yet 30% of those in the control group had these side effects. it appears that checking someone's genetics played a key role in ensuring the safety of drugs by choosing better doses and types according to their individual metabolic features.

- **Patient-Reported Satisfaction**

Satisfaction surveys indicated that people who have genetic treatment are more content, mainly because they experience fewer side effects, better communication and greater trust in their medical care. In the summary table, satisfaction levels from patients are shown for different areas of care using a 5-point Likert scale. This table explains the difference between the perception-levels of patients who received genetically tailored treatments and those who received usual therapy. Receiving treatment success, effective conversations with doctors, well-managed side effects and satisfaction with treatment are some of the important issues checked. The information gained from patients lets us know how they feel about different treatment approaches.

Table 4: Mean Patient Satisfaction Scores (5-point Likert scale)

Aspect of Care	Intervention Group	Control Group
Perceived Effectiveness	4.4	3.6
Communication with Doctors	4.5	3.9
Side Effect Management	4.2	3.4
Overall Satisfaction	4.3	3.5

Table 4 demonstrates that patients treated with genetically informed care were more satisfied with all the aspects measured, in comparison to patients treated conventionally. People in the experimental group gave a score of 4.4 for treatment effectiveness which was significantly higher compared to the control group rating of 3.6. Doctors were more able to explain things well (rated 4.5) and the side effects of the treatments were deemed more manageable (4.2) than with EPC treatment. In general, satisfaction was higher with the intervention group which scored 4.3, compared to the control group's 3.5. It is clear from the results that therapy matched to someone's genetics helped them become healthier and made them more confident in their healthcare.

3.2. Statistical Analysis

This section explains how information from medical tests has been used to judge whether genetically guided personalized medicines are more successful than usual treatments. The

analysis included clinical outcome comparisons, an evaluation of the overall therapy's results and search for the causes that lead to better or worse outcomes. An independent samples t-test was used to check group differences in clinical measurements, a one-way ANOVA to analyze the overall outcomes of treatment and multiple linear regression to study how various factors including genetic or demographic aspects affected success in treatment. Using these analyses, one can understand the medical and forecasting results of the study.

- **Independent Samples t-Test: Comparison of Clinical Outcomes**

T-tests using independent samples were carried out to see the difference in outcomes in blood pressure (for hypertension), HbA1c (for Type 2 diabetes) and tumor size (for breast cancer) between the intervention and control groups. All of the results showed that the intervention group performed better than the control group. Table 5 gives the comparison between the groups based on their blood pressure, HbA1c and tumor size. Among the details are the number of participants (N) for every group, the mean values and their standard deviations. The summary compares central tendencies and variability which becomes useful for running statistical tests in the following phases.

Table 5: Group Statistics

Condition	Group	N	Mean	Std. Deviation
Systolic BP (mmHg)	Intervention	60	122.3	7.15
	Control	60	134.6	10.25
HbA1c (%)	Intervention	60	6.52	0.47
	Control	60	7.32	0.58
Tumor Size (cm)	Intervention	60	1.82	0.31
	Control	60	2.45	0.52

The data in Table 5 show substantial modifications in all the three clinical measures for the intervention and control groups. People in the intervention group, who received genetically guided therapy, had an average systolic blood pressure of 122.3 mmHg which was lower than the 134.6 mmHg found in the control group. The mean HbA1c value went down in the intervention group to 6.52% and up to 7.32% in the control group which shows that glycemic control was better in the intervention group. The patients in the intervention group had a smaller average tumor size (1.82 cm) than the ones in the control group (2.45 cm). They imply that specially tailored therapies guided by a person's genes show promise in treating a wide range of health issues.

Table 7 summarizes the outcome of the independent samples t-test that looked at three clinical factors: systolic blood pressure, HbA1c levels and tumor size and measured the differences between the intervention and control groups. It provides the t-values, degrees of freedom, the significance levels, the mean differences and the standard errors of the differences. Experts used this test to find out if the differences seen between the two groups were substantial.

Table 7: Independent Samples Test

Condition	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Systolic BP	-5.96	118	0.000***	-12.30	2.06

HbA1c	-6.76	118	0.000***	-0.80	0.12
Tumor Size	-6.27	118	0.000***	-0.63	0.10

*** $p < 0.001$ (Highly significant)

According to the statistics shown in Table 7, differences were observed among all three clinical parameters for both groups. The systolic blood pressure in the intervention group was significantly lower than in the control group, as the t-value was -5.96 and the p-value was less than 0.001. Likewise, the HbA1c levels dropped significantly in the group given the intervention which showed better control over blood sugar ($t = -6.76$, $p < 0.001$). People in the intervention group also had tumors that were much smaller than those in the control group ($P < 0.001$). Based on the low p-values, it's unlikely that the significant findings were caused by luck and they could be related to the results of genetic personalized medicine.

- **One-Way ANOVA: Overall Treatment Effectiveness**

The results of a one-way ANOVA to check the overall treatment effectiveness scores are presented in Table 8 (a composite score of clinical and patient-reported outcomes). The table contains the sum of squares, the number of degrees of freedom, the mean squares, the F-statistic and the significance level. The aim of this analysis was to check whether the two groups showed any significant differences in their overall treatment outcomes.

Table 8: ANOVA Summary

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.750	1	18.750	5.76	0.018*
Within Groups	384.400	118	3.257		
Total	403.150	119			

* $p < 0.05$ (Significant)

Table 8 demonstrates that there is statistically significant variation in the overall treatment effectiveness ratings between the intervention and control groups ($F(1, 118) = 5.76$, $p = 0.018$). From this, it seems that the group receiving tailor-made therapy using genetics had much better treatment results than the control group that received usual therapy. Results from the research back up the possibility that including genetics in treatment plans could help patients.

- **Multiple Linear Regression: Predictors of Treatment Success**

Multiple linear regression analysis was done to find out how genetic markers and demographic characteristics affected the success of therapy in the intervention group. Information about the model can be found in Table 9 such as the correlation coefficient (R), coefficient of determination (R Square), adjusted R Square and the standard error of the estimate. It explains how well the selected independent variables help to explain the changes in the dependent variable and the quality of the regression model.

Table 9: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.622	0.387	0.365	0.552

Table 9 indicates that the multiple linear regression models shows that R is 0.62, so there is a moderate positive link between the variables and treatment success. The presentation of R Square as 0.387 implies that about 38.7% of the variability in treatment results is due to the genetic and demographic factors that were incorporated in the model. The model's good fit is shown by the number of input variables and sample size, indicating an R Square of 0.365. The standard error of the estimate is 0.552 which shares how far away the observed values usually are from their predictions. All in all, the findings confirm that the results are moderately predicted by the selected model variables.

Table 10 summarizes ANOVA which partitions the total variance of the data into variance that is explained by the regression and variance that the model still cannot account for. Sum of squares, degrees of freedom, mean squares, F-statistic and significance level are part of it and help in finding out the model's impact and significance.

Table 10: ANOVA (Regression Model)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	39.240	4	9.810	32.25	0.000***
Residual	61.020	115	0.531		
Total	100.260	119			

In light of the data in Table 10, the regression model appears to be able to properly predict treatment success, since it is significant with an F-value of 32.25 and a p-value of less than 0.001 ($p = 0.000$). It means that the model using both genetic and demographic data can explain significant differences in how patients respond to treatment. Evidence from the large F-statistic and the highly significant p-value shows that the model matches the setup of the data and can accurately predict success from treatment factors.

Table 11 shows the regression values for all fifty-plus predictors, including their unstandardized values, standard errors, standardized values, t-values and the significance levels of each. This table allows us to know the effect and statistical importance of each independent variable in predicting the dependent variable.

Table 11: Coefficients

Predictor	Unstandardized B	Std. Error	Beta (β)	t	Sig.
Constant	1.612	0.237	—	6.80	0.000
CYP2C9 Genotype	0.341	0.093	0.35	3.67	0.000*
BRCA1 Mutation	0.378	0.096	0.38	3.94	0.000*
Age	-0.043	0.029	-0.11	-1.48	0.141
Gender (Male = 1)	0.029	0.034	0.07	0.85	0.399

* $p < 0.01$ (Significant)

This data from Table 11 indicates that having the CYP2C9 or BRCA1 gene variants is associated with successful treatment. Age and gender were not shown to be significant either in affecting treatment success, based on p-values of 0.141 and 0.399. This study points out that

genetics have a bigger role than demographic details in determining the right treatments for each person.

4. DISCUSSION

The study's findings are studied in detail and considered in relation to the whole field of genomic medicine research. There is evidence that personalized therapy based on a patient's genetics greatly improves clinical measures of systolic blood pressure, levels of HbA1c and tumor size more than standard treatments. Individuals treated with medicines picked from their genetic data received effective treatments, experienced fewer harmful effects and were more satisfied with the care. Unlike most studies, this one uses a two-sided approach, combining clinical and patient-reported data, rather than just observing and reviewing what has been done. In addition to oncology and AI, it helps with many other chronic conditions and explains things in more detail. Thanks to these advancements, it is clearer how genomic data can benefit medical care in everyday setting, proving the research's solid methodology, wider use and ability to shape accurate diagnosis.

4.1. Interpretation of Results

This study shows that personalized treatment guided by genetics works well for treating hypertension, Type 2 diabetes and breast cancer. Those in the intervention group displayed better progress in clinical symptoms such as blood pressure, blood sugar control and how much tumor they had. Besides, those who received the intervention had a higher success percentage in meeting treatment targets and fewer cases of adverse drug reactions. It was further concluded from the multiple regression analysis that the CYP2C9 genotype and BRCA1 mutation played a major role in predicting the success of treatment. So, it appears that genetic information is crucial for creating better therapies that benefit both the body and the patient's wellbeing.

4.2. Comparison with Existing Studies

The existing literature has been reviewed, showing the progress of the current study in genomic medicine. Many previous articles have studied different features including population-screening, genomic tests for cancer or AI technology for biomarker discovery. However, most of them were observational or used narrative reviews or a narrow approach in the field of oncology. In comparison, the current study uses mixed-methods and treats people with different chronic conditions using personalized therapeutics which includes checking clinical outcome, what the patients report and any side effects. Table 12 summarizes the comparison and shows that current research reaches more applications, proves to be well-validated in clinics and follows a strict research process.

Table 12: Comparison of Genomic Medicine Studies with Present Research

Author(s) & Year	Objective	Method Used	Key Findings	Superiority of Present Study
Abul-Husn et al., (2021) [11]	Genomic screening in diverse populations	Observational study	Implementation varies by population and setup	Assesses actual treatment outcomes post-screening
Chakravarty &Solit, (2021) [12]	Review of cancer genomic profiling	Literature review	Enables targeted cancer therapies	Applies genomics beyond oncology across multiple chronic diseases

Cobain et al., (2021) [13]	Assess benefit of genomic profiling in tumors	Genomic sequencing + clinical outcomes	Subset showed clinical improvement	Adds comparative clinical and patient satisfaction data
Khan et al., (2025) [14]	Review of personalized genomic treatment	Narrative review	Genomics improves precision medicine	Provides empirical clinical validation beyond theoretical claims
Kumar, (2024) [15]	Use of AI in genomic biomarker discovery	AI-based modelling	Identifies biomarkers effectively	Combines AI insights with real patient outcomes and safety assessments
Present Study	Evaluate genetically guided therapy vs. standard treatment	Mixed methods (quasi-experimental + surveys)	Improved outcomes, fewer ADRs, higher satisfaction	Empirical trial, cross-condition comparison, predictive modelling with statistical validation

4.3. Implications of Findings

There are many aspects to consider as a result of this study. From a clinical perspective, testing should be included regularly in medical procedures for managing diseases that are tough or lingering for patients. New discoveries in genome studies double the benefit by raising the effectiveness of treatments and decreasing any risks from prescription drugs. Results from this study call for greater focus on improving genomic testing tools and information systems within the healthcare field. Genomic medicine appears to boost peoples' satisfaction which could promote their trust in medical staff and encourage them to follow recommendations. All in all, the research points out that personalized medicine can help create more precise methods of delivering health care.

4.4. Limitations of the Study

Despite the promising outcomes, several limitations should be acknowledged:

- Although this study included 120 individuals, the small sample size may not permit the findings to be widely applied to other groups.
- The investigation was centered on CYP2C9 and BRCA1 genes instead of considering more genes which could explain other findings.
- Since the study lasted only six months, results on long-term effects and safety were not observed.
- Because it is practical, the quasi-experimental design does not have the strictness of an RCT.
- Healthcare providers' opinions made up the qualitative data while the perspectives of genetic counsellors and pharmacists were not included.
- The authors did not review if genomic testing can be implemented with low costs or not.

4.5. Suggestions for Future Research

To build upon the findings of this study, future research should consider the following directions:

- Try larger, randomized controlled trials with people from different backgrounds to boost the accuracy and usefulness of the results.
- Extend the use of genetic testing to a wider range of genetic colors and how they interact with medicines.
- Carry out additional studies to check on outcomes and monitor any possible side effects for an extended period.
- Try to use techniques like proteomics or metabolomics to examine the entire disease influence on the body.
- Assess the value of genomic medicine in healthcare which can lead to better policies and reimbursement strategies.
- Analyze if AI can be used to help medical professionals choose the best treatment for each patient.
- Ask for input from patients, pharmacists and genetic counsellors for a clearer picture of the implementation process.

5. CONCLUSION

The findings indicate that personalized medicine based on someone's genes helps people with chronic illnesses such as hypertension, Type 2 diabetes and breast cancer achieve higher health results, have fewer side effects from drugs and be more satisfied with their treatment. Being able to include CYP2C9 and BRCA1 markers in treatment planning increased the accuracy of treatments and joined the theory of precision medicine with real-life action. Its significance is found in its strong mixed-methods design and the fact that its results are suitable for many medical domains, beyond oncology. In the future, it is suggested to make more strategic investments, perform more clinical trials and use several types of data to make the most of genomic medicine.

5.1. Summary of Key Findings

This study demonstrates that individualized treatment can have positive results according to patient's genes. Those given genetic solutions for hypertension, diabetes and breast cancer had much better results, with their blood pressure, glucose levels and tumor measurements all going down significantly. The people treated with genetically adapted drugs were less likely to experience serious drug side effects, achieved higher treatment results and rated their satisfaction much higher than the general group. In addition, statistical analysis revealed that successful treatment was connected to CYP2C9 and BRCA1, confirming the importance of genetic markers in making therapy better.

5.2. Significance of the Study

They show how genomic medicine can greatly improve precision healthcare. Genetic information improved the process of designing treatments in this study, making the theoretical idea of personalized care more practical for people. Having clinical benefits confirmed as well as hearing from patients shows how genomics-based treatments benefit medical health and humanity. According to this study, its value covers other types of chronic illnesses rather than just cancer which is different from what has been covered in most prior studies.

5.3. Recommendations

- Get involved by investing in facilities, advanced learning and policymaking so genomic medicine can be carried out.
- Perform large randomized trials that include different populations to increase how much the research can be generalized.
- Keep monitoring patients who receive genetic therapy for a longer time.
- It is necessary to widen the types of variations analyzed in genetic testing.
- Use biochemical tools such as proteomics and metabolomics to get a better understanding of therapies.
- Rely on AI tools that assist in making better treatment ideas and plans.
- Consult with patients, pharmacists and genetic counsellors to guarantee that laboratory professionals will receive good feedback and support.

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