EVALUATION OF PRENATAL DIAGNOSIS METHODS, INDICATIONS, AND RESULTS OF RARE DISEASES: BEZMİALEM VAKIF UNIVERSITY EXPERIENCE

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PLAN

1	**INTRODUCTION**	What is “Rare Diseases”?
2	**PURPOSE**	What is the purpose of this study?
3	**METHODS**	How did we conduct our research?
4	**RESULTS**	What have we discovered?
5	**CONCLUSION**	How the results should be interpreted?

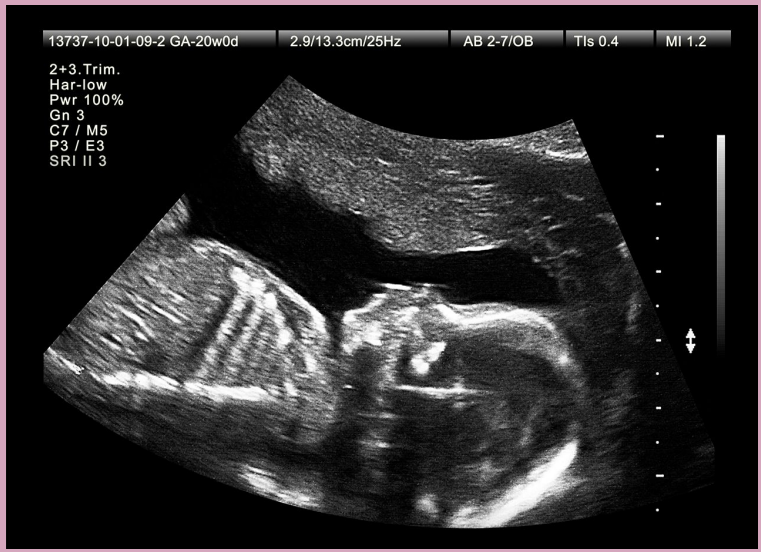
RARE DISEASES

RARE DISEASES DAY
February, 23rd

- Mostly progressive, metabolic, and chronic diseases seen in 1 in 2000 people or less
- Approximately 8000 rare diseases (RD) described in the literature and 80% of them are genetically inherited.
- 30% of children die before the first decade.

PURPOSE OF THE STUDY

- The main purpose of the study is to determine the frequency, distribution, and population profile of prenatal diagnostic tests for RD.
- Data obtained will form a basic data set for the evaluation of the effectiveness of the RD screening program in the 1st level health institutions.



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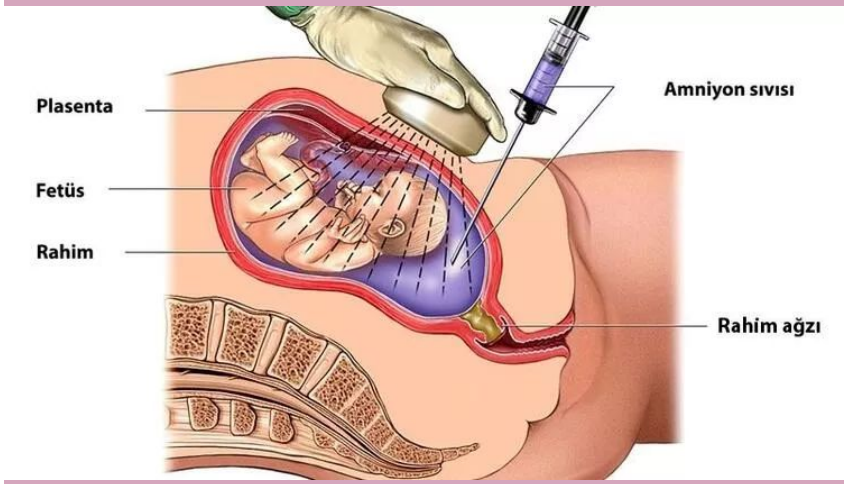
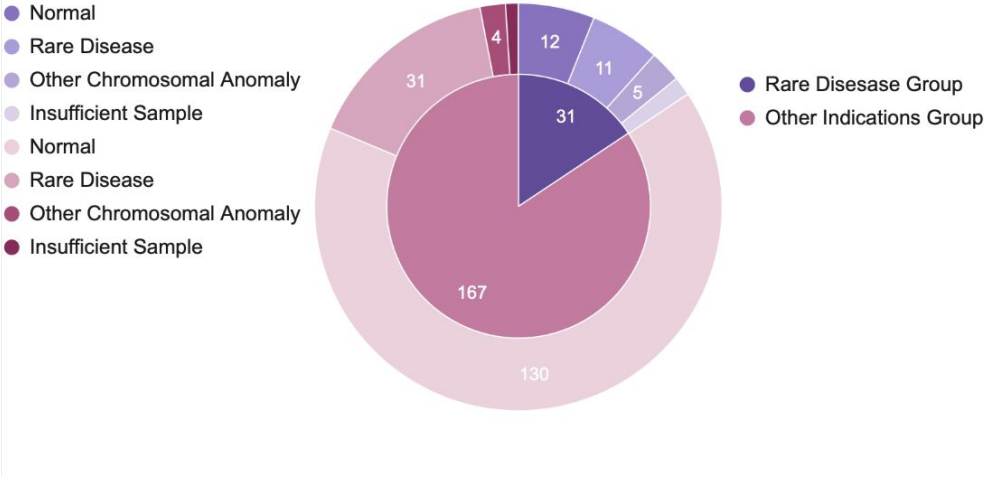
METHODS

In this study, a retrospective analysis of Prenatal Invasive Diagnostic Tests (PIDT) such as: chorionic villus sampling, amniocentesis, cordocentesis performed in Bezmialem Vakıf University, Department of Obstetrics and Gynecology between the years of 2017-2022 was evaluated.



RESULTS



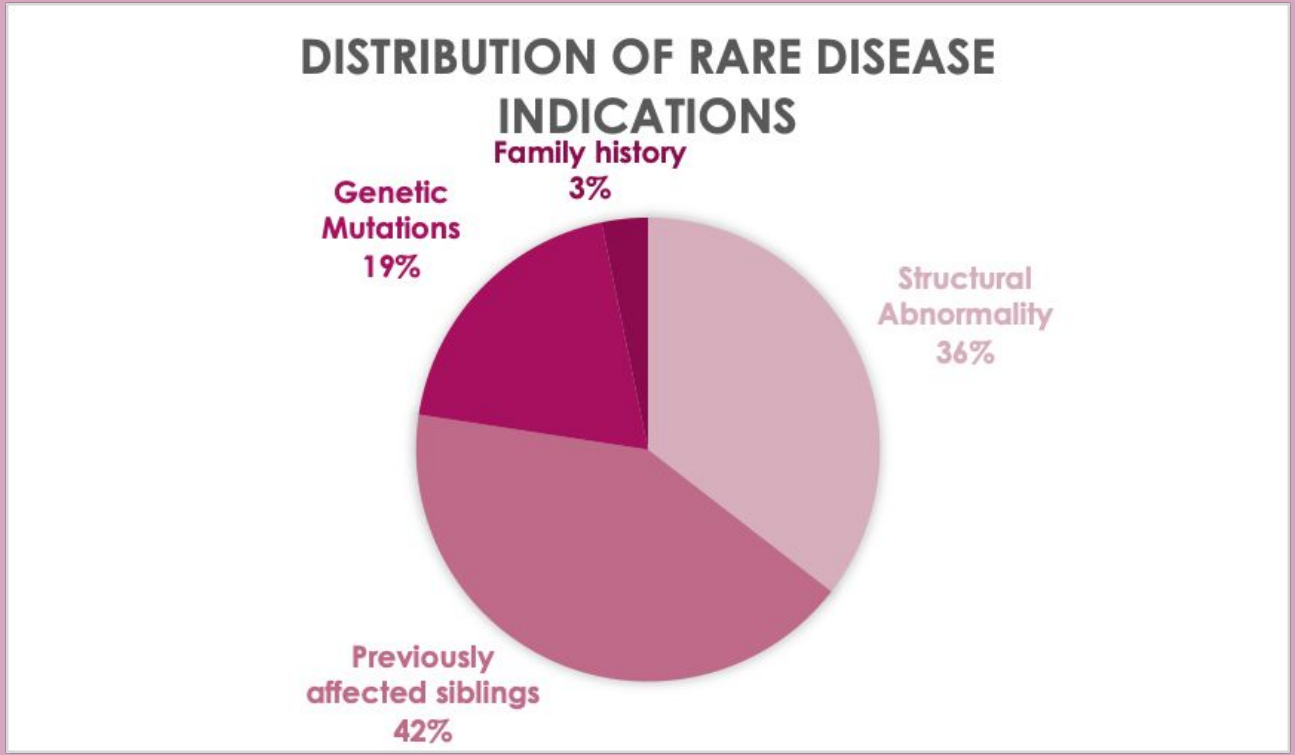
- In our clinic, 198 prenatal invasive diagnosis tests were performed.
- Results of rare disease group:
  - rare disease was seen in 11 (35.4%)
  - other chromosomal anomaly in 5 (16.1%)
- In the other indications group:
  - 31 (18.6%) chromosomal/other diseases
  - 4 (2.4%) rare diseases

RESULTS - PRENATAL INVASIVE DIAGNOSTIC TESTS

Variables	Rare	Other	Total	p
Type of diagnostic test				
- Amnio	19 (61.3%)	133 (79.6%)	152 (76.8%)	0.506
- Cvs	12 (38.7%)	31 (18.6%)	43 (21.7%)	0.011
- Cordocentesis	0	3 (1.8%)	3 (1.5%)	-
Abnormal results	16 (57.1%)	35 (21%)	51 (25.8%)	<0.001*
Insufficient samples	3 (9.7%)	2 (1.2%)	5 (2.5%)	0.028*

- The probability of a positive result in the RD group is significantly higher than the other group. (57.1%, 21.7%, p<0.001)
- The number of cases with insufficient sample were statistically significant between RD and other indications group. (9.7%, 1.2%, p=0.028)

RESULTS - INDICATIONS



RESULTS

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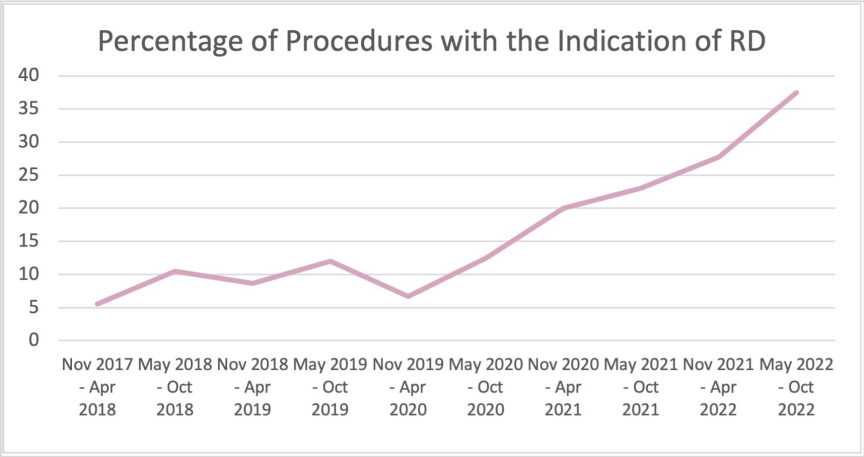
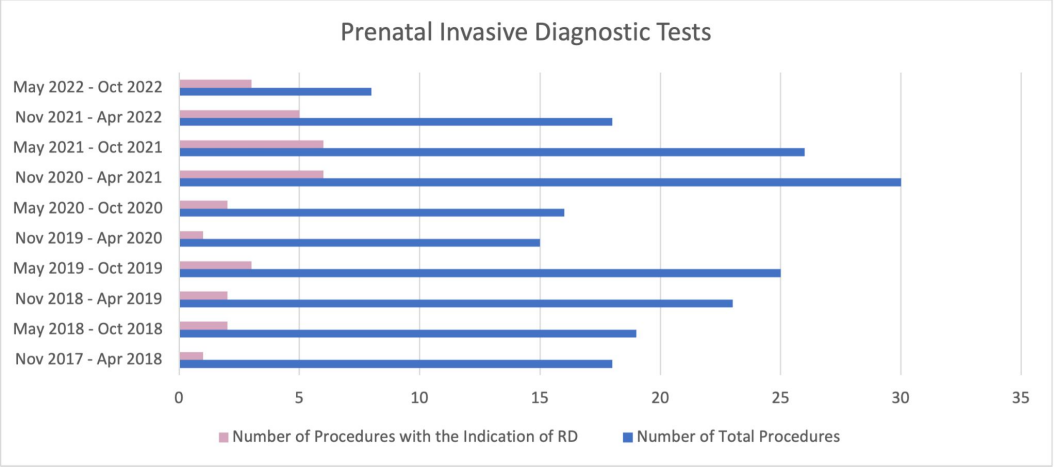
- In terms of maternal age, gestational age, gravity, and parity, there was no significant difference between two groups.
- The rate of consanguineous marriage and previous abortion was statistically higher in the RD group. ($p<0.01$, $p<0.026$)

Variables	Rare	Other	p
Maternal age	32.13±4.47	33.04±6.04	0.428
Gest. age at invasive procedure (Day)	118 ± 1.91	124 ±6.66	0.324
IVF	1 (3.2%)	5 (3%)	0.709
Gravide	3 (1-6)	2 (1-7)	0.08
Parite	1 (0 – 4)	1 (0 – 6)	0.06
Abortus	1 (0 – 4)	0 (0 – 4)	0.026*
Consanguinity	10 (32.3%)	8 (4.1%)	<0.001*

RESULTS

The line plot depicting temporal change of indication for prenatal test shows steep increase of rate of rare disease related invasive test.





CONCLUSION & DISCUSSION

Our data indicates that PIDT with the indication of RD are gradually increasing. Reasons might be:

- Increasing social awareness and use of prenatal invasive testing
- Widespread use of PGD/PGS and NIPT
- Programs implemented by the Ministry of Health.

Based on the results of this study, more effective screening programs should be enforced by health authorities to ensure these positive improvements.

Evaluation of Prenatal Diagnosis Methods, Indications and Results of Rare Diseases: Bezmialem Vakıf University Experience

Introduction: Rare diseases (RD) are mostly progressive and chronic diseases with serious morbidity and mortality, seen in 1 in 2000 people or less. Today, a great majority of RD can be detected prenatally with next generation sequencing techniques. The main purpose of this study is to determine the frequency, distribution, and population profile of prenatal invasive diagnostic tests (PIDT) for RD.

Method: In this study, a retrospective analysis of PIDT performed at Bezmialem Vakıf University, Department of Obstetrics and Gynecology between the years of 2017-2022 was evaluated.

Conclusion: Our data indicate that PIDT with the indication of RD is gradually increasing. This information leads us to believe that soon invasive tests might be primarily used for rare diseases and/or single gene mutations. More effective screening programs should be implemented by health authorities to ensure these positive improvements on rare diseases.

Results: In our clinic, 198 PIDT were performed. While 15.7% of the procedures were performed for the investigation of RD, 84.3% were for other indications. There was no significant difference in age, gestational age, or type of pregnancy between the groups. The rate of consanguineous marriage among the groups was statistically significant. (32.3%, 4.1%, $p<0.01$) In the group who underwent PIDT for RD, the results were positive in 11 (39.3%) cases and other chromosomal anomalies were seen in 5 (17.9%); while 31 patients (19.3%) were diagnosed with chromosomal/other diseases, and 4 (2.4%) with RD in the other group. The probability of a positive result in the RD group is significantly higher. (57.1%, 21.7%, $p<0.001$) The line plot depicting the temporal change of indication for prenatal test shows steep increase of rate of RD related invasive tests.

Key Words: Rare diseases, prenatal invasive diagnostic tests, amniocentesis

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REFERENCES

1. Pollard S, Weymann D, Dunne J, Mayanloo F, Buckell J, Buchanan J, et al. Towards the diagnosis of rare childhood diseases: what do parents value most?. ESHG. 2021 Apr;29:1491-1501. Available from: https://www.nature.com/articles/s41431-021-00882-1 DOI: 10.1038/s41431-021-00882-1
2. Lin L, Zhang Y, Pan H, Wang J, & Ma Y. Clinical and genetic characteristics and prenatal diagnosis of patients presented GDD/ID with rare monogenic causes. Orphanet J Rare Dis [Internet]. 2020 Nov; 15:317. Available from: https://ojrd.biomedcentral.com/track/pdf/10.1186/s13023-020-01599-y.pdf DOI: 10.1186/s13023-020-01599-y
3. Hardy T. The role of prenatal diagnosis following preimplantation genetic testing for single-gene conditions: A historical overview of evolving technologies and clinical practice. Prenatal Diagnosis. 2020;40:647-651. Available from: https://doi.org/10.1002/pd.5662

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