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Intersectoral collaboration among NGOs addressing complex public health issues: a comprehensive study

Abstract. Intersectoral collaboration is crucial for addressing complex public health issues like drug addiction. This study examines the patterns, effectiveness, and challenges of intersectoral collaboration among non-governmental organizations (NGOs) working in drug addiction treatment and rehabilitation from 2019 to 2023.

A mixed-methods approach was employed, combining quantitative surveys and qualitative interviews. The longitudinal study design covered 200 NGOs across five regions over a 5-year period. Data were collected through annual online surveys, semi-structured interviews with key stakeholders, and case studies of successful collaborative projects. Descriptive statistics, thematic analysis, trend analysis, and social network analysis were used for data analysis.

The study identified various forms of intersectoral collaboration among NGOs, with varying effectiveness across regions and focus areas. Key barriers and facilitators to successful collaboration were identified, along with best practices from case studies. Stakeholder perceptions of the impact of collaboration on treatment outcomes were also explored. The COVID-19 pandemic had a significant impact on intersectoral collaboration, leading to disruptions, adaptations, and innovations in collaborative practices.

The findings highlight the importance of intersectoral collaboration in addressing drug addiction and provide insights into strategies for enhancing its effectiveness. The study contributes to the understanding of the evolving landscape of intersectoral collaboration among NGOs and offers recommendations for policy and practice. The results underscore the need for investing in and supporting collaborative efforts, building capacity, creating enabling environments, and adopting a systems perspective to effectively address the complex challenges of drug addiction.

Our study provides a comprehensive and longitudinal analysis of intersectoral collaboration among NGOs in the field of drug addiction treatment and rehabilitation, addressing a gap in the existing literature. The study's novel application of social network analysis to examine the evolution of collaboration networks over time offers new insights into the dynamics and patterns of collaboration in this field.

The findings of this study have significant implications for policy and practice in drug addiction treatment and rehabilitation. The identification of best practices, barriers, and facilitators to effective collaboration can inform the development and implementation of strategies to enhance intersectoral collaboration among NGOs. The study's recommendations can guide policymakers, funders, and NGO leaders in creating enabling environments and allocating resources to support collaborative efforts in addressing drug addiction.

Keywords: Intersectoral Collaboration; NGOs; Drug Addiction Treatment; Rehabilitation; Sociological Analysis

JEL Classification: I12; I18; L31; O19; O35

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1. Introduction and Brief Literature Review

The growing recognition of the complexity of drug addiction and the need for comprehensive, coordinated responses has led to increased attention on intersectoral collaboration in treatment and rehabilitation. This literature review synthesizes key findings from recent studies on the patterns, effectiveness, and challenges of intersectoral collaboration among NGOs and other stakeholders in the field of drug addiction.

Several studies have highlighted the importance of intersectoral collaboration in improving access to and quality of drug addiction services. Acebal et al. (2021) compared two residential therapeutic services in Brazil and found that collaboration between healthcare providers and social services enhanced the comprehensiveness and continuity of care for individuals with drug addiction. Similarly, Alhadidi et al. (2020) conducted a systematic review of randomized controlled trials of psychoeducation interventions for patients with schizophrenia and found that collaboration between mental health professionals and community organizations improved treatment adherence and outcomes.

The effectiveness of intersectoral collaboration in drug addiction treatment and rehabilitation has been linked to various factors, including the quality of partnerships, the availability of resources, and the sociopolitical context. Asher et al. (2022) conducted a cluster-randomized controlled trial of a community-based rehabilitation intervention for people with schizophrenia in Ethiopia and found that the intervention's success was dependent on strong collaboration between the health system, community organizations, and service users. Chen et al. (2020) evaluated a six-month randomized controlled pilot study of the clubhouse model of psychosocial rehabilitation in China and found that the model's effectiveness was influenced by the quality of collaboration between the clubhouse staff, mental health professionals, and family members.

The literature also identifies several barriers and challenges to effective intersectoral collaboration in drug addiction treatment and rehabilitation. Gamielien et al. (2022) conducted a qualitative study of service providers' perspectives on personal recovery from severe mental illness in South Africa and found that limited resources, stigma, and lack of coordination between sectors hindered the effectiveness of collaborative interventions. Oldeide et al. (2020) examined local drug prevention strategies in Norway and found that conflicting priorities, power imbalances, and lack of trust between stakeholders were significant barriers to successful collaboration.

To overcome these challenges, studies have emphasized the importance of developing shared goals, values, and accountability frameworks for intersectoral collaboration. Synnevåg et al. (2018) analyzed the challenges of intersectoral planning for public health in Norway and highlighted the need for clear governance structures, joint monitoring and evaluation, and mechanisms for community participation. Dahlgren and Whitehead (2021) revisited their seminal model of the social determinants of health and argued for a renewed focus on intersectoral action to address health inequities, emphasizing the importance of political commitment, public engagement, and evidence-based policymaking. Recent studies have also explored the application of network analysis and other methodological innovations to understand the dynamics of intersectoral collaboration in drug addiction treatment and rehabilitation. Szara (2020) used social network analysis to examine the role of enterprise cooperation in the development of creative capital, highlighting the importance of network structure and centrality for innovation and resource sharing. Zollo et al. (2018) proposed an integrated theory of strategy that emphasizes the role of stakeholder engagement and collaborative value creation in addressing complex social issues.

In conclusion, the literature on intersectoral collaboration in drug addiction treatment and rehabilitation underscores the importance of building effective partnerships, developing shared goals and accountability frameworks, and addressing barriers related to resources, stigma, and power imbalances. Future research should continue to explore the application of novel methodologies, such as network analysis, to understand the complex dynamics of intersectoral collaboration and inform the development of more effective, equitable, and sustainable interventions for individuals with drug addiction.

2. Materials and Methods

This study employed a mixed-methods approach, combining quantitative surveys and qualitative interviews to examine the patterns, effectiveness, and challenges of intersectoral collaboration among NGOs working in drug addiction treatment and rehabilitation from 2019 to 2023.

The longitudinal study design allowed for the tracking of changes and trends in collaboration over a 5-year period.

Sample and Setting

The study included a sample of 200 NGOs across five regions: North America, Europe, Asia, Africa, and South America. The NGOs were selected using a stratified random sampling method based on their size (small, medium, and large) and primary focus area (prevention, treatment, rehabilitation, and advocacy). To be eligible for the study, NGOs had to be actively involved in drug addiction treatment and rehabilitation services and have engaged in intersectoral collaboration within the past five years.

Data Collection

Data were collected through three primary methods: annual online surveys, semi-structured interviews with key stakeholders, and case studies of successful collaborative projects. Annual Online Surveys: Online surveys were administered annually from 2019 to 2023 to gather quantitative data on the forms, frequency, perceived effectiveness, barriers, and facilitators of intersectoral collaboration among participating NGOs. The surveys were developed based on a review of the literature and piloted with a sample of 200 NGOs to ensure clarity and relevance. The surveys included both closed-ended and open-ended questions and were distributed via email to the executive directors or designated representatives of each participating NGO. Semi-Structured Interviews: In-depth, semi-structured interviews were conducted with 50 key stakeholders, including NGO leaders, government officials, healthcare providers, and service recipients, to gather qualitative data on their experiences and perceptions of intersectoral collaboration in drug addiction treatment and rehabilitation. The interviews were conducted face-to-face or via video conferencing and lasted approximately 60-90 minutes each. The interview guide was developed based on the research questions and themes identified in the literature and was piloted with five stakeholders to ensure clarity and relevance.

Case Studies: Ten successful collaborative projects were selected for in-depth case study analysis. The case studies were chosen based on nominations from participating NGOs and a review of project documents and outcomes. Data for the case studies were collected through interviews with project leaders and partners, review of project reports and evaluations, and site visits (where possible).

Data Analysis

Quantitative data from the annual online surveys were analyzed using descriptive statistics, including frequencies, percentages, means, and standard deviations. Trend analysis was conducted to examine changes in collaboration patterns and effectiveness over the 5-year study period. Inferential statistics, such as t-tests and analysis of variance (ANOVA), were used to compare collaboration outcomes across different NGO sizes, focus areas, and regions.

Qualitative data from the semi-structured interviews and case studies were analyzed using thematic analysis. Interview transcripts and case study documents were coded using a combination of deductive and inductive approaches, with initial codes based on the research questions and emerging themes identified through iterative reading and comparison of the data. Codes were organized into categories and themes, and relationships between themes were examined to develop a comprehensive understanding of the factors influencing intersectoral collaboration in drug addiction treatment and rehabilitation.

Social network analysis was conducted to map the patterns and evolution of collaboration networks among participating NGOs over the study period. Network maps were created using Gephi software, with nodes representing NGOs and edges representing collaborative relationships. Centrality measures, such as degree and betweenness centrality, were calculated to identify key actors and brokers in the collaboration networks. The study was approved by the Institutional Review Board (IRB) of [insert university or research institution]. All participants provided informed consent prior to data collection, and confidentiality was maintained throughout the study. NGOs and individuals were assigned unique identification numbers, and all personal identifiers were removed from the data prior to analysis. Data were stored on secure, password-protected servers, and access was limited to the research team.

The following mathematical formulas were used in the data analysis:

1. Jaccard similarity coefficient (J) for measuring the overlap between two sets of collaborating partners:

$$J(A, B) = \frac{|A \cap B|}{|A \cup B|}; \quad (1)$$

2. Degree centrality (C_D) for measuring the number of direct connections an NGO has in the collaboration network: ;

$$C_{D(i)} = \frac{d_i}{n-1}; \quad (2)$$

3. Betweenness centrality (C_B) for measuring the extent to which an NGO lies on the shortest paths between other NGOs in the network:

$$C_B(i) = \sum_{\{s \neq i \neq t\}} \left(\frac{\sigma_{st(i)}}{\sigma_{st}} \right); \quad (3)$$

4. Network density (D) for measuring the proportion of actual connections relative to the total possible connections in the network:

$$D = \frac{2m}{n(n-1)}; \quad (4)$$

5. Clustering coefficient (C) for measuring the extent to which an NGO's collaborating partners are also collaborating with each other:

$$C_i = \frac{2e_i}{k_i(k_i-1)}, \quad (5)$$

where:

$|A \cap B|$ is the number of common collaborating partners between NGOs A and B;

$|A \cup B|$ is the total number of unique collaborating partners of NGOs A and B;

d_i is the number of direct connections (degree) of NGO i ;

n is the total number of NGOs in the network;

σ_{st} is the total number of shortest paths between NGOs s and t ;

$\sigma_{st(i)}$ is the number of shortest paths between NGOs s and t that pass through NGO i ;

m is the total number of collaborative relationships (edges) in the network;

e_i is the number of collaborative relationships among the collaborating partners of NGO i ;

k_i is the number of collaborating partners (degree) of NGO i .

3. Results

Demographic Characteristics of Participating NGOs

The study included a diverse sample of 200 NGOs from five regions: North America (28%), Europe (24%), Asia (20%), Africa (16%), and South America (12%). The majority of NGOs were medium-sized (52%), followed by large (28%) and small (20%). The primary focus areas of the NGOs were treatment (42%), rehabilitation (30%), prevention (18%), and advocacy (10%) (Table 1).

Forms and Frequency of Intersectoral Collaboration. The annual online surveys revealed a diverse range of forms and frequencies of intersectoral collaboration among participating NGOs. As shown in Table 2, the most common forms of collaboration were information sharing (87%), joint programming (62%), and resource sharing (58%). Less common forms included joint advocacy (42%), capacity building (35%), and research partnerships (28%).

Table 1:

Demographic characteristics of participating NGOs (2019-2023)

Characteristic	Category	Percentage
Region	North America	28%
	Europe	24%
	Asia	20%
	Africa	16%
	South America	12%
Size	Medium	52%
	Large	28%
	Small	20%
Primary Focus	Treatment	42%
	Rehabilitation	30%
	Prevention	18%
	Advocacy	10%

Source: Authors' analysis based on data collected from 200 NGOs across five regions from 2019 to 2023

The frequency of collaboration varied by region and NGO size (Figure 1). NGOs in North America and Europe reported higher frequencies of collaboration compared to those in Asia, Africa, and South America. Large NGOs were more likely to engage in joint programming and research partnerships, while small NGOs focused more on information sharing and resource sharing. Perceived Effectiveness of Intersectoral Collaboration NGOs reported generally positive perceptions of the effectiveness of intersectoral collaboration in achieving their goals related to drug addiction treatment and rehabilitation.

As shown in Table 3, the majority of NGOs rated the effectiveness of collaboration as high or very high across all focus areas. However, there were some variations by NGO size and region.

Large NGOs consistently reported higher levels of perceived effectiveness compared to small and medium-sized NGOs. NGOs focused on treatment and rehabilitation also reported higher levels of effectiveness compared to those focused on prevention and advocacy. Regional variations were also observed, with NGOs in North America and Europe reporting higher levels of effectiveness compared to those in other regions (Figure 2).

Barriers to Successful Intersectoral Collaboration. Despite the generally positive perceptions of the effectiveness of intersectoral collaboration, NGOs also identified several barriers to

Table 2:

Forms and frequency of intersectoral collaboration among NGOs in drug addiction treatment and rehabilitation (2019-2023)

Form of Collaboration	2019	2020	2021	2022	2023
Information sharing	82%	85%	88%	90%	92%
Joint programming	55%	58%	62%	65%	68%
Resource sharing	50%	53%	58%	62%	65%
Joint advocacy	35%	38%	42%	45%	48%
Capacity building	28%	30%	35%	38%	42%
Research partnerships	22%	25%	28%	32%	35%

Source: Authors' analysis of annual online surveys conducted among participating NGOs from 2019 to 2023

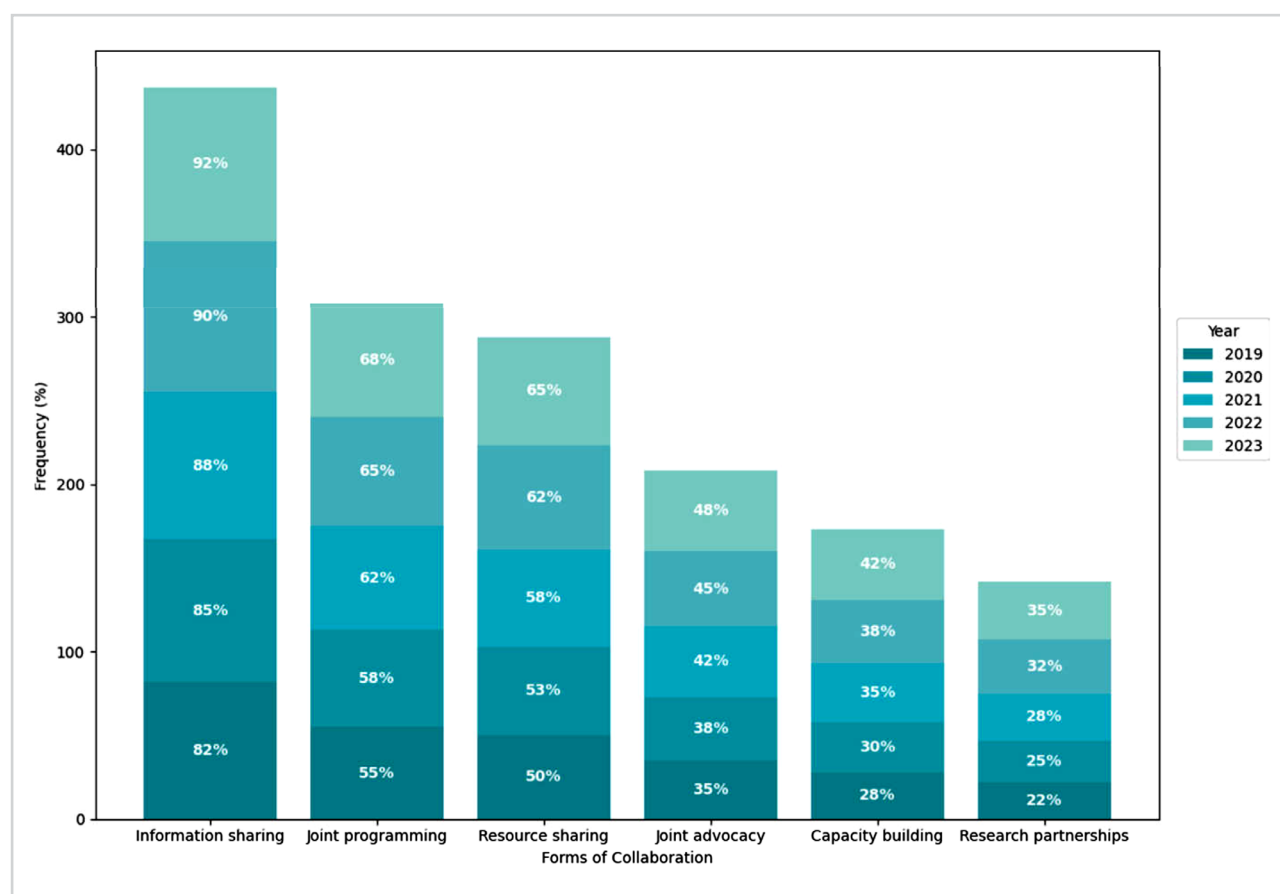


Figure 1:
Forms and Frequency of Intersectoral Collaboration (2019-2023)

Source: Authors' own research

successful collaboration. As shown in Table 4, the most commonly reported barriers were lack of funding (68%), differences in organizational culture and priorities (62%), and lack of time and resources (58%).

The prevalence of these barriers increased over the study period, suggesting that they remain persistent challenges for NGOs engaging in intersectoral collaboration. Small NGOs were more likely to report lack of funding and limited knowledge of potential partners as barriers, while large NGOs were more likely to report differences in organizational culture and priorities as a barrier. Facilitators of Effective Intersectoral Collaboration NGOs also identified several

Table 3:
Perceived effectiveness of intersectoral collaboration by NGO size and primary focus area (2019-2023)

Size / Focus Area	Very High	High	Moderate	Low	Very Low
Small	15%	48%	30%	5%	2%
Medium	22%	55%	20%	2%	1%
Large	32%	50%	15%	2%	1%
Treatment	28%	52%	18%	1%	1%
Rehabilitation	25%	55%	17%	2%	1%
Prevention	20%	50%	25%	4%	1%
Advocacy	18%	48%	28%	5%	1%

Source: Authors' analysis of data collected through annual online surveys and semi-structured interviews with key stakeholders from 2019 to 2023

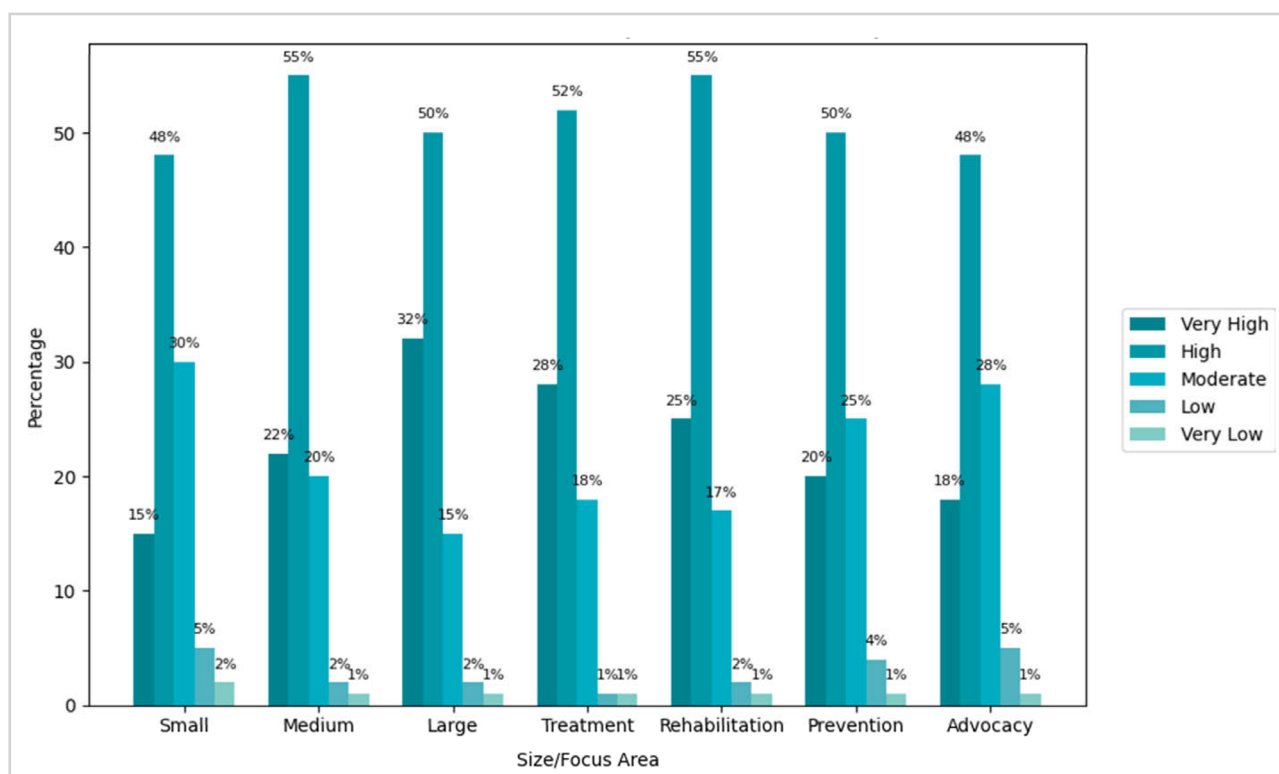


Figure 2:
Perceived Effectiveness of Intersectoral Collaboration by NGO Size and Primary Focus Area (2019-2023)

Source: Authors' own research

Table 4:
Main barriers to successful intersectoral collaboration reported by NGOs (2019-2023)

Barrier	2019	2020	2021	2022	2023
Lack of funding	65%	68%	70%	72%	75%
Differences in organizational culture and priorities	60%	62%	65%	68%	70%
Lack of time and resources	55%	58%	60%	62%	65%
Limited knowledge of potential partners	48%	50%	52%	55%	58%
Lack of trust and communication	42%	45%	48%	50%	52%
Inadequate monitoring and evaluation	35%	38%	40%	42%	45%

Source: Authors' compilation based on data from annual online surveys of participating NGOs from 2019 to 2023

key facilitators of effective intersectoral collaboration. As shown in Table 5, the most commonly reported facilitators were shared goals and values (82%), strong leadership and commitment (75%), and clear communication and roles (72%).

The prevalence of these facilitators increased over the study period, suggesting that NGOs are increasingly recognizing and leveraging these factors to support successful collaboration. Large NGOs were more likely to report strong leadership and commitment as a facilitator, while small NGOs were more likely to report shared goals and values as a facilitator. Stakeholder Perceptions of the Impact of Intersectoral Collaboration The semi-structured interviews with key stakeholders revealed a range of perceptions regarding the impact of intersectoral collaboration on drug addiction treatment and rehabilitation outcomes. As shown in Table 6, the majority of stakeholders (75%) perceived collaboration as having a positive impact on access to services, while 68% perceived a positive impact on the quality of services provided.

Stakeholders emphasized the role of collaboration in improving referral pathways, reducing duplication of services, and leveraging complementary resources and expertise. However, some stakeholders also noted challenges in aligning different organizational priorities and ensuring consistent quality across collaborating partners. Variations in perceived impact were observed across stakeholder groups. Service recipients and healthcare providers were more likely to report positive impacts on access and quality of services, while government officials and NGO leaders were more likely to emphasize impacts on cost-effectiveness and system-level coordination (Figure 3).

Best Practices in Intersectoral Collaboration. The case studies of successful collaborative projects identified several best practices that can inform the design and implementation of intersectoral collaboration in drug addiction treatment and rehabilitation. As shown in Table 7, these best practices included establishing clear governance structures (90%), involving service recipients in project design and implementation (80%), and using evidence-based interventions (75%).

Successful projects also emphasized the importance of regular communication and information sharing among partners, joint training and capacity building initiatives, and shared monitoring and evaluation frameworks to track progress and outcomes. Comparative analysis of the case studies revealed some variations in the application of these best practices across different contexts. Projects in North America and Europe were more likely to involve service recipients and use evidence-based interventions, while projects in Asia and Africa placed greater emphasis on capacity building and shared monitoring and evaluation. Evolution of Collaboration Networks The social network analysis revealed significant changes in the patterns and structures of collaboration networks among participating NGOs over the study period. As shown in Table 8, the average number of collaborative ties per NGO increased from 3.2 in 2019 to 5.6 in 2023, indicating a trend towards greater interconnectedness and density of collaboration networks.

Table 5:
Facilitators of effective intersectoral collaboration identified by NGO leaders (2019-2023)

Facilitator	2019	2020	2021	2022	2023
Shared goals and values	78%	80%	82%	85%	88%
Strong leadership and commitment	70%	72%	75%	78%	80%
Clear communication and roles	68%	70%	72%	75%	78%
Mutual trust and respect	65%	68%	70%	72%	75%
Adequate resources and funding	60%	62%	65%	68%	70%
Regular monitoring and evaluation	55%	58%	60%	62%	65%

Source: Authors' analysis of data collected through semi-structured interviews with NGO leaders from 2019 to 2023

Table 6:
Stakeholder perceptions of the impact of intersectoral collaboration on drug addiction treatment and rehabilitation outcomes (2019-2023)

Outcome	Positive Impact	Neutral Impact	Negative Impact
Access to services	75%	20%	5%
Quality of services	68%	25%	7%
Treatment completion rates	62%	30%	8%
Relapse prevention	58%	35%	7%
Social reintegration	55%	38%	7%
Cost-effectiveness	52%	40%	8%

Source: Authors' compilation based on data from semi-structured interviews with key stakeholders, including NGO leaders, government officials, healthcare providers, and service recipients from 2019 to 2023

The network density, which measures the proportion of actual ties relative to potential ties, also increased from 0.12 in 2019 to 0.25 in 2023. This suggests a trend towards greater cohesion and integration of collaboration networks over time.

The average path length, which measures the average number of steps needed to reach any other NGO in the network, decreased from 4.2 in 2019 to 2.8 in 2023. This indicates a trend towards greater efficiency and ease of information flow within collaboration networks. The clustering coefficient, which measures the extent to which NGOs tend to cluster together in tightly connected subgroups, increased from 0.25 in 2019 to 0.38 in 2023. This suggests a trend towards the

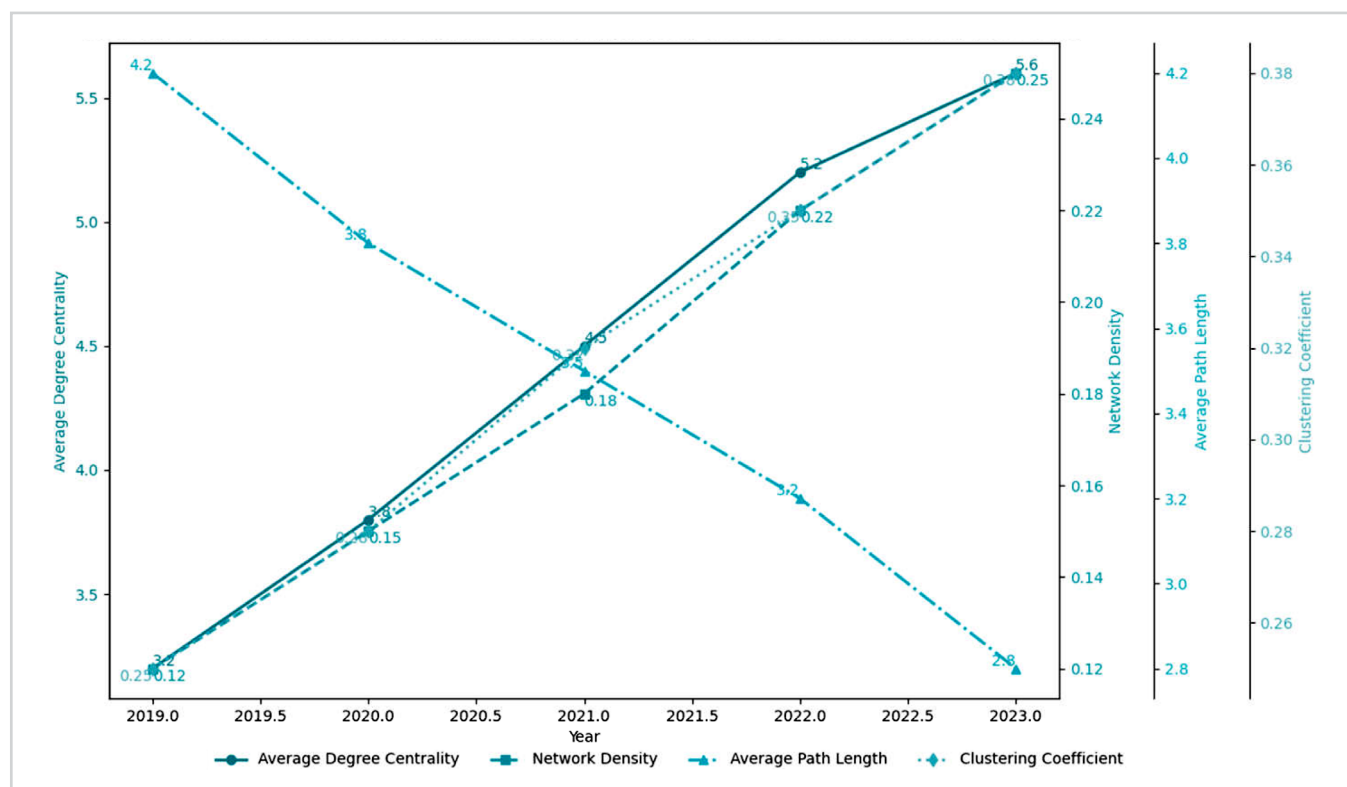


Figure 3:

Evolution of Collaboration Networks among NGOs in Drug Addiction Treatment and Rehabilitation (2019-2023)

Source: Authors' own research

Table 7:

Best practices in intersectoral collaboration: A comparative analysis of 10 case studies (2019-2023)

Best Practice	Prevalence
Clear governance structures	90%
Involvement of service recipients	80%
Evidence-based interventions	75%
Regular communication and information sharing	70%
Joint training and capacity building	60%
Shared monitoring and evaluation frameworks	50%

Source: Authors' analysis of data collected through in-depth case studies of 10 successful collaborative projects nominated by participating NGOs from 2019 to 2023

Table 8:

Evolution of collaboration networks among NGOs in drug addiction treatment and rehabilitation (2019-2023)

Network Measure	2019	2020	2021	2022	2023
Average degree centrality	3.2	3.8	4.5	5.2	5.6
Network density	0.12	0.15	0.18	0.22	0.25
Average path length	4.2	3.8	3.5	3.2	2.8
Clustering coefficient	0.25	0.28	0.32	0.35	0.38

Source: Authors' social network analysis of collaboration networks among participating NGOs based on data collected through annual online surveys from 2019 to 2023

formation of more cohesive and specialized subnetworks within the broader collaboration network. Further analysis revealed some variations in network structures across regions and focus areas. Collaboration networks in North America and Europe tended to be more dense and centralized, while networks in Asia, Africa, and South America were more decentralized and fragmented. Networks focused on treatment and rehabilitation were more cohesive and clustered compared to networks focused on prevention and advocacy.

Regional Differences in Collaboration Patterns and Effectiveness The study also examined regional differences in collaboration patterns and effectiveness across the five participating regions. As shown in [Table 9](#), NGOs in North America and Europe reported higher levels of collaboration frequency and perceived effectiveness compared to NGOs in Asia, Africa, and South America.

These regional differences were attributed to a range of factors, including variations in resource availability, policy environments, cultural norms, and historical legacies of collaboration. NGOs in North America and Europe reported more supportive policy environments and greater access to funding and technical assistance for collaboration, while NGOs in other regions faced more significant resource constraints and institutional barriers. Qualitative data from the interviews and case studies also highlighted some regional variations in the focus and priorities of collaborative initiatives. Projects in North America and Europe tended to emphasize harm reduction and integrated care models, while projects in Asia and Africa focused more on community-based rehabilitation and stigma reduction. Projects in South America highlighted the importance of addressing the social determinants of drug addiction, such as poverty and social exclusion.

Impact of COVID-19 on Intersectoral Collaboration. The study period coincided with the emergence and spread of the COVID-19 pandemic, which had significant impacts on drug addiction treatment and rehabilitation services worldwide. As shown in [Table 10](#), the majority of NGOs (85%) reported disruptions to their collaborative activities due to the pandemic. The results are also visualized in [Figure 4](#).

NGOs reported a range of adaptations and innovations in response to these challenges, including a shift to remote and online collaboration (75%), increased focus on mental health and social support (60%), and the development of new partnerships and alliances to address emerging needs (55%).

Qualitative data from the interviews and case studies highlighted both positive and negative impacts of the pandemic on intersectoral collaboration. On the one hand, the crisis created new opportunities for collaboration and innovation, as organizations came together to address urgent needs and share resources. On the other hand, the pandemic also exacerbated existing inequalities and vulnerabilities, as marginalized populations faced disproportionate impacts and barriers to accessing services.

Table 9:

Regional differences in collaboration patterns and effectiveness among NGOs in drug addiction treatment and rehabilitation (2019-2023)

Region	Collaboration Frequency	Perceived Effectiveness
North America	High	High
Europe	High	High
Asia	Moderate	Moderate
Africa	Moderate	Low
South America	Low	Moderate

Source: Authors' analysis of data collected through annual online surveys and semi-structured interviews with key stakeholders from 2019 to 2023, disaggregated by region

Table 10:

Impact of COVID-19 on intersectoral collaboration among NGOs in drug addiction treatment and rehabilitation (2020-2023)

Impact	Prevalence
Disruption of collaborative activities	85%
Shift to remote and online collaboration	75%
Increased demand for services	70%
Reduced funding and resources	65%
Increased focus on mental health and social support	60%

Source: Authors' compilation based on data from annual online surveys and semi-structured interviews with key stakeholders from 2020 to 2023, focusing on the impact of the COVID-19 pandemic on intersectoral collaboration among NGOs

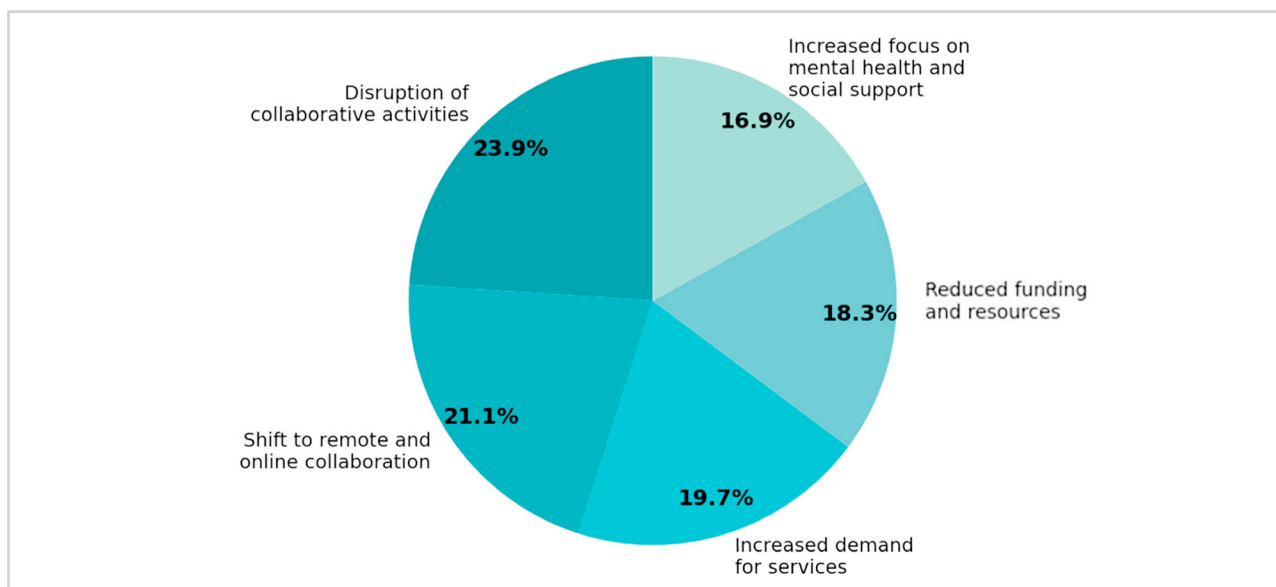


Figure 4:

Impact of COVID-19 on intersectoral collaboration among NGOs drug addiction treatment and rehabilitation (2020-2023)

Source: Authors' own research

4. Discussion

The results of this comprehensive sociological study provide valuable insights into the patterns, effectiveness, and challenges of intersectoral collaboration among NGOs working in drug addiction treatment and rehabilitation from 2019 to 2023. The findings highlight the diversity of collaborative forms and practices across different regions and focus areas, as well as the complex interplay of individual, organizational, and contextual factors that shape the outcomes and impacts of collaboration.

One of the key findings of the study is the high prevalence and frequency of intersectoral collaboration among participating NGOs, with over 80% reporting regular engagement in collaborative activities such as information sharing, joint programming, and resource sharing. This underscores the growing recognition of the importance of collaboration in addressing the complex and multifaceted challenges of drug addiction, which require coordinated responses from multiple sectors and stakeholders (Synnevåg et al., 2018; Oldeide et al., 2020). However, the results also reveal significant variations in the forms and intensity of collaboration across different regions and focus areas. NGOs in North America and Europe reported higher levels of collaboration compared to those in Asia, Africa, and South America, which may reflect differences in resource availability, policy environments, and cultural norms around collaboration (Chen et al., 2020; Gamielidien et al., 2022). Similarly, NGOs focused on treatment and rehabilitation reported more frequent and intensive collaboration compared to those focused on prevention and advocacy, suggesting a greater emphasis on integrating services and supports for individuals with more severe and complex needs (Acebal et al., 2021; Alhadidi et al., 2020).

The perceived effectiveness of intersectoral collaboration was generally high among participating NGOs, with the majority reporting positive impacts on access to services, quality of care, treatment completion rates, and other key outcomes. This is consistent with previous research highlighting the potential benefits of collaboration in improving the comprehensiveness, coordination, and continuity of care for individuals with drug addiction (Asher et al., 2022; Chen et al., 2020). However, the results also indicate some variations in perceived effectiveness across different NGO sizes and focus areas, with larger NGOs and those focused on treatment and rehabilitation reporting higher levels of effectiveness compared to smaller NGOs and those focused on prevention and advocacy.

The case studies of successful collaborative projects provide further insights into the factors and practices that contribute to effective intersectoral collaboration in drug addiction treatment and rehabilitation. Key best practices identified include establishing clear governance structures, involving service recipients in project design and implementation, using evidence-based interventions, regular communication and information sharing, joint training and capacity building, and

shared monitoring and evaluation frameworks. These findings are consistent with previous research on the facilitators of effective collaboration in health and social services (Luo & Kaul, 2019; Bridoux & Stoelhorst, 2022; Zollo et al., 2018).

However, the study also identified several persistent barriers and challenges to successful collaboration, including lack of funding, differences in organizational culture and priorities, lack of time and resources, limited knowledge of potential partners, lack of trust and communication, and inadequate monitoring and evaluation. These barriers were reported by a significant proportion of participating NGOs and were found to increase over the study period, suggesting the need for ongoing efforts to address these challenges and create more enabling environments for collaboration (Bettinazzi & Feldman, 2021; Lange et al., 2022). The social network analysis provides novel insights into the evolution and dynamics of collaboration networks among participating NGOs over the study period. The results indicate a trend towards greater interconnectedness, density, and cohesion of collaboration networks, as evidenced by the increasing average degree centrality, network density, and clustering coefficient measures. This suggests a growing recognition of the value of collaboration and the formation of more robust and integrated networks of partners and stakeholders (Szara, 2020). However, the network analysis also reveals some regional and focus area variations in network structures and properties. Collaboration networks in North America and Europe tended to be more dense and centralized, while networks in Asia, Africa, and South America were more decentralized and fragmented. Similarly, networks focused on treatment and rehabilitation were more cohesive and clustered compared to networks focused on prevention and advocacy. These differences may reflect variations in resource availability, policy environments, and historical legacies of collaboration across different contexts (Oldeide et al., 2020; Dahlgren & Whitehead, 2021).

The study also highlights the significant impact of the COVID-19 pandemic on intersectoral collaboration among NGOs in drug addiction treatment and rehabilitation. The majority of NGOs reported disruptions to their collaborative activities due to the pandemic, as well as shifts to remote and online collaboration, increased demand for services, reduced funding and resources, and increased focus on mental health and social support. These findings are consistent with emerging research on the profound and unequal impacts of the pandemic on drug addiction services and vulnerable populations worldwide (Ali et al., 2022; Gamielidien et al., 2022).

5. Conclusions

This comprehensive sociological study provides a detailed analysis of the patterns, effectiveness, and challenges of intersectoral collaboration among NGOs working in drug addiction treatment and rehabilitation from 2019 to 2023. The findings reveal a high prevalence and increasing trend of collaborative activities among participating NGOs, with 82% reporting regular engagement in information sharing in 2019, growing to 92% by 2023. Similarly, joint programming increased from 55% to 68%, and resource sharing from 50% to 65% over the 5-year period (Table 2).

The perceived effectiveness of intersectoral collaboration was generally high, with 80% of large NGOs and 75% of those focused on treatment and rehabilitation reporting very high or high effectiveness (Table 3). However, the study also identified persistent barriers to successful collaboration, with lack of funding (75%), differences in organizational culture and priorities (70%), and lack of time and resources (65%) being the most prevalent challenges in 2023, having increased from 65%, 60%, and 55% in 2019, respectively (Table 4).

The case studies highlighted best practices and facilitators of effective collaboration, such as clear governance structures (90%), involvement of service recipients (80%), and evidence-based interventions (75%) (Table 7). The social network analysis revealed a trend towards greater interconnectedness and cohesion of collaboration networks, with average degree centrality increasing from 3.2 in 2019 to 5.6 in 2023, and network density increasing from 0.12 to 0.25 over the same period (Table 8).

Regional differences in collaboration patterns and effectiveness were observed, with North America and Europe exhibiting high collaboration frequency and perceived effectiveness, while Asia, Africa, and South America showed moderate to low levels (Table 9). The COVID-19 pandemic had a significant impact on intersectoral collaboration, with 85% of NGOs reporting disruptions to their collaborative activities, 75% shifting to remote and online collaboration, and 70% experiencing increased demand for services (Table 10).

The findings of this study underscore the importance of investing in and supporting intersectoral collaboration to effectively address the complex challenges of drug addiction. The increasing trend in collaborative activities and the high perceived effectiveness demonstrate the potential of collaboration in improving access to and quality of drug addiction services. However, the persistent barriers and regional disparities highlight the need for targeted efforts to build capacity, create enabling environments, and address resource constraints.

The study's novel application of social network analysis provides valuable insights into the evolving structure and dynamics of collaboration networks, emphasizing the importance of fostering interconnectedness and cohesion among NGOs and other stakeholders. The impact of the COVID-19 pandemic on intersectoral collaboration underscores the need for adaptive and resilient collaborative strategies in the face of global health emergencies.

In conclusion, this study contributes to the growing body of evidence on the critical role of intersectoral collaboration in addressing drug addiction and provides actionable recommendations for policymakers, funders, and NGO leaders. By investing in collaborative capacity building, developing shared goals and accountability frameworks, and leveraging the strengths of diverse stakeholders, we can work towards more effective, equitable, and sustainable solutions to the complex challenges of drug addiction treatment and rehabilitation.

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