Presentation: Natural History Study Insights
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The Glut1 Deficiency Foundation Matrix Natural History Study is a patient-powered data collection project on the Matrix platform, done in collaboration with other rare disease organizations as part of our membership in the COMBINEDBrain consortium for neurodevelopment disorders. The Matrix platform provides a secure place to share information about symptoms, development, and medical history based on information and data provided by patients and families, which is also known as “patient reported outcomes”.

The goal of this project is to help understand the individual experiences of people who have this disease so researchers can better understand its impact on patients and how that may change over time. These insights will be critical for developing new and better ways to diagnose and treat Glut1 Deficiency.

The data presented at the Glut1 Deficiency Summit is a preliminary report of the project, and the aim is to continue collecting longitudinal data to determine the changes in symptoms throughout time, and learning more about the unique experiences of patients and families in our community.

Currently, there are 37 patients from all over the world enrolled in this project. The majority of surveys have been completed by parents or caregivers. Most participants are females, 54%, and most are within the 18 to 40 years old age range. The majority of participants, 46%, have received genetic testing, with single gene test being the most common type of test used for diagnosis. In addition, most of the participants who received genetic testing reported having a missense variant on the *SLC2A1* gene.

The ketogenic diet is the standard care of treatment for patients with Glut1 Deficiency Syndrome. The results of the study indicate that more than half of the participants have tried the ketogenic diet, with the classical 3:1 or 4:1 ratio being the most common type of diet tried.

The information for this study is collected through a series of validated surveys, and the first questionnaire is a health and development survey, or head to toe survey as we call it in our community. This survey provides a quick check up of all body systems. If participants report issues related to any of the body systems, other more in depth surveys are assigned with questions specific about that system. The results of the head to toe survey indicate that most of the participants, 94%, experience issues with the brain and nervous system, followed by issues with muscles, 72%, and issues with eyes and/or vision, 61%.

Among the most common issues with the brain and nervous system are coordination issues (96%), cognitive impairment (92%) and seizures (87%). In relation with muscles, the majority of participants reported experiencing issues in regards to muscle function (94%), followed by issues with arms and legs (67%). The third most common issue reported by participants was

issues with eyes and/or vision. The majority of them reported experiencing abnormal eye movements (65%), followed by nearsightedness (41%).

50 % of the participants reported experiencing behavioral issues with anxiety being the most common issue reported, followed by short attention span and obsessive compulsive disorder or OCD. Other less common issues reported include issues with the digestive system including feeding issues; issues with growth, including having short stature; and mothers of patients experiencing issues during pregnancy, including maternal health problems and at term complications.

Additional information collected in The Natural History Study, includes information around milestones and development. About half of the participants in the study have responded the milestones survey. The majority of participants report that patients sat alone between 9 to 12 months of age range; took first steps after 24 months of age; spoke first words between 10 to 14 months of age range and spoke first phrases after 36 months of age. Finally, the majority of participants report being toilet trained by 3 years of age.

In summary, the information presented about this project, is just a glimpse of some of the patient-reported data collected. The number of participants in the Natural History Study is still low, therefore, we cannot make any meaningful or generalized conclusions. We need to collect more information, we need more people to participate, and we want to hear everyone's voices in order to make meaningful conclusions that include the majority of the people living with Glut1 Deficiency. Everyone’s participation is key to contribute to research and to help develop new and better ways to diagnose and treat Glut1 Deficiency.