From Diagnoses to Connections: A Social Network Exploration of OCD Patients with shared previous mental health experiences

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Introduction

Obsessive-Compulsive Disorder (OCD) is a long-lasting disorder in which a person experiences uncontrollable and recurring thoughts (obsessions), engages in repetitive behaviors (compulsions), or both. People with OCD have time-consuming symptoms that can cause significant distress or interfere with daily life. [1]

This project aimed to map connections between patients diagnosed with OCD to understand how well they connect with one another. One such factor to focus on for this was shared diagnoses previously. For people with this disorder, finding community with empathic people "who get it" is a valuable resource for navigating through its various experiences. The objective of peer support is to connect with individuals at any point in their personal journey, aiming to normalize their experiences and instill hope. Peers possess the capacity to convey their own lived experiences in a manner that encourages individuals to persist in their treatment with newfound courage. [2]

Peer support networks refer to connections formed between people with a shared health condition, in this case OCD, centred around mutual support, knowledge exchange, and community building driven by shared lived experience.

Peer support matters a lot in mental health, as it removes the perceived hierarchy of influence or control that patients would feel with clinicians. The dynamic of understanding allows for sufferers to feel more comfortable and ultimately empowered by being heard or seen by someone who knows their situations. Peers are on similar footing and don't aim to provide advice, but instead offer relatable stories and increase the

likelihood of a successful recovery journey. It is increasingly recognized that individuals with OCD frequently suffer in silence for many years before actively seeking or receiving appropriate treatment. [2]

This study seeks to map OCD peer support connections specifically anchored through patients' previous mental health diagnoses. Network links will be drawn between patients that have a history of managing the same co-occurring disorders.

While prior research has examined clinical correlations and media influences, a gap exists in understanding the role of previous diagnosis-based common experiences in shaping collaborative peer support circles in OCD. The objective of this analysis is to quantitatively assess if shared mental health histories enable tighter-knit subsequent communities centred around coping with OCD.

Literature Review

The notion of peer support has a longstanding history, and in 2007, it gained official recognition as "evidence-based" by the Center for Medicare and Medicaid Services. This designation signifies that there is substantial and positive evidence indicating a correlation between peer support and sustained recovery. In the last 15 years, peer support has evolved into a recognized profession, with individuals who have lived experiences actively contributing to the recovery of others across diverse settings, including long-term in-patient facilities, private telehealth services, and various other contexts.

Research conducted by by Guazzini et al. provided initial evidence that online social media usage has measurable impacts on symptoms and outlooks of patients with various types of OCD, indicating a noticeable influence on mood. However, it did not specifically address if and how OCD patients utilize social platforms to actively connect with and support fellow peers in managing their condition. [3] This research on diagnostically-defined patient networks attempts to uncover that deeper support-oriented relationships and social capital.

Other research work done on OCD utilizing network analysis methods was aimed at connections between symptoms of OCD and correlating with other symptoms of OCD or that of other disorders.

Design

Social network analysis (SNA), built on concepts from network science, graph theory, and relational data analytics, was adopted as the core methodological paradigm for this research. Specifically, the open-source platforms Gephi and NetworkX Python were leveraged for empirically mapping and statistically analyzing patient diagnosis networks. [5][6][7]

The data underpinning the analysis consists of deidentified clinical records for a cross-sectional cohort of 1500 OCD patients accessed from the OCD Patient Demographics and Profile repository curated by data science collective Kaggle. [4] The dataset encompasses detailed attribute capture across various demographic dimensions—age, gender, ethnicity, family history—and clinical parameters—diagnosis dates, symptomatology, comorbid conditions, treatment status.

Based on the specific research objectives, the dimensions of Patient ID, Age, Gender, Previous Diagnoses, and Medications were extracted into an analytical dataset. R programming was utilized to transform this dataset into compatible node and edge list representations for ingestion into Gephi and NetworkX. Patient IDs encoded nodes while shared diagnoses defined edges.

The processed patient node and edge list data were loaded into Gephi and NetworkX to construct diagnosis networks and compute relevant network statistics like degree centrality, clustering coefficients etc. These measures were further analyzed using data science libraries such as SciPy to derive statistical significance and draw relevant inferences.

Methods

Prior to network mapping, exploratory analysis and pre-processing of the extracted patient dataset was conducted using R. Initial frequency distributions indicated a significant proportion of patients lacked documented previous diagnosis information. These missing values were dropped to enable more robust graphical mapping of diagnosis-based relationships. Additionally, all instances of 'panic disorder' mentions were programmatically standardized to the acronym convention used for other conditions (PD) to reduce terminology heterogeneity. A new frequency distribution (Figure 1) was generated, with the 4 disorders:

Generalized Anxiety Disorder (GAD), Major Depressive Disorder (MDD), Panic Disorder (PD) and, Post-Traumatic Stress Disorder (PTSD).

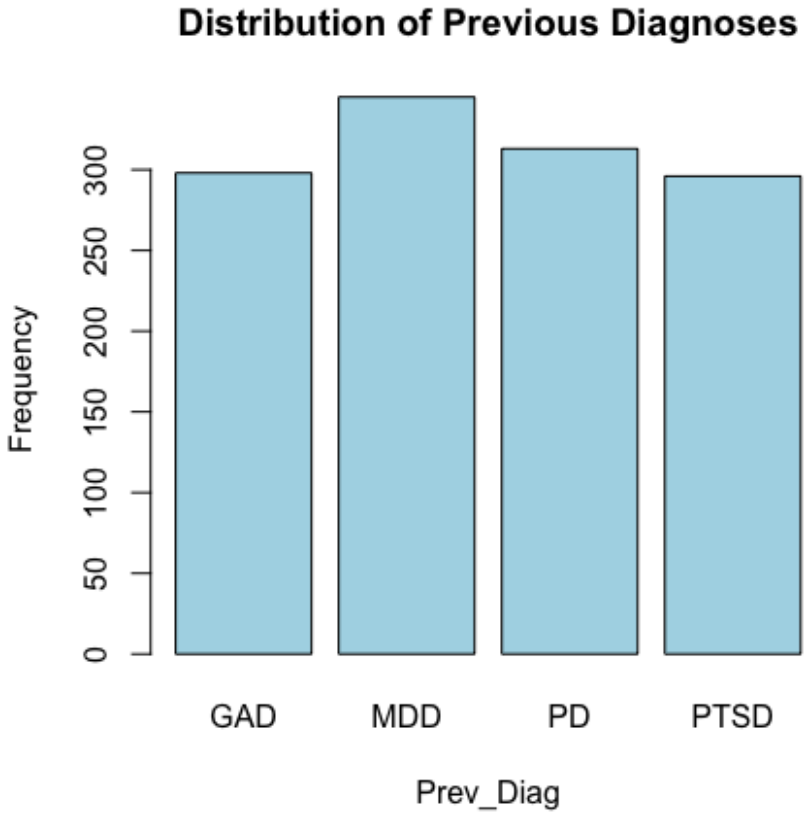

Figure 1 Distribution of past diagnoses among the patients in the database

Any duplicate patients, if found were also deleted. With the data cleansed and standardized, patients sharing common diagnoses were used as network nodes and diagnosis partnerships encoded as connection edges linking peer patients. The processed patient node and edge lists were imported into Gephi for spatialized visualization and positional statistics. For Gephi, the Yifan Hu layout is used for generation of the 'Directed Graph' with 2543 Nodes, and 221584 Edges. A similar network graph was generated in python utilizing NetworkX. Both graphs are shown in Figure 1 and Figure 2, the larger clusters are the patient nodes, with the common nodes representing the 1100 communities formed within them.

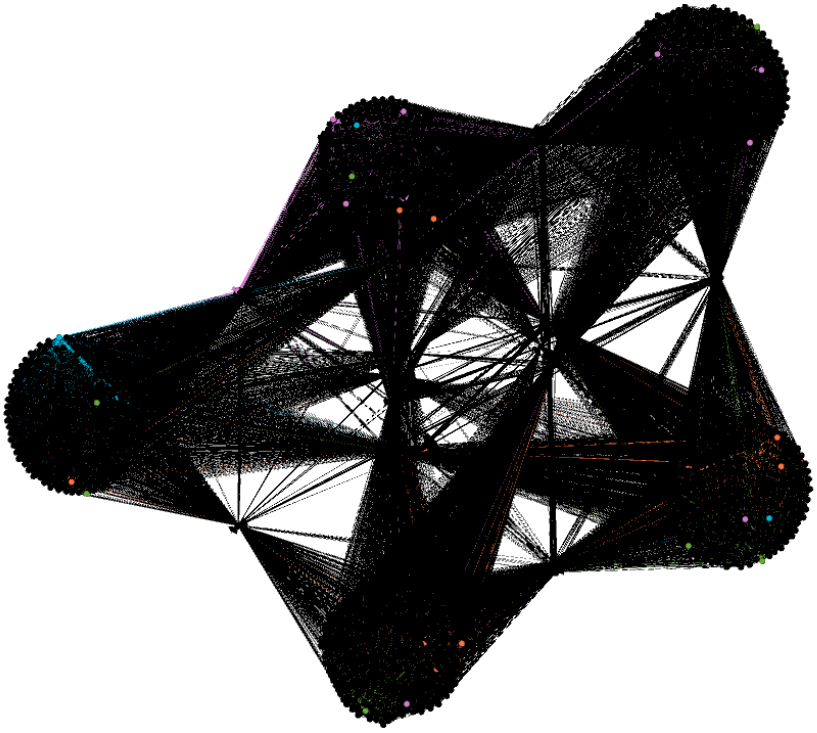

Figure 2 Network Graph in Gephi, showing the communities formed with shared diagnoses, indicating cohesive subgroups within the network

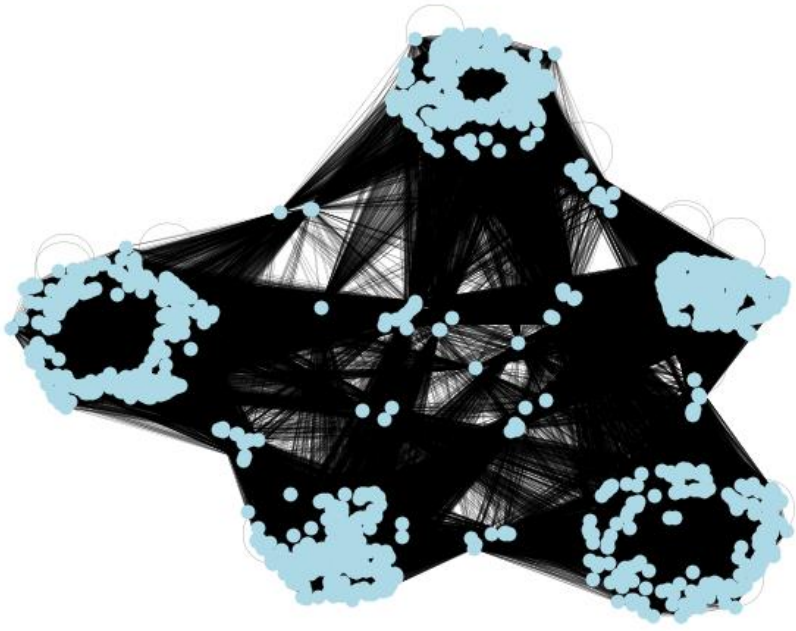

Figure 3 Network Graph in Python using NetworkX, looks similar to the Gephi graph, blue colored points are the nodes

Network connectivity metrics were exported for subsequent statistical analytics in Python computed to determine the correlation coefficient and P-value.

In summary, rigorous pre-processing and intentionally structuring the dataset as a graph enabled layered investigation—from visual layout patterns to localized statistical tests—to uncover the role of diagnostic history in nurturing empathetic peer support post OCD diagnosis.

Results

The OCD patient diagnosis network demonstrates a high density of connections, with an average degree of 87, indicating most patients are connected to dozens of peers based on shared diagnoses. However, the long average path length of 2.1 shows these connections are distributed globally rather than localized to dense clusters. The cohesive sub-groups are evident in the graphs fulfilling the goal the project started out with.

The network shows extremely high modularity at 0.688, partitioning patients into over 1100 diagnosis-based communities. Yet, the low average clustering coefficient of 0.27 indicates these communities have sparse internal connections.

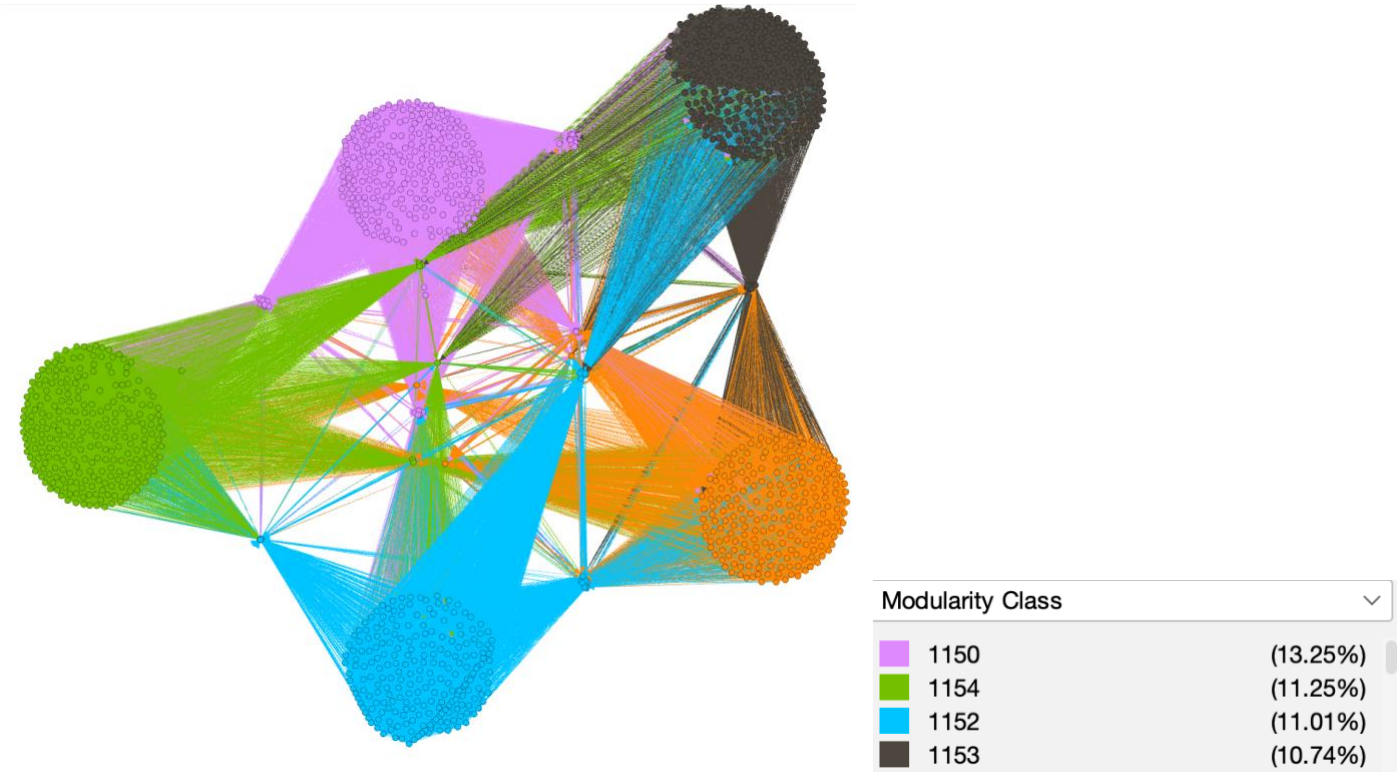

Figure 4 Partition: Modularity Class, with the description on left showing patient IDs with respective colors

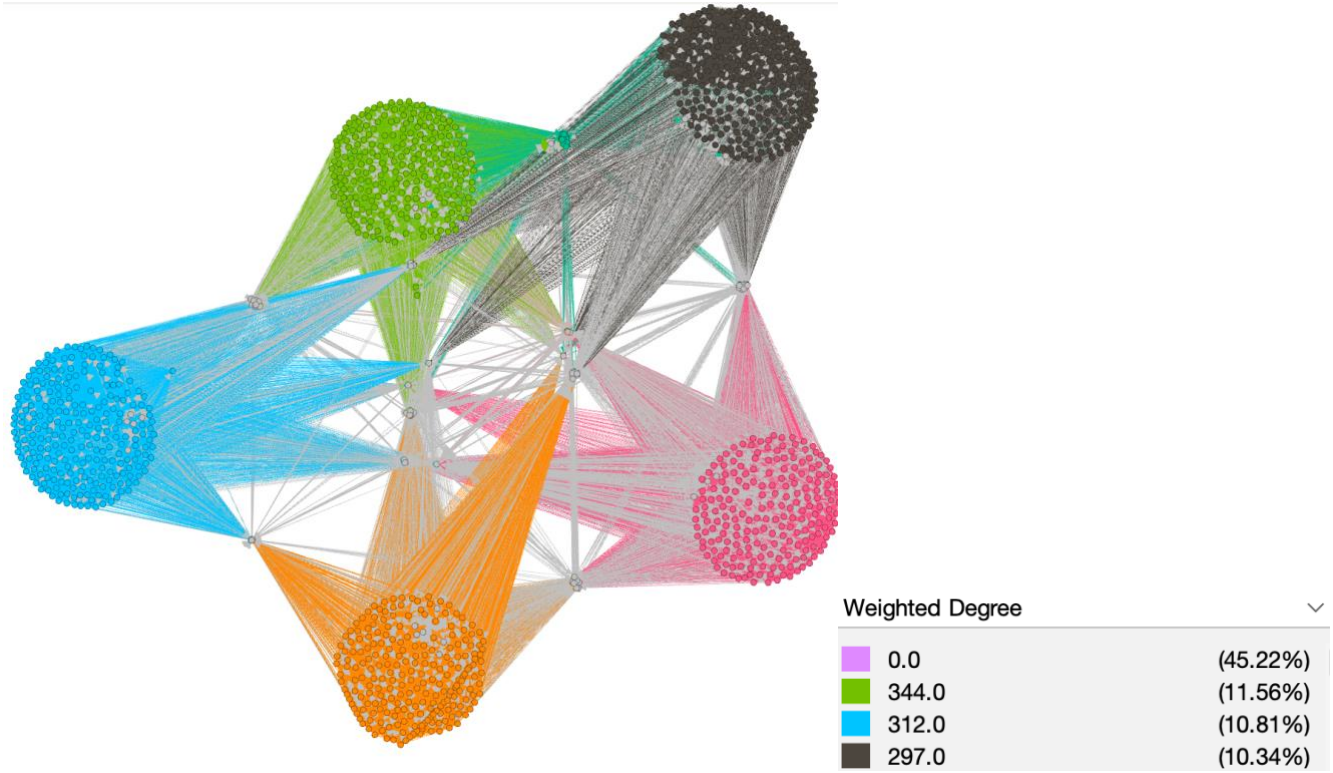

Figure 5 Partition: Weighted Degree, with 'legend' for the graph

From the network measures, correlation was calculated between the number of connections a patient has and their modularity class, the results are as shown below

- Pearson correlation coefficient: 0.738
- P-value: 0.0

The network analysis demonstrates a significant positive correlation between belonging to diagnosis-based community modules and having a higher degree centrality ($r = 0.74$, $p < 0.05$). The p-value of 0.0 suggests that this correlation is highly statistically significant.

Specifically, patients that clustered into densely connected groups with others sharing past mental health diagnoses had, on average, more peer support connections surrounding their OCD treatment.

These results provide quantitative evidence for the hypothesis that common previous experiences with mental health conditions can facilitate greater access to and engagement with support systems for OCD patients. Patients seem more willing to both provide support and seek support from peers who share overlapping psychiatric histories.

Discussion

The analysis reveals an extensive web of linkages in the patient network based on previously diagnosed conditions, evidenced by the high average node degrees. However, the lack of localized clustering suggests these diagnosis-derived relationships do not reside in tightly knit support groups.

Instead, the patterns showcase peer sharing as part of a broad tapestry of support permeating the entire OCD treatment ecosystem. Though the patients are sub-divided into numerous diagnosis-anchored communities, most peer engagement happens through random bridging ties across the whole network.

This demonstrates the pervasive and interwoven role of co-occurring patient experiences in enabling social exchange. But it also highlights untapped potential in fostering more intensely collaborative support sub-groups concentrated around specific diagnosis experiences.

The robust positive correlation between modular community membership based on shared diagnosis history and overall degree centrality has important implications for social capital and knowledge exchange dynamics among OCD patients. Belonging to modules clustered around common diagnoses like major depression, anxiety, etc. appears key to unlocking greater access to empathetic support and tailored advice among peers in the OCD treatment network.

This research primes deeper investigation into the topology and characteristics of OCD peer support networks anchored along diagnostic history. Incorporating supplemental attributes like medication regimens, symptom profiles, even social determinants of health, would paint a richer picture of peer activation phenomena. Qualitative analysis of lived experiences via patient interviews or focus groups would further contextualize the measurable patterns.

As such, designing interventions and programs that can activate these diagnosis-specific channels of support, instead of adopting a more generalist approach, may have enhanced outcomes and sustainability. Support groups anchored around dealing with OCD comorbidities could better leverage patients' experiential knowledge and willingness to engage with each other derived from shared mental health backgrounds.

Conclusion

This research extends current conceptions of diagnosis networks as purely clinical representations to encompassed conduits of social support and shared identity. Where prior mappings linked conditions based on epidemiological or phenotypic factors, this analysis reveals diagnosis histories' secondary role in nurturing empathetic communities, providing a foundation for targeted interventions and support strategies in the healthcare domain.

By spotlighting diagnosis events as pivotal moments that rewrite social scripts, unveiling possibilities for reciprocal care, these findings enrich notions of what constitutes meaningful ties for vulnerable populations on their recovery journeys.

While foundational, this diagnosis-based peer network analysis remains exploratory. However, it offers a compass for navigating more refined inquiries into support ecosystems among OCD communities. The robust correlation established here promotes collective awareness and knowledge sharing.

Further research should strive for increased technical and methodological sophistication to uncover nuanced dynamics within this narrative. Mapping these intricacies can inform tailored interventions, amplifying the power of shared experience in reducing the burden of OCD. It emphasizes diagnosis histories not merely as medical events but as fulcrums for reducing isolation on the road to recovery.

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