



Genetic Diagnosis and Medical Genetics in Turkish Court of Cassation Decisions: A Cross-sectional Decision Analysis

Türk Yargıtay Kararlarında Genetik Tanı ve Tıbbi Genetik: Kesitsel Bir Karar Analizi

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Department of Medical Genetics, University of Health Sciences Türkiye, Ankara Etlik City Hospital, Ankara, Türkiye

ABSTRACT

Objective: Advances in genetic and genomic technologies have expanded the clinical role of medical genetics and created complex legal, ethical, and social implications. Despite the growing integration of genetic information into clinical practice and legal proceedings, the representation of genetic and medical genetic concepts in Turkish Court of Cassation decisions has not been systematically examined.

Methods: A retrospective, descriptive, cross-sectional decision analysis was conducted using the publicly accessible Yargıtay Karar Arama database. Two keywords, “genetic diagnosis” and “medical genetics,” were searched in Turkish. After removal of duplicates and assessment of eligibility, 16 decisions were included in the final analysis. Decisions were classified into a main analysis group (n = 12) and a secondary analysis group (n = 4). Data were extracted on legal context, genetic themes, role of genetic evidence, expert assessments, and judicial outcomes.

Results: The included decisions spanned 2009 to 2024 and covered both civil and criminal chambers. The most frequent legal context was DNA-based parentage and family law disputes (37.5%), followed by prenatal diagnosis or medical genetics-related malpractice and laboratory responsibility (31.3%), medical genetics service reimbursement disputes (18.8%), and genetic disease-related procedural rights and personality rights claims (12.5%). Expert evaluation was a recurring determinant of judicial reasoning across all categories.

Öz

Amaç: Genetik ve genomik teknolojilerdeki gelişmeler, tıbbi genetiğin klinik rolünü genişletmiş ve karmaşık hukuki, etik ve sosyal sonuçlar doğurmuştur. Genetik bilginin klinik uygulamaya ve hukuki süreçlere giderek artan entegrasyonuna karşın, genetik ve tıbbi genetik kavramlarının Türkiye Yargıtay kararlarındaki yansımaları sistematik olarak incelenmemiştir.

Yöntemler: Kamuya açık Yargıtay Karar Arama veri tabanı kullanılarak geriye dönük, tanımlayıcı, kesitsel bir karar analizi gerçekleştirilmiştir. “Genetik tanı” ve “tıbbi genetik” olmak üzere iki anahtar kelime Türkçe olarak taranmıştır. Yinelene kararların çıkarılması ve uygunluk değerlendirmesinin ardından 16 karar nihai analize dahil edilmiştir. Kararlar, ana analiz grubu (n = 12) ve ikincil analiz grubu (n = 4) olarak sınıflandırılmıştır. Her karardan hukuki bağlam, genetik temalar, genetik kanıtın rolü, uzman değerlendirmeleri ve yargısal sonuçlara ilişkin veriler elde edilmiştir.

Bulgular: Dahil edilen kararlar 2009-2024 yılları arasında yayılmakta olup hem hukuk hem de ceza dairelerini kapsamaktadır. En sık karşılaşılan hukuki bağlam, DNA temelli soybağı ve aile hukuku uyumsuzlukları (%37,5) olmuştur. Bunu sırasıyla prenatal tanı veya tıbbi genetik kaynaklı malpraktis ve laboratuvar sorumluluğu davaları (%31,3), tıbbi genetik hizmeti geri ödeme uyumsuzlukları (%18,8) ve genetik hastalığa bağlı usul hakları ile kişilik hakkı talepleri (%12,5) izlemiştir. Uzman değerlendirmesi, tüm kategorilerde yargısal muhakemenin tekrarlayan bir belirleyicisi olarak öne çıkmıştır.

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Address for Correspondence/Yazışma Adresi: Dilsu Dicle Erkan, Department of Medical Genetics, University of Health Sciences Türkiye, Ankara Etlik City Hospital, Ankara, Türkiye
E-mail / E-posta: dilsudicle@gmail.com
ORCID ID: orcid.org/0000-0002-2400-8344

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ABSTRACT

Conclusion: Decisions of the Turkish Court of Cassation reveal that genetics has become a multidimensional legal issue, extending beyond parentage testing into prenatal diagnosis, laboratory responsibilities, informed consent, reimbursement, and procedural rights. Emerging genomics-related issues such as variant reinterpretation, duties to warn relatives, and genetic discrimination have not yet achieved visibility before the high courts in Türkiye.

Keywords: Medical genetics, genetic diagnosis, Court of Cassation, judicial decisions, medical law, prenatal diagnosis, DNA testing

Öz

Sonuç: Yargıtay kararları, genetiğin soybağı tespiti için ötesine geçerek prenatal tanı, laboratuvar sorumluluğu, aydınlatılmış onam, geri ödeme ve usul hakları alanlarına uzanan çok boyutlu bir hukuki mesele haline geldiğini ortaya koymaktadır. Varyantların yeniden yorumlanması, risk altındaki akrabaları uyarma yükümlülüğü ve genetik ayrımcılık gibi genetik ilişkili hukuki sorunlar ise henüz Türkiye’de yüksek mahkemelerin gündemine girmemiştir.

Anahtar Sözcükler: Tıbbi genetik, genetik tanı, Yargıtay, yargı kararları, tıp hukuku, prenatal tanı, DNA analizi

INTRODUCTION

Advances in genetic testing have substantially expanded the role of medical genetics in contemporary medicine. Genetic and genomic technologies are now used not only for the diagnosis of rare inherited disorders, but also in prenatal diagnosis, carrier screening, preimplantation genetic testing, human leukocyte antigen (HLA) matching, pharmacogenetics, cancer susceptibility assessment, and individualized risk prediction (1). As these applications increasingly influence diagnosis, reproductive decision-making, treatment planning, and long-term care, medical genetics has become an integral component of modern health care.

The growing clinical use of genetic information has also created important legal, ethical, and social implications (2). Genetic test results may have direct consequences not only for the individual being tested, but also for family members and future offspring. In legal practice, genetic evidence may serve as decisive proof in parentage and paternity disputes, while prenatal genetic testing may become central to malpractice claims involving missed or delayed diagnosis, inadequate counseling, laboratory error, or failure to obtain informed consent (3-5). Similarly, disputes may arise regarding the reimbursement of genetic tests, the medical necessity of specialized genetic services, and the interpretation of expert reports in cases involving genetic diseases (2). Therefore, genetic information increasingly functions as both a clinical tool and a legal determinant.

High court decisions provide a valuable source for understanding how these complex issues are interpreted within a legal system. In Türkiye, decisions of the Court of Cassation are particularly important because they reflect the judicial approach to causation, standard of care, expert evaluation, informed consent, evidentiary sufficiency, and procedural requirements. Previous decision-based analyses in medical law have demonstrated that court judgments can reveal recurring patterns in malpractice allegations, expert report conflicts, and judicial reasoning (6). Despite the expanding role of medical genetics in clinical practice, how genetic and medical genetic concepts are represented in decisions of the Turkish Court of Cassation has not been systematically examined.

Although genetic information is increasingly used in both clinical practice and legal decision-making, its representation in Turkish Court of Cassation decisions remains unclear. Therefore, this study aimed to systematically examine decisions of the Court of

Cassation and to classify their legal contexts, clinical and genetic themes, role of genetic evidence, expert assessments, and judicial outcomes.

MATERIALS AND METHODS

Study Design

This study was designed as a retrospective, descriptive, cross-sectional decision analysis of publicly available decisions of the Turkish Court of Cassation concerning genetic diagnosis and medical genetics. The study aimed to evaluate the legal contexts in which genetic and medical-genetic concepts appear, the role of genetic evidence or genetic services in judicial reasoning, and the outcomes of those decisions.

Data Source and Search Strategy

The data source was the publicly accessible “Yargıtay Karar Arama” database (<https://karararama.yargitay.gov.tr/#>), which contains anonymized decisions of the Turkish Court of Cassation. The database was searched using two predefined keywords: genetic diagnosis (originally searched in Turkish as “genetik tanı”) and medical genetics (originally searched in Turkish as “tıbbi genetik”).

The keyword “genetic diagnosis” yielded 13 decisions, while “medical genetics” yielded 12 decisions. Thus, 25 records were initially identified. After comparing the search results, 4 duplicate records were removed. The remaining 21 unique decisions were reviewed at the full-text level for eligibility.

Eligibility Criteria

Decisions were included if a genetic or medical genetic element had a meaningful role in the factual background, evidentiary assessment, expert evaluation, legal reasoning, or judicial outcome of the case. Specifically, decisions were considered eligible if they involved at least one of the following:

Genetic testing, DNA analysis, molecular genetic analysis, prenatal genetic diagnosis, preimplantation genetic diagnosis, HLA tissue typing, genetic disease, medical genetics expert assessment, medical genetics laboratory evaluation, or disputes concerning the necessity, reimbursement, or legal consequences of genetic services.

Decisions were excluded when the terms “genetic diagnosis” or “medical genetics” appeared only incidentally (for example, as part of a department or institution name, a device location, an academic position, a commercial contract, or a technical service relationship)

and there was no substantive discussion of genetic testing, genetic disease, medical genetic evaluation, or genetic health service. Duplicate decisions and those that did not contain sufficient relevant content for analysis were also excluded.

After eligibility assessment, 5 decisions were excluded and 16 were included in the final analysis (Figure 1).

The main analysis group included decisions in which genetic testing, genetic disease, medical genetic evaluation, genetic laboratory responsibility, or genetic health service was directly central to the dispute or judicial reasoning. This group included 12 decisions.

The secondary analysis group included decisions in which a genetic test result or genetic disease appeared as background information or supporting evidence, while the principal legal dispute concerned another issue such as divorce, compensation, waiver of a paternity claim, or procedural rights in criminal proceedings. This group included 4 decisions.

Data Extraction

For each included decision, the following variables were extracted into a standardized data collection form:

Court of Cassation chamber, case number, decision number, decision year, type of court, civil or criminal jurisdiction, type of legal dispute, genetic or medical genetic concept involved, clinical or genetic condition, role of the genetic element in the decision, presence of expert report, presence of medical genetics expert or medical genetics department assessment, presence of Forensic Medicine Institute report, presence of conflicting expert reports, first-instance court outcome, regional appellate court outcome if available, Court of Cassation outcome, and main reasoning of the Court of Cassation.

The genetic or medical-genetic concepts were categorized as DNA/parentage testing, molecular genetic analysis, prenatal diagnosis, preimplantation genetic diagnosis, HLA tissue typing, genetic disease, medical-genetics expert evaluation, medical-genetics laboratory responsibility, or medical-genetics service/reimbursement dispute.

The role of the genetic element was categorized as primary evidence, supporting evidence, expert assessment, malpractice or negligence evaluation, informed consent issue, causation assessment, health

service necessity/reimbursement issue, procedural rights issue, or background information.

Outcome Measures

The primary outcome was the distribution of legal contexts in which genetic and medical genetic concepts appeared in Court of Cassation decisions. Secondary outcomes included the type of genetic/genomic issue addressed, the role of genetic evidence or medical genetic assessment in judicial reasoning, the presence and nature of expert reports, the existence of conflicting expert opinions, and the final Court of Cassation outcome.

Statistical Analysis

Data were analyzed descriptively. Categorical variables were presented as numbers and percentages. Because of the limited sample size and the descriptive nature of the study, no comparative statistical analysis was performed.

Ethical Considerations

This study did not involve human participants, patient records, direct patient contact, or identifiable personal data. All decisions were obtained from the publicly accessible Yargıtay Karar Arama database and had already been anonymized. Therefore, ethics committee approval and informed consent were not required.

RESULTS

Decision Selection

The initial search identified 25 records from the Turkish Court of Cassation database; 16 decisions were included in the analysis. Of these, 12 decisions were classified in the main analysis group, and 4 in the secondary analysis group.

General Characteristics of Included Decisions

The included decisions were issued between 2009 and 2024 and involved both the civil and criminal chambers of the Court of Cassation. Most decisions were from civil chambers, whereas two were from criminal chambers. The main analysis group included decisions in which genetic testing, medical genetic evaluation, genetic laboratory responsibility, or genetic health services were central to the dispute. The secondary analysis group included decisions in which genetic testing or genetic disease served as background or supporting evidence, while the principal legal dispute involved another issue, such as divorce, compensation, waiver of a paternity claim, or procedural rights in criminal proceedings (Table 1).

The decisions covered a broad range of legal and clinical contexts. The most frequent category was DNA-based parentage and family law disputes, accounting for 6 of the 16 decisions (37.5%). This was followed by prenatal diagnosis or medical genetics-related malpractice and laboratory responsibility, accounting for 5 decisions (31.3%). Disputes concerning reimbursement or financing of medical genetics services were identified in 3 decisions (18.8%). Genetic disease and criminal procedural rights, as well as DNA-related personality rights or compensation disputes, each accounted for 1 decision (6.3%) (Figure 2).

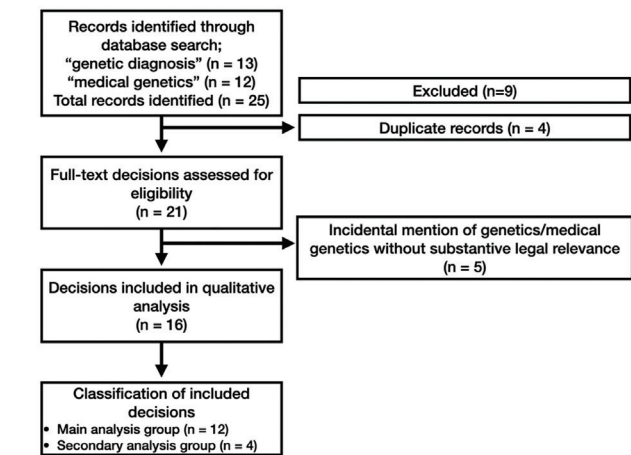


Figure 1. Schematic algorithm for inclusion & exclusion of decisions.

Legal Contexts and Genetic Themes

DNA or parentage testing was the most common genetic theme identified among the included decisions. These cases involved paternity actions, denials of parentage, divorce proceedings based on DNA evidence, waiver-related disputes in paternity litigation, and compensation claims following the discovery of biological

non-paternity. In these decisions, DNA testing generally served as a central or highly influential evidentiary element in determining biological relationships or the legal consequences arising from such determinations (Table 2).

Prenatal diagnosis-related disputes constituted the second major group. These decisions involved Down syndrome, prenatal screening, chorionic villus sampling, maternal cell contamination,

Table 1. Included Court of Cassation decisions and classification.

No.	Chamber	Case/decision no.	Year	Analysis group	Legal context	Genetic/clinical theme	Role of genetic element
1	11 th civil chamber	2023/5901 E., 2024/9400 K.	2024	Main analysis	Prenatal diagnosis-related malpractice/laboratory responsibility	Down syndrome, CVS, maternal cell contamination	Assessment of laboratory error and medical genetics responsibility
2	11 th civil chamber	2023/1669 E., 2024/4009 K.	2024	Main analysis	Prenatal diagnosis and informed consent	Down syndrome, prenatal screening	Evaluation of counseling, informed consent
3	2 nd civil chamber	2021/5966 E., 2021/9684 K.	2021	Main analysis	Paternity action	DNA testing	Primary evidence; adequacy of DNA report and requirement for expert committee evaluation
4	2 nd civil chamber	2023/1987 E., 2023/2378 K.	2023	Main analysis	Denial of parentage	Molecular genetic analysis	Primary evidence for absence of parentage relationship
5	18 th civil chamber	2015/11880 E., 2016/7576 K.	2016	Main analysis	Denial of parentage	Private genetic diagnosis center report	Private DNA report and need for official verification
6	2 nd civil chamber	2022/1067 E., 2022/2242 K.	2022	Main analysis	Denial of parentage and limitation period	Genetic-biological origin, out-of-court DNA testing	Determination of the date of knowledge for filing period
7	3 rd civil chamber	2023/1162 E., 2023/3046 K.	2023	Main analysis	Prenatal genetic testing-related laboratory responsibility	Thalassemia, Sanger sequencing, mutation analysis	Assessment of laboratory responsibility, causation, and expert reports
8	11 th civil chamber	2020/342 E., 2021/6946 K.	2021	Main analysis	Prenatal screening, informed consent, and malpractice	Down syndrome, amniocentesis, prenatal screening tests	Evaluation of medical records, informed consent, and prenatal counseling
9	5 th criminal chamber	2012/6668 E., 2013/3008 K.	2013	Main analysis	Criminal proceedings related to alleged medical negligence	Prenatal care, medical genetics expert opinion	Conflicting expert reports and need for further specialist evaluation
10	3 rd civil chamber	2020/3411 E., 2020/7269 K.	2020	Main analysis	Reimbursement/deduction dispute for medical genetics services	Medical genetics tests	Assessment of medical necessity of genetic investigations
11	13 th civil chamber	2012/10869 E., 2013/4645 K.	2013	Main analysis	Medical genetics service purchase and reimbursement dispute	Medical genetics services	Financial/legal evaluation of medical genetics service provision
12	10 th civil chamber	2009/5150 E., 2009/16257 K.	2009	Main analysis	Coverage of health expenses	PGD, HLA tissue typing, IVF, stem cell donor sibling	Evaluation of PGD/HLA-related expenses as part of necessary treatment
13	4 th civil chamber	2015/12078 E., 2017/3155 K.	2017	Secondary analysis	Personality rights and compensation following parentage dispute	DNA testing	Background evidence leading to compensation/personality rights dispute
14	8 th civil chamber	2020/946 E., 2021/5413 K.	2021	Secondary analysis	Invalidity of waiver in paternity action	DNA testing, genetic diagnosis center report	Background evidence in waiver, fraud, and procedural validity dispute
15	2 nd civil chamber	2023/49 E., 2023/2994 K.	2023	Secondary analysis	Divorce based on adultery and related compensation	Private DNA/genetic diagnosis report	Background evidence supporting adultery and parentage-related dispute
16	12 th criminal chamber	2017/1050 E., 2018/10198 K.	2018	Secondary analysis	Criminal procedural rights	Huntington disease, molecular genetic analysis	Genetic disease as background for mandatory defense counsel and fair trial concerns

CVS: Chorionic villus sampling, HLA: Human leukocyte antigen, IVF: In vitro fertilization, PGD: Preimplantation genetic diagnosis.

amniocentesis, thalassemia, Sanger sequencing, and mutation analysis. In these cases, genetic or medical-genetic issues were mainly discussed in relation to alleged missed diagnoses, inadequate counseling, informed consent, laboratory error, causation, and medical negligence (Tables 1 and 2).

Three decisions involved reimbursement or financing of medical genetics services. These included disputes regarding the necessity and financial coverage of genetic investigations, medical genetics service provision, and preimplantation genetic diagnosis with HLA tissue typing for the purpose of identifying a potential stem cell donor sibling. These decisions demonstrated that genetic services were relevant not only to malpractice and family law disputes but also to health financing and reimbursement-related litigation (Table 3).

Role of Genetic Evidence and Medical Genetic Assessment

The role of the genetic element varied according to the legal context. In 5 decisions, genetic or DNA testing served as the primary evidence, particularly in parentage or biological relationship disputes. In 3 decisions, genetic testing or prenatal diagnosis was used to assess malpractice, negligence, laboratory responsibility, or causation.

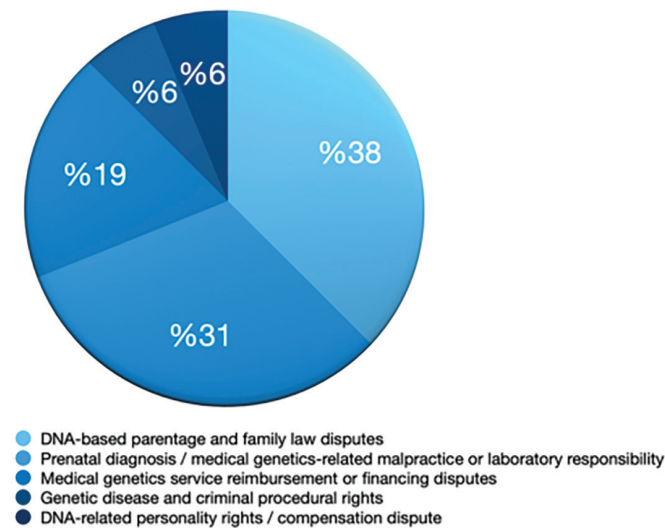


Figure 2. Pie chart showing legal contexts of individual decisions.

Table 2. Genetic and clinical themes identified in the decisions.

Genetic/clinical theme	No. of decisions	Typical legal relevance
DNA or parentage testing	6	Parentage, paternity, divorce, waiver, and compensation-related disputes
Down syndrome and prenatal screening	3	Prenatal counseling, informed consent, and alleged missed diagnosis
Medical genetics service provision/reimbursement	2	Necessity and financial coverage of genetic investigations
Thalassemia and prenatal molecular testing	1	Laboratory responsibility and interpretation of mutation analysis
PGD and HLA tissue typing	1	Coverage of IVF/PGD expenses for potential stem cell donor sibling
Huntington disease and molecular genetic analysis	1	Procedural rights and need for mandatory defense counsel
Prenatal care with medical genetics expert involvement	1	Conflicting expert opinions in alleged medical negligence
DNA-related personality rights dispute	1	Compensation after discovery of biological non-paternity
Total	16	—

HLA: Human leukocyte antigen, IVF: In vitro fertilization, PGD: Preimplantation genetic diagnosis.

In 2 decisions, the genetic issue was closely related to informed consent and counseling, especially regarding prenatal screening, amniocentesis, and the limitations or implications of genetic testing (Table 3).

In 3 decisions, the genetic element was evaluated with respect to the necessity of health services or reimbursement. These cases focused on whether genetic investigations or interventions related to genetic diagnosis should be considered medically necessary or financially covered. In 1 decision, a genetic disease was relevant to procedural rights in criminal proceedings, specifically regarding the need for mandatory defense counsel. In 2 decisions, genetic evidence served as background or supporting evidence for a related legal claim rather than forming the primary dispute itself (Table 3).

Expert Reports and Judicial Reasoning

Expert evaluation was a recurring theme across the included decisions. In parentage-related cases, the adequacy and evidentiary value of DNA reports were emphasized, including the need for reliable expert assessment when determining biological relationships. In cases related to prenatal diagnosis, medical genetics was commonly associated with expert interpretation of test results, laboratory responsibility, informed consent, and causation. Several decisions highlighted the importance of specialist evaluation, particularly in cases where the dispute involved complex prenatal testing, genetic laboratory procedures, or conflicting expert opinions.

In medical-genetics-related malpractice and laboratory-responsibility cases, expert reports were especially important in distinguishing among an unavoidable limitation of testing, a complication, and a preventable error. The decisions involving prenatal diagnosis and thalassemia testing illustrated how courts may rely on expert assessments to evaluate whether the appropriate genetic test was performed, whether the result was interpreted correctly, whether the patient was adequately informed, and whether an alleged error had a causal relationship with the claimed harm (Tables 1 and 3).

Summary of Findings

Overall, the included cases showed that genetics and medical genetics featured in decisions of the Court of Cassation across multiple legal domains. Although DNA-based parentage disputes represented the largest category, a substantial proportion of decisions involved

Table 3. Role of the genetic element in judicial reasoning.

Role of genetic element	No. of decisions	Description
Primary evidence (3–4–5–6–15)	5	Genetic/DNA test result was central to proving or disproving parentage or biological relationship
Malpractice, negligence, or laboratory responsibility assessment (1–7–9)	3	Genetic testing or prenatal diagnosis was used to evaluate alleged medical error, laboratory error, or causation
Informed consent/counseling issue (2–8)	2	Genetic or prenatal testing raised questions regarding patient counseling, test limitations, and informed consent
Health service necessity or reimbursement (10–11–12)	3	Genetic services were evaluated in relation to medical necessity, payment, or public coverage
Procedural rights/legal capacity-related issue (16)	1	Genetic disease was relevant to the defendant's procedural protection and defense rights
Background or supporting evidence (13–14)	2	Genetic evidence was not the main dispute but formed the factual basis of a related legal claim
Total	16	—

broader medical genetics issues, including prenatal diagnosis, genetic laboratory responsibility, informed consent, reimbursement of genetic services, and genetic disease-related procedural rights. These findings suggest that genetic information in high-court decisions functions not only as biological evidence, but also as a basis for evaluating medical responsibility, counseling, health service coverage, and procedural safeguards.

DISCUSSION

The principal finding of this study was that genetic and medical-genetic concepts in decisions of the Turkish Court of Cassation were not confined to DNA-based parentage disputes but also appeared across a broader range of legal contexts, including prenatal diagnosis, laboratory responsibility, informed consent, reimbursement of genetic services, and procedural rights related to genetic disease. Although DNA-based parentage and family law disputes constituted the largest category, nearly one-third of the included decisions involved prenatal diagnosis or medical genetics-related malpractice, demonstrating that genetics has already entered Turkish high court jurisprudence as a multidimensional legal issue rather than merely a tool for establishing biological relationships. This pattern is consistent with the broader international transition from conventional genetics to genomics, in which expanding genetic technologies increasingly generate legal questions related not only to biological identity, but also to clinical responsibility, counseling, interpretation, and access to services (2).

DNA-based parentage disputes constituted the most frequent legal context in the present sample. This finding is unsurprising, because DNA analysis has long been one of the earliest and most established forensic applications of genetic testing in Türkiye, with Turkish data showing its high discriminative value in disputed paternity cases (7). However, the decisions included in this study also show that the Court of Cassation does not treat DNA results as automatically dispositive; rather, it gives substantial weight to the procedural reliability of the report, including whether the analysis was performed by an appropriate expert committee and whether private reports were supported by official evaluation (Turkish Civil Code Arts. 285-309). Thus, the Turkish jurisprudential approach appears to combine recognition of the scientific strength of DNA

evidence with continued emphasis on procedural safeguards in matters affecting civil status and family relationships (8).

The most clinically significant group of decisions involved prenatal diagnosis, including cases related to Down syndrome, procedures such as chorionic villus sampling and amniocentesis, issues such as maternal cell contamination, and prenatal molecular testing for thalassemia. These decisions closely parallel the international literature on wrongful birth claims, in which the central allegation is that inadequate testing, incorrect interpretation, or insufficient counseling deprived the parents of the opportunity to make an informed reproductive decision (5,9). The Turkish cases identified in the present study reflected two recurring dimensions of liability: first, whether appropriate prenatal genetic counseling and informed consent were provided, and second, whether the genetic laboratory process was conducted and interpreted appropriately. This is important because prenatal genetic testing is not simply a technical diagnostic act; it is a process in which the clinical value of the test depends on appropriate patient selection, explanation of residual risk, accurate laboratory practice, and documentation of counseling (2-4). Therefore, the Turkish Court of Cassation decisions in this field are broadly aligned with international medico-legal concerns surrounding prenatal diagnosis and reproductive autonomy (5,9).

Another important observation was that the legal function of genetic information differed markedly across contexts. In parentage disputes, genetic testing generally served as primary evidence; in prenatal diagnosis-related cases, it was used to assess negligence, causation, laboratory responsibility, or informed consent; in reimbursement disputes, it was evaluated with respect to medical necessity and financial coverage; and in one criminal case, a genetic disease was relevant to procedural protection and to the right to counsel. This diversity shows that genetic information should not be conceptualized as a single category of proof, because its legal significance depends on the factual and normative structure of each dispute (2,10). Genetics in judicial reasoning may function as biological evidence, a marker of professional responsibility, a determinant of access to care, or a trigger for procedural safeguards.

The decisions also highlighted the central role of expert assessment in disputes involving genetics and medical genetics. Several judgments turned not merely on the existence of a genetic test

result, but on the adequacy of the expert report, the specialty of the evaluating physicians, the resolution of conflicting reports, and the completeness of the underlying medical documentation. This is particularly relevant in genetics, where the legal assessment may depend on complex issues such as sample identity, maternal contamination, test limitations, analytical performance, and the interpretation of uncertain or evolving findings (1,2). The need for qualified specialist input is likely to become even more important as clinical genetics continues to move toward broader genomic testing and reinterpretation of results over time. From a practical standpoint, these decisions reinforce the importance of careful documentation, appropriate referral, and transparent laboratory reporting in reducing legal vulnerability in genetic care.

The reimbursement-related decisions constituted another noteworthy finding of the study. In addition to disputes about payment for medical genetics services, one decision concerned the coverage of in vitro fertilization combined with preimplantation genetic diagnosis and HLA tissue typing to facilitate the birth of a potential stem-cell donor sibling. Internationally, litigation concerning preimplantation genetic diagnosis has most often focused on misdiagnosis, procedural error, and failure to inform patients of inherent error rates, whereas the Turkish decision identified in the present sample illustrates that genetic technologies may also reach the courts through questions of medical necessity and access to publicly funded care (4,11). This suggests that the legal footprint of genetics extends beyond liability into broader issues of health policy, allocation of resources, and the boundaries of reimbursable treatment.

Notably, several topics that are prominent in the international genetics-law literature did not appear in the present sample. These include duties to warn at-risk relatives, reinterpretation or reanalysis of previously reported variants, and genetic discrimination in employment or insurance (1,6,12). For example, the English case of *ABC v St George's Healthcare NHS Trust* has prompted detailed discussion of whether healthcare professionals may owe duties of care to relatives at genetic risk, while in the United States cases such as *Pate v. Threlkel* established important early principles regarding familial disclosure of hereditary risk (6,13,14). Similarly, contemporary literature has emphasized emerging legal uncertainty around variant reinterpretation and ongoing disputes regarding the scope of protection against genetic discrimination (1,12). Their absence from the present Turkish Court of Cassation sample should not be interpreted as evidence that such issues are irrelevant in Türkiye; rather, current high-court visibility appears to remain concentrated in more established domains such as parentage, prenatal diagnosis, laboratory responsibility, and reimbursement. Given that genetic data are uniquely identifying, enduring, and informative about both the individual and biological relatives, privacy and familial implications are likely to become increasingly important in future Turkish legal disputes.

The temporal distribution of the decisions also deserves comment. Although the included judgments spanned 2009–2024, nearly two-thirds were issued between 2019 and 2024, suggesting that disputes involving genetic diagnosis and medical genetics have become more visible in recent years. This pattern may reflect the increasing integration of genetic testing into clinical practice, broader

availability of prenatal and reproductive genetic technologies, and the expanding use of DNA-based evidence in family law disputes. However, because the present study relied on publicly available decisions retrieved through selected keywords, this trend should be interpreted as increased visibility within the available jurisprudence rather than as definitive evidence of a rise in litigation frequency.

The present findings have several practical implications. For medical geneticists, these decisions underscore the importance of comprehensive prenatal counseling, explicit discussion of test limitations and residual risk, and complete documentation of informed consent. For genetic laboratories, these cases demonstrate the legal importance of maintaining sample integrity, controlling contamination, selecting appropriate methods, and ensuring clear reporting practices. For courts, the findings support the need for appropriately qualified expert panels when adjudicating disputes that depend on specialized genetic knowledge. For policy-makers, the results suggest that clearer frameworks may eventually be needed not only for reimbursement and access to genetic services, but also for emerging areas such as variant reinterpretation, familial disclosure, and genetic discrimination.

Study Limitations

This study has several limitations: First, the search strategy was based on the keywords “genetic diagnosis” and “medical genetics”; therefore, decisions on related issues that used different terminology may not have been captured. Second, only publicly available Court of Cassation decisions were analyzed, and the study therefore reflects the contents of the accessible database rather than the entire genetics-related litigation in Türkiye. Third, the number of included decisions was limited, and the cases were heterogeneous, precluding comparative statistical analyses. Finally, the temporal analysis was based on decision year rather than filing year, which limits the ability to draw conclusions about changes in litigation incidence over time.

CONCLUSION

Turkish Court of Cassation decisions reveal that genetics has become a multidimensional legal issue, extending beyond parentage testing to include prenatal diagnosis, laboratory responsibility, informed consent, reimbursement, and procedural rights. At present, Turkish high court jurisprudence appears to be concentrated in the established areas of genetic practice, whereas newer genomics-related issues, such as variant reinterpretation, duties to warn relatives, and genetic discrimination have not yet been observed in the sample identified in this study. As genomic medicine continues to expand, both clinical practice and legal doctrine will likely need to adapt to increasingly complex questions concerning genetic responsibility, access, privacy, and family-linked risk.

Ethics

Ethics Committee Approval: Ethical approval was not required for this study, as it involved no human participants, patient data, or identifiable personal information.

Informed Consent: No informed consent was required for this study, as publicly available anonymized decisions were analyzed.

Footnotes

Authorship Contributions

Concept: D.D.E., Design: D.D.E., Data Collection or Processing: D.D.E., Analysis or Interpretation: D.D.E., Literature Search: D.D.E., E.T., Writing: D.D.E., E.T.

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