

INTEGRATED COLLABORATIONS IN TWENTE

A qualitative study to the Integrated Care for Overweight and Diabetes in Twente: Exploring Professionals' Role Fulfillment and its Impact on GLI and NDC Interventions.

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Abstract

Introduction: The growing challenges of overweight and diabetes severity call for effective interventions like GLI and NDC. Integrated collaborations are considered crucial for addressing overweight and diabetes. This study examines the extent to which professionals fulfill their roles within integrated collaborations and how this impacts the functioning of GLI and NDC interventions in Twente municipalities. Moreover, the study explores the barriers and facilitators shaping professionals' role fulfillment.

Methods: Through qualitative interviews and quantitative program data analysis, this study investigates professionals' roles, participant intake, dropout rates, and transition to local sports activities. Patterns of role fulfillment, barriers, and facilitators were synthesized to gain a comprehensive understanding.

Results: Professionals exhibited a strong understanding of their roles. Effective role fulfillment seems to correlate with successful functioning of the interventions. Specific roles, such as GP referrals and comprehensive intakes by GLI providers, were pivotal for intake, minimizing dropouts, and promoting engagement in local sports. Key barriers included complex resident backgrounds, time constraints, and economic considerations. Essential facilitators encompassed streamlined communication, intrinsic motivation among professionals, and having short lines.

Discussion and Conclusion: The degree of role fulfillment of professionals seems to have an influence on the functioning of the GLI and NDC. Crucially, roles like GP referrals and thorough intakes play a pivotal part in influencing participant intake, dropout rates, and community sports involvement. Municipality size affects the level of collaborative integration. These findings yield valuable insights for enhancing existing collaborative models and give practical tools for the development of new ones.

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1. Introduction

The prevalence of people who are overweight is a national problem for which there is no solution yet in the Netherlands.[1] While in 1990 33% of the Dutch population over the age of 18 was overweight, this had already risen to 56% in 2021.[2]

Looking at the different regions in the Netherlands, an average percentage of overweight people in Twente in 2020 of no less than 53.2% (52.1-54.4.CI 95%) can be seen.[3] Besides that, the average of people with severely overweight in Twente was 16.3% (15,5-17,2 CI 95%). Being overweight is considered when a person has a BMI of 25 or higher, and being severely overweight is considered when a person has a BMI of 30 and higher. The averages of overweight and seriously overweight in the Netherlands are 49.4% and 14.3%.[3] This indicates that Twente's prevalence of overweight and severe overweight is relatively higher than the national average. This indicates a notable number of individuals in the region facing weight-related concerns.

Being overweight is often accompanied by comorbidities, such as diabetes mellitus, also known as type 2 diabetes. The likelihood of developing diabetes is increased among individuals with excess weight, as their weight serves as a contributing factor. Specifically, individuals with a body mass index (BMI) of 30 or higher face a 28% increased risk of developing diabetes.[4]

There are currently more than 1.1 million people with diabetes in the Netherlands. Given the chronic nature of this disease, it comes with high healthcare costs. In 2019, the costs related to diabetes were 1.3 billion euros. Diabetes is ranked high among the top 10 diseases with the highest burden of disease.[5] Like many diseases, the disease burden also continues to increase as the diabetes patient ages.[6]

In addition to the social burden, namely the high healthcare costs of having diabetes, there is also a lot of impact on the individual. A study conducted by Zurita-Cruz et al. showed that diabetes patients have a relatively poor quality of life. Factors that affect the quality of life of these patients the most are social functioning, physical limitations, and mental health.[7]

Lastly, it's worth noting that the prevalence of chronic illnesses, such as diabetes, is somewhat higher in Twente compared to the national average in the Netherlands. This is why the focus of this study is on addressing both overweight and diabetes.[8]

Prevention has become increasingly important to reduce this upcoming trend of the increasing number of people with overweight and diabetes. The Dutch government also recognizes that healthcare is under enormous pressure. That is why the Integral Care Agreement (IZA) also proposes prevention in the broadest sense of the word.[9] The prevention of overweight and diabetes mainly focuses on lifestyle factors like exercise, nutrition, sleep, and stress management. [10,11] Along with lifestyle factors, socio-economic, psychological, and medication factors are all important in the prevention of being overweight.[11] Commitment to the prevention of overweight and diabetes can contribute to physical health, emotional well-being, reduction in disability, lower social and healthcare costs, and lower pressure on the healthcare system in the long term.[12]

Two initiatives are implemented in the region of Twente to reduce the increasing trend in the number of diabetes patients and overweight people, are the GLI and the NDC. The GLI (Gecombineerde Leefstijl Interventie) stands for Combined Lifestyle Intervention and has 6 different programs. Among them are De BeweegKuur, SLIMMER, Cool, Samen Sportief in Beweging, X-Fitt GLI and Keer Diabetes2 Om.[13] These programs have a duration of two years during which participants receive multiple forms of professional guidance, including support from a dietitian, physiotherapist, lifestyle coach, or remedial therapist. However, in the COOL program, the guidance is primarily provided by the lifestyle coach. The focus of these programs is on exercise, nutrition, and behavioral change. This is done with the aim of promoting sustainable behavioral change and fostering a healthy lifestyle. Given the combination of lifestyle, nutrition, behaviour, and the fact that the first indications of the effectiveness of these programs were found in 2019, the recognized effective interventions De Beweegkuur, Cool, and SLIMMER have been included in basic insurance since 2019. Later, the other 3 GLI interventions, Samen Sportief in Beweging, X-Fitt GLI, and Keer Diabetes2 Om, were added.[14] This means that people who qualify for the GLI, which is determined by the general practitioner (GP), are being reimbursed by their health insurance. However, the costs associated with exercising during, and after completing, the GLI are often for the participants themselves. These costs

typically encompass expenses associated with engaging in exercise, such as membership fees or gym subscriptions.

In addition to the GLI, in the region of Twente, various municipalities also started the NDC (Nationale Diabetes Challenge). It is an intervention by the Bas van de Goor Foundation. During this intervention, participants walk for 20 weeks under the guidance of a walking supervisor once a week. During these walks, different lifestyle themes can be discussed.

In addition to people with pre-diabetes and diabetes, those at an increased risk of chronic diseases can also participate. The intervention is concluded with an NDC festival where the participants are completely in the spotlight, and they walk a certain distance for which they have trained. All this is to allow participants to experience a positive exercise experience to give behavioral change a significant boost.[15]

Individuals who are overweight often face underlying factors that contribute to the risk of obesity, such as financial difficulties, psychological issues, or unemployment.[16] In Appendix 10.2, a framework outlining the underlying causes of obesity is presented. This is a framework that provides an overview of all factors that play a role in the development of overweight.[17]

When examining the region of Twente, it becomes evident that it faces significant socio-economic challenges. With above-average unemployment rates, below-average disposable income, and poor health indicators, an integrated approach is necessary in Twente.[18]

Considering the numerous adverse consequences of being overweight and the multifaceted nature of its causes, it is suggested to deliver prevention efforts through integrated collaborations.[19] These integrated collaborations involve various professionals and organizations working together to provide optimal and coordinated support for a specific target group, in this case, individuals with overweight and (pre) diabetes.[20]

The objective of such integrated collaborations is to deliver timely and tailored assistance based on the individual's needs. It encompasses the social domain, medical domain, sports, public health, and prevention. [21,22] By adopting this integrated approach, the underlying issues faced by citizens can be more effectively addressed. This is achieved through improved communication and cooperation among professionals, allowing each expert to contribute their expertise more efficiently. A study conducted by Valentijn et al. (2013) demonstrated the importance of effective professional integration in achieving successful integrated collaboration. This involves all professionals in a collaboration having well-defined roles and responsibilities to ensure comprehensive care for a specific group of individuals. For integrated collaboration to be effective, it's crucial that all organizations and professionals involved carry out their tasks and responsibilities properly.[23]

There are numerous bottlenecks known from previous research that impede integrated collaboration around the GLI and the NDC. These bottlenecks are primarily due to the fact that these organizations may have different ways of approaching collaboration, unique ways of conducting their work, and distinct organizational cultures. Communication is often difficult; responsibilities are unclear and existing laws and regulations are not in line with the NDC and GLI.[24] There are three categories in which the bottlenecks of integral collaboration can be categorized, namely laws and regulations, financing bottlenecks, and collaboration-specific bottlenecks. These include issues such as conflicting regulations between different organizations, difficulty obtaining financing for projects, and difficulty working together due to different working methods and cultures. Each of these issues can create a barrier to effective collaboration and hinder progress toward the goals of the NDC and GLI.

Twentse Koers has been set up with the purpose of ensuring that this integrated collaboration runs smoothly and achieves healthier living conditions for the residents of Twente. The Twentse Koers partnership is a strategic regional collaboration among 14 municipalities in the province of Twente, the health insurer and care office Menzis, GGD Twente, and the province of Overijssel. In addition to these parties involved, there is also intensive collaboration with welfare organisations, care providers, care groups, general practitioners, residents' initiatives, and debt counselling organizations. The vision of Twentse Koers is to achieve more healthy life years for citizens.

The Twentse Koers have helped with facilitating the implementation of local integrated collaborations in several municipalities around the GLI and NDC.

Given the relatively recent establishment of integrated collaborations in the selected six municipalities, there is currently insufficient knowledge about the extent to which these collaborations contribute to the improved functioning of the GLI and NDC interventions. This research seeks to provide deeper insights into the degree to which integrated collaboration enhances the effectiveness of these interventions. By doing so, it aims to address the challenges posed by the overweight and diabetes trend, thereby facilitating the improvement of existing integrated collaborations and the successful establishment of new ones.

2. Reading guide

- **Aim of the Study:** This section outlines the insights that need to be gained from this study to ultimately answer the research question. The sub-questions are discussed here.
- **Theoretical Framework:** This section elaborates on the essential models, concepts, and information used or required to address the sub-questions.
- **Methodology:** This section comprehensively describes how the research is conducted and how answers are provided to the various research questions.
- **Results:** This part presents a case-based elaboration of the sub-questions, with an overview at the end.
- **Discussion:** This section interprets the results.
- **Conclusion:** This part provides an answer to the research question.
- Appendix:
 - **Roles Overview:** Summary of the roles of involved professionals as outlined in the project plan.
 - **Framework for Obesity Causes:** Overview of all factors influencing the development of obesity.
 - **Topic List:** The interview schedule that formed the basis of the conducted interviews.
 - **Facilitators and Barriers:** Detailed elaboration of various facilitators and barriers categorized by professional.

3. Aim of the study

This research aims to assess the effectiveness of the integrated approach in Twente by examining its impact on the functioning of the GLI and NDC interventions. Currently, there is limited available information to gauge the effectiveness of integrated collaboration due to its recent implementation in Twente and the absence of prior evaluations. Thus, the objective of this research is to contribute to the assessment of integrated collaboration's effectiveness in relation to the GLI and NDC interventions. Conducting this study seeks to fill the existing knowledge gap and provide valuable insights into the effectiveness of integrated collaboration in Twente.

The effectiveness of collaboration is dependent on the fulfillment of predetermined roles by all professionals involved. A well-functioning collaboration is indicated when every individual within the integrated collaboration successfully performs their assigned roles. When evaluating the functioning of the GLI and NDC interventions, it is crucial to assess the degree to which professionals within the integrated collaboration fulfill their respective roles. This research aims to identify the barriers and facilitators experienced by professionals in carrying out their roles. By understanding these factors, we can gain insights into why some professionals excel in fulfilling their roles while others face challenges. The research question derived from this is:

"To what extent do professionals, involved in integrated collaboration, fulfill their roles and having an impact on the functioning of the GLI and NDC, and what are the barriers and facilitators that explain the fulfillment of professionals' roles?"

In order to address the main research question, it is imperative for professionals themselves to have a clear awareness of their roles in relation to the GLI and NDC, as this enables them to effectively fulfill their responsibilities.[23] This study explores how professionals perceive their roles in relation to the GLI and NDC and whether these align with predefined roles. The first sub-question is therefore also: *"What are the roles of the professionals involved in the local integrated collaboration regarding the GLI and NDC, and how do these professionals perceive these roles themselves?"*

To explore the potential relation between role fulfillment and the functioning of the GLI and NDC interventions, it is crucial to assess the extent to which professionals effectively carry out their assigned roles.[23] So therefore it is important to determine the extent of role fulfillment in each municipality. The second sub-question is: *"To what extent do professionals involved in local integrated collaborations fulfill their roles regarding to the functioning of the GLI and NDC?"*

In order to examine the functioning of the GLI and NDC interventions within a municipality, it is important to operationalize the functioning of these interventions. This operationalization entails analyzing three crucial aspects: the number of participants, dropout rates, and the successful transition of participants to local sports and exercise facilities. At the municipality level, we investigate these three aspects to explore potential correlations between the fulfillment of professionals' roles and the functioning of the interventions. The third sub-question is as follows: *"How many people start, dropout and move on to local sport/exercise offerings when participating in the GLI and NDC?"*

In order to gain a deeper understanding of role fulfillment among professionals, this study additionally investigates the perceived barriers and facilitators encountered by these professionals. By examining the factors that impede or assist professionals in effectively executing their roles, valuable insights into the dynamics and challenges associated with role fulfillment within a municipality can be gained.[25] The fourth sub-question addressed in this study is as follows: *"What are the facilitators and barriers that professionals encounter in fulfilling their roles within the local integrated collaboration?"*

Finally, the study investigates whether there is a relationship between the degree of role fulfillment and the functioning of the GLI and NDC interventions. This examination is framed as sub-question 5, which seeks to answer: *"What is the relation between the role fulfillment of professionals in the local integrated collaboration and the functioning of the GLI and NDC?"*

In summary, this report examines the impact of integrated collaboration on lifestyle interventions within the GLI and NDC. It aims to address research questions and provide recommendations for enhancing integrated collaboration within specific municipalities, while also highlighting successful practices. Furthermore, the report will offer insights for establishing integrated collaborations in other municipalities. Additionally, it will aid in the internal evaluation of partner organizations involved in the integrated collaboration.

The main question:

1. To what extent do professionals, involved in integrated collaboration, fulfill their roles and having an impact on the functioning of the GLI and NDC, and what are the barriers and facilitators that explain the fulfillment of professionals' roles?

The corresponding sub-questions are:

1. What are the roles of the professionals involved in the local integrated collaboration regarding the GLI and NDC, and how do these professionals perceive these roles themselves?
2. To what extent are the professionals involved in the local integrated collaborations fulfilling their roles regarding the functioning of the GLI and NDC?
3. How many people start, dropout and move on to local sport/exercise offerings when participating in the GLI and NDC?
4. What are the facilitators and barriers that professionals face in fulfilling their roles in the local integrated collaboration?
5. What is the relation between the role fulfilment of the professionals in the local integrated collaboration and the functioning of the GLI and NDC

4. Theoretical framework

In this chapter, we present essential key concepts, theories, and additional information necessary to address the sub-questions of the study. We lay the foundation by discussing the integrated collaboration approach, the GLI and NDC interventions, and the roles of professionals involved. Moreover, we delve into a relevant theory, such as the COM-B model, which provides a framework for understanding the barriers and facilitators that influence professionals' role fulfillment. This knowledge serves as a basis for the study and analysis.

COM-B Model

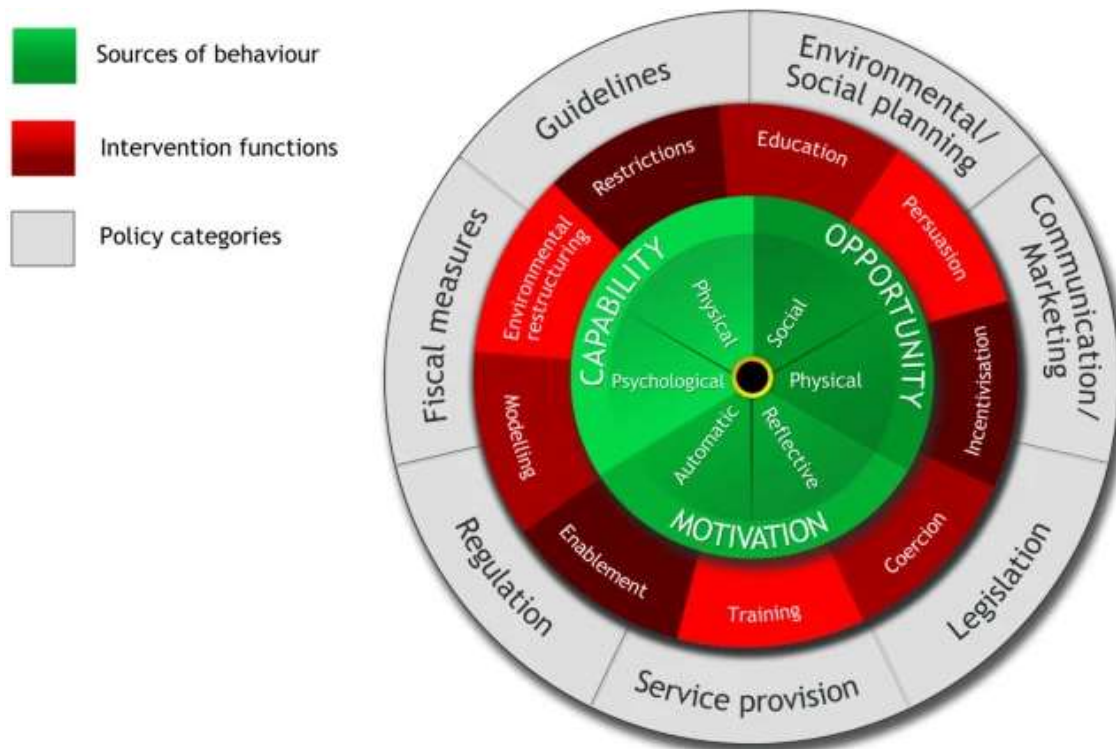
For integrated collaboration to function effectively, it is crucial to ensure high levels of role fulfillment among professionals within the municipality. The COM-B model, based on the behavior change wheel, is in this study utilized to identify the barriers and facilitators experienced by professionals in fulfilling their roles within the integrated collaboration.[26] This model is depicted in *Figure 1* and consists of different layers.

The innermost layer of the model represents the target behavior, which in this study refers to the professional's role within the integrated collaboration. The second layer identifies the necessary factors that must be present in sufficient quantities for the performance of the target behavior.[26] These factors include physical capability, psychological capability, automatic motivation, reflective motivation, physical opportunity, and social opportunity. The third layer of the COM-B model pertains to the levels at which these behaviors occur, namely Opportunity, Motivation, and Capability. Capability refers to an individual's capacity to perform the required tasks, motivation refers to the individual's drive to engage in the target behavior, and opportunity encompasses variables related to social, physical, or environmental factors. The dimensions of motivation and capability can be further operationalized into automatic motivation (emotions), reflective motivation (evaluation and plans), psychological capability (capacity to engage in the necessary thought processes), and physical capability (capacity to engage in the necessary physical processes).

This model has previously been employed by Hendriks et al. to identify and categorize barriers and facilitators experienced by professionals when implementing integrated policies at the local level.[25] Facilitators are factors that stimulate the target behavior, while barriers are factors that hinder its performance. Hendriks et al. identified various facilitators and barriers to implementing integrated collaborations, such as having a shared mission, willingness to cooperate, belief in the benefits of collaboration, clear division of roles, presence of a management structure, distribution of power, inclusion of all members in decision-making, sufficient resources, good communication, and positive relationships and respect.[25] However, these success factors primarily relate to implementing integrated collaboration as a whole, rather than specifically addressing the fulfillment of individual roles within the collaboration.

Hendriks et al. used the COM-B model to understand behavior in integrated collaboration in their study. In this study, we apply the COM-B model to examine behavior that specifically relates to the fulfillment of roles within the collaboration.

Figure 1 The Behaviour Change Wheel



Lifestyle interventions: GLI and NDC

To properly understand the roles regarding the GLI and NDC interventions, it is important to further elaborate the interventions. It also explains why the number of participants, the dropout rate, and the transition to local sports and exercise options are crucial factors for the effectiveness of both GLI and NDC interventions.

The GLI is a preventive program targeting insured individuals aged 18 and above with overweight (BMI between 25-40 kg/m²) and a moderate or high risk of chronic disorders.[27] Participants must also exhibit motivation to improve their health. This two-year program aims to establish and maintain a healthy lifestyle through behavioural changes. The primary focus areas are calorie intake reduction, increased physical activity, and behavioural change support.[28] Since 2019, the GLI has been reimbursed by health insurers and most GLI programs are implemented by various professionals, such as lifestyle coaches, dietitians, physiotherapists, and remedial therapists. The goals of the GLI include reducing chronic conditions, improving overall health, reducing limitations and disabilities, lowering healthcare costs, and alleviating the strain on healthcare resources.[11]

To make the GLI work properly, three aspects are very important. These aspects are the influx of participants, the interim dropouts, and the flow of participants to local sports/exercise offerings after completing the GLI. First, the influx of participants is important. The more people participate in the GLI, the more people will start working to become healthier. Further, it is important for intervention providers to have full GLI groups for the survival of the group. With a low number of participants, it is not profitable for the GLI provider to offer a GLI trajectory. This is because the intervention provider can declare the GLI costs per participant to the health insurer.

The second aspect of GLI concerns interim dropouts. GLI is a two-year program, so it is crucial that participants complete the full two years for positive behavioural change regarding lifestyle. Intermediate dropouts are more likely to fall back into old habits.[13] This does not contribute to the health of the inhabitants of Twente and results in wasted expenditure. The third aspect of the GLI is the progression of the participant to local sports/exercise offerings after they have completed the GLI trajectory. It is a critical element because it makes structural behavioural changes possible and prevents participants from falling back into old habits after the program.

In addition to the GLI, the National Diabetes Challenge (NDC) is also being conducted at several municipalities in Twente. The NDC is an exercise intervention from the Bas van de Goor Foundation in which participants walk once a week for 20 weeks, together with professional guidance, towards a better quality of life. [15,29] The aim is to increase the activeness of people structurally. Intervention providers can sign up on the site of the Bas van de Goor Foundation where they can then start recruiting participants.

In comparison with the GLI interventions, the NDC is a less protocolized intervention, which is often provided on a voluntary basis, and the participants are not charged.

During the intervention, a variety of lifestyle themes can be discussed. There are about 20 participants in a group. After 20 weeks of guided walking, the participants will finish the intervention with the NDC festival. At this festival, they will walk the distance for which they have trained for 20 weeks. The goal is to give participants a positive experience of exercise as a final step to boost their behavioural change by organizing the event in a festive manner.

The same characteristics of the GLI also apply to the NDC. Also here, it is desirable to have the highest possible intake, as few dropouts as possible, and the greatest possible flow into the local sports/exercise offer.

Integrated collaboration

Integrated collaborations involve the active participation of diverse professionals and organizations working together to provide optimal and coordinated support for a specific target group, such as individuals with overweight and diabetes.[30] The primary goal of such collaborations is to deliver timely and tailored assistance based on the unique needs of everyone. This approach encompasses multiple sectors, including the social domain, medical domain, sports, public health, and prevention. [18, 29] By adopting this integrated approach, the underlying challenges faced by citizens can be more effectively addressed. This is facilitated through enhanced communication and cooperation among professionals, allowing each expert to contribute their specialized knowledge and skills more efficiently. This collaborative effort, specifically pertaining to health promotion, is commonly referred to as integrated health policy.[31] It entails the collaboration of multiple domains within and outside the public health sector to address a public health issue.[32]

Integral collaboration in Twente

In Twente, the integrated collaboration surrounding the GLI and NDC interventions involves multiple stakeholders, including the municipality, a sports company, general practitioners, care groups, hospitals, paramedics, welfare organizations, the GGD, care office, health insurer Menzis, an intervention provider, the province, and the Twente Koers. This collaboration can be divided into regional and local levels. The regional collaboration includes Menzis, the province of Overijssel, the 14 municipalities, the GGD, and Twente Koers, with a primary focus on policy. Local collaborations consist of the municipality, paramedics, general practitioners, sports companies, and neighborhood sports coaches, as well as lifestyle coaches, and are geared towards implementing the GLI and NDC interventions.

The roles that professionals involved in the local integrated collaborations are expected to fulfill in theory are described, in relation to the three aspects of the GLI and NDC interventions. These roles are generally described to investigate later in the study whether professionals themselves perceive their roles regarding the GLI or NDC in the same way. *Table 1* on page 14 provides a comprehensive overview of these roles. All these roles are based on the project plan of the Twentse Koers, this is presented in Appendix 10.1.

Roles of the Municipality

The municipality has the role of co-financier within the integrated collaboration. In small municipalities, they often employ a neighbourhood sports coach who is responsible for the implementation of the NDC. In addition, municipalities have an important function in connecting the domains of sport, care, work, and income. By establishing agreements on collaboration between the sports service

organization, primary care, hospitals, and intervention providers. In the (subsidy) policy, the municipality contributes to the safeguarding and sustainability of the connection. Other functions include communicating with the parties involved, connecting them with existing ones, and supporting the realization of a sustainable regional and national approach. Finally, the municipality is responsible for implementing local health policies.[33] They help to translate regional plans and goals into concrete local actions. The social counter is sometimes also the responsibility of municipalities. Due to the connecting function of the municipality, the municipality has an influence on all three aspects of the GLI and NDC. So primarily the municipality's role will include connecting the different domains, referring to GLIs and NDCs, and facilitating and financing projects.

Roles of the Sports company/neighborhood sports coach

The sports company is generally the point of contact for (care) professionals with regard to the GLI and NDC. (See Appendix 10,1) General practitioners, district teams, or district nurses can refer people here. Sports Company serves as a counter function, providing short intakes and referrals as needed. In addition, it is an independent party that is very accessible to residents. The sports company aims to guide residents toward structural exercise. This can be accomplished by setting up their initiatives and forming connections with local sports associations or physical activity groups. Looking at the GLI and NDC, the sports company has an important role in the flow of people to local sports and exercise. However, the presence of a sports company differs greatly per municipality. Larger municipalities in Twente often have sports companies, while smaller municipalities do not. In smaller municipalities, there is often a neighbourhood sports coach from the municipality who actively takes on this role. Lastly, the sports company or neighbourhood sports coach can also provide the NDC itself. The sports company or neighbourhood sports coach can influence the interim dropouts by properly referring to the social domain. In addition, they can influence the flow to local sports and exercise offerings by facilitating this transition. Hence, the main function of sports companies is to serve as a point of contact between different domains and citizens. Besides that, they must get people to engage in structural movement and refer people when necessary to the medical or social domains.

Roles of the General Practitioner

The integrated collaboration also involves general practitioners. They have a lot of contact with the target group. The GP's role is therefore to identify and refer people who are eligible for the GLI and NDC interventions. For the GLI, participants must receive a referral from their GP to participate. This is because without this referral, they must pay the costs of the GLI themselves. This is not the case for NDC because there are often no costs, or these costs are very low. GP's, therefore, have a particularly key role in recruiting participants for the interventions.

In addition, GPs must have a broad conversation about health to identify underlying problems. To help these patients tackle their underlying problems, GPs also need to be able to find other professionals such as physiotherapists or welfare organizations when necessary. In this way, GPs and practice nurses can influence the intake and drop-out rates of participants at the GLI and NDC. So the main role of the general practitioner is to identify patients who are eligible for the GLI and NDC, helping them when possible, or referring them to the right organization.

Roles of the Professionals in social domain

Welfare organizations also play an important role in recruiting participants. People working for these welfare organizations see many vulnerable people whom they can refer to a local sports coach or sports company. They can also continue to offer guidance as someone starts a GLI or NDC process, for example by looking at the underlying problems. Alongside welfare organizations, municipal employees also operate within the social domain and frequently engage in assisting citizens with matters concerning the WMO (Wet Maatschappelijke Ondersteuning) or debt relief.[34] By tackling background issues, people are more willing to participate in interventions and they are also less likely to drop out. So the main role of professionals working in the social domain are to identify people who are eligible for the GLI and NDC, helping them when possible, or referring them to the right organization.

Roles of the Paramedics

Paramedics are involved in the recruitment of participants for the interventions. Paramedics come into contact with the target group fairly often as well. Besides their recruitment role, they also have a guiding role when a person starts an intervention. They can offer specific support such as dietetics and physiotherapy for people during their intervention. Lastly, it happens that sometimes, someone within the field of paramedic feels the need to guide an NDC intervention or GLI by themselves. In these ways, paramedics can increase the influx of participants and they can decrease the number of dropouts. So, the main roles of paramedics are to identify people who are eligible for the GLI and NDC, help them when possible, or refer them to the right organization. In addition to this, they also provide support during the GLI and NDC trajectories.

Roles of the Performer/Provider

The provider of the NDC and the GLI will work with the referred participant. After an intake, the participant can begin the intervention. During the process, the provider is the central point of contact for the participants and the professionals and has a connecting and coordinating role. By facilitating existing exercise/sports offerings, the provider ensures sustainable behavioural change. Through a proper intake, a good referral to the social domain if necessary, and by introducing the groups to the local sport and exercise offer at an early stage, the provider can increase intake, reduce dropouts and improve throughput to local exercise and sports offerings. In addition, by connecting well with the social environment, the social context and the skills of the participants, the provider can reduce the number of dropouts.[35]

Looking at the intervention provider, the main role is to serve as a point of contact between different domains and citizens. Besides that, they must get people to engage in structural movement and refer people when necessary to the medical or social domains. Lastly, their ultimate role is to run a successful GLI/NDC trajectory.

The next chapter provides a detailed overview of the research methodology used in this study to effectively address the research questions.

Table 1, The roles of the professional/professional organisations

Professionals/organisations in local integrated collaboration	Roles
Municipality	Connecting function between all the domains Identifying, helping or referring participants to the right organisation Responsible for implementing local health policies
Sports company / neighborhood sportcoach	Contact point for the different domains Facilitating citizens to move structurally Reference to social domain, or medical domain when necessary Providing a GLI or NDC by themselves
General practitioner	Identifying, helping, or referring participants to the right organisation
Professionals working in the social domain	Identifying, helping, or referring participants to the right organisation

Paramedic	Identifying, helping, or referring participants to the right organisation Providing care during a GLI or NDC trajectory Providing a GLI or NDC by themselves
Provider	Contact point for the different domains Facilitating citizens to move structurally Reference to social domain when necessary Providing a GLI or NDC by themselves

5. Method

5.1 Cases

The study encompasses all 14 municipalities in Twente, with a more detailed examination conducted in six municipalities: Almelo, Enschede, Hellendoorn, Oldenzaal, Losser, and Haaksbergen.[36] These municipalities have a relatively more advanced level of integrated collaboration compared to others. The selection of these municipalities was based on the expectation that in municipalities where integrated collaboration is not yet well organized, the measurement of role fulfillment could be challenging. The other municipalities in Twente serve as a comparison group. This comparison is essential to demonstrate the potential relationship between integrated collaboration and the functioning of the GLI and NDC interventions.

The included professionals within those municipalities are all involved in the GLI and NDC interventions. They were approached through the network of the Twentse Koers and through the professionals working within a municipality.

To improve external validity, the study includes both large and small municipalities. The NDC has been examined in Enschede, Losser, Hellendoorn, and Almelo. Additionally, the GLI was studied in Oldenzaal, Almelo, Enschede, Losser, Hellendoorn, and Haaksbergen. Almelo and Enschede are considered as large municipalities, while Hellendoorn, Oldenzaal, Losser, and Haaksbergen are categorized as smaller municipalities.

5.2 Research Method

The research adopts a qualitative approach, employing semi-structured interviews to gain comprehensive insights into the degree of role fulfillment among the professionals involved. The interviews are designed based on the COM-B model, with the role(s) of the professionals falling under the Behavior domain (B). The questions from the interviews focus on the roles regarding the GLI and NDC that the professionals perform, and the factors that stimulate or hinder the performance of the behavior.

The questions in the interview schedule are general, as the roles of the professionals vary. Depending on the professional, further questions are asked based on the theoretical framework and the answers given. The topic list is presented in the Appendix 10.3.

The professionals who were interviewed depended on how integrated collaboration is organized in a municipality. In each municipality, interviews were first held with someone working for the municipality. These people have been actively involved in setting up integrated collaboration. By starting with them, it was clear who was involved in integral collaboration, and no professionals were forgotten. All professionals have been invited by email through the network of the Twentse Koers and its partners.

It was chosen to conduct individual interviews to gain a thorough understanding of each individual, without hiding behind opinions held by others. Moreover, it is possible to continue asking questions if this is not possible when taking a questionnaire. To avoid a hasty conclusion, barriers and facilitators found within a municipality are also tested with other professionals within that municipality. All the interviews were conducted via phone or through online Teams.

Based on these interviews, sub-question 1 about the extent to which professionals themselves know which roles they have, is answered. Answers of the professionals are compared with each other, and with a theoretical framework to judge whether they know the roles well. Subsequently, sub-question 2 about the extent to which professionals believe that they perform their roles well, and sub-question 4 about the experienced facilitators and barriers in performing the roles, are examined. Based on professionals' responses, further questions are asked in the Capability, Opportunity, and Motivation domains to identify factors that facilitate or hinder their role performance.

Sub-question 3 is about the functioning of the GLI and NDC. Data on the intake, dropouts and flow to local sports and exercise offerings was collected from Menzis, the Bas van de Goor Foundation, the

care institute and from the intervention providers.[37] The data regarding participant intake is normalized per 10,000 residents, while dropout data is adjusted based on the initial participant count. This normalization enables meaningful comparisons of intervention functioning data between the studied municipalities, as well as against other municipalities and national data. This assessment contributes to understanding how the interventions perform in practice.

Sub-question 5 about the relationship between the degree of role fulfillment and the functioning of the GLI and NDC is answered by comparing the Twente municipalities with each other. The degree of role fulfillment is compared with the functioning of the GLI and NDC intervention.

5.3 Data Analysis

All the interviews were manually transcribed. The data was then subjected to a deductive analysis using Atlas.ti software. Deductive coding was chosen due to the existing knowledge on the subject. There was already a lot of knowledge about the predetermined roles and a lot of available literature of the COM-B model and integrated collaborations. The interview responses were carefully coded, labeled, and organized into a coding sheet, with specific categories such as "roles of the professionals," "extent of role fulfillment," "barriers," and "facilitators." Based on the interviews, it was possible to determine whether there was a high degree of role fulfillment, average or low degree in a particular municipality.

The barriers and facilitators were specified within the domains of the COM-B model. Specifically, the barriers and facilitators were categorized based on whether they related to the professional's capability, opportunity, or motivation.

Once all interviews had been coded, the interviews were checked to ensure no relevant codes were missed. The codes within a transcription were all thoroughly checked to merge codes that match too much. Such as having short lines, knowing each other well, knowing how to find each other quickly, and the "we know us" principle.

To address the sub-questions, a quantitative analysis was performed to determine the frequency with which professionals mentioned specific topics during the interviews. This approach allowed the researcher to gain insights into shared perspectives and experiences among professionals. The analysis not only compared similarities and differences between different professionals but also between municipalities.

To ensure a fair overview of how the interventions are functioning, data related to intake, dropouts, and transfer to local sports/exercise offerings were standardized. The inflow from the GLI and NDC was normalized per 10,000 residents of each municipality, allowing for a more accurate comparison across different population sizes. Additionally, the number of dropouts was standardized based on the number of entrants insured with Menzis. These standardized measures were chosen to achieve a consistent and fair evaluation of the interventions' functioning, compensating for potential variations in population sizes and insurance coverage. The decision to standardize the number of dropouts based on the number of entrants rather than the number of dropouts per cohort was made due to the unavailability of cohort-specific data.

Finally, a potential relationship between the functioning of integrated collaboration and the results of the GLI and NDC aspects was examined. The municipalities with little to no role fulfillment were compared to those where role fulfillment was very high, and a conclusion was drawn based on this comparison. This analysis helps to identify potential correlations between integrated collaboration and the outcomes of the GLI and NDC interventions.

5.4 Ethical approval

Ethics approval for this research was gained from the Ethics Committee BMS of the University of Twente (reference number 230069). All participants in this study were provided with a clear explanation of the study's purpose. They were informed that their responses would be treated with complete anonymity. Verbal consent was obtained from the participants to record the interviews.

6. Results

The results begin by providing a detailed description of the participants, including their professions and the municipalities they belong to. This contextual information helps readers understand the background of the professionals involved in the integrated collaboration within each municipality.

Next, the research addresses sub-question 1, which focuses on the extent to which professionals themselves are aware of their roles within the integrated collaboration regarding the GLI and NDC.

Sub-questions 2 to 4 are then addressed individually for each case (municipality). This approach allows the study to provide a comprehensive analysis of how well professionals within a municipality fulfill their roles and the factors that support or hinder their role fulfillment in each specific setting.

Upon analyzing all the cases, the study offers an overall summary of the results across all municipalities. This summary enables a comparison between the degree of role fulfillment among professionals and the functioning of the GLI and NDC interventions. Sub-question 5 is addressed in this overall summary.

6.1 Participants

In this study, a total of 27 interviews were conducted with professionals involved in the integral collaboration pertaining to the GLI and the NDC. *Table 2* provides an overview of the interviewed professionals from the different municipalities. These professionals represent diverse municipalities and possess various professions. Additionally, it should be noted that some professionals have dual roles, resulting in a representation of 31 professionals in total.

Table 2 Demographic information of participants

	Municipality						
	Total	Almelo	Losser	Hellendoorn	Haaksbergen	Oldenzaal	Enschede
Pharmacist	2	1				1	
Dietitian	2		1			1	
Municipality/Umbrella organization	5	1	1		1	1	1
GLI/NDC provider	7	2	1	1	1	1	1
GP/practice nurse	6		1			3	2
Sports company/neighborhood sport coach	6	2	1		1	1	1
Social domain/welfare organization	3	1	1	1			
Total	31	7	6	2	3	8	5

6.2 Roles of the professionals

The findings from the interviews revealed that pharmacists primarily focus on medication checks and act as signalers and referrers due to their regular involvement. Dieticians play a crucial role in guiding individuals in the nutritional aspect of lifestyle changes and often conduct GLI intakes.

The general practitioner or practice nurse serves as signalers and referrers. Many individuals from the target group seek assistance at the GP's practice. After conducting a comprehensive assessment and identifying needs, a plan is formulated in collaboration with the patient.

The GLI provider's main focus is addressing lifestyle-related issues and implementing GLIs. They also have the responsibility of referring individuals to other professionals if additional needs are identified. The role of sports companies or neighborhood sports coaches is to facilitate residents to suitable local sports and exercise options. This necessitates establishing strong connections with healthcare providers and local sports organizations.

Within the social domain, professionals are responsible for signaling, referring, and addressing background issues, while also facilitating connections among their peers. Municipalities share common roles but also have a financing role and are responsible for local health policy.

The interviews indicated a high level of consistency among most professionals within each specific profession regarding their perceived roles and are displayed in *Table 3*. Notable examples include identifying and referring, facilitating connections among professionals, performing GLIs, and assisting residents. However, some disparities exist in roles such as the intake procedures at the GLI/NDC provider, and not every GLI/NDC provider perceives referral as part of their tasks and responsibilities.

The roles of the professionals mentioned also correspond to the predefined roles from the theoretical framework. The consistency between the roles identified in the interviews and those derived from the theoretical framework indicates that most professionals possess a clear understanding of their specific roles within the context of the GLI and NDC interventions.

Table 3 Roles of the professionals

	Total (n=31)	Pharmaci st(n=2)	Dietitian (n=2)	Municipality /umbrella organizatio n (n=5)	GLI/ NDC provider (n=7)	GP (n=6)	Social domain/w elfare organizati ons (n=3)	Sports company/ neighbour hood sport coach (n=6)
Signalling and referral to professional	18	2	1		4	5	2	4
Connecting professionals	12			4	1		3	4
Collecting needs and assisting residents	9				1	2	2	4
Performing GLI	6				5		1	
Proactively educate and inform	6				3	2		1
Joining a GLI trajectory	6						1	5
Recruitment GLI and NDC participants	6	1		2				3
Intake GLI	5		2		3			
Tackling background issues of residents	4			2			2	1
NDC provider	4				1			3
Guidance nutrition GLI	2		2					

6.3 Collaborations in the different municipalities

In this section, the study delves into sub-questions 2 to 4 by examining the specific findings and outcomes for each municipality. Each time, the degree of role fulfillment within the municipality is first examined. Subsequently, it is examined which facilitators and barriers are particularly important in the municipality. Finally, something is said about the GLI and NDC functioning in that municipality. This case-based structure was chosen because in this way it becomes clear what the role fulfillment is like in a certain municipality. This is important to ultimately see whether there is a relationship between the degree of role fulfillment in a municipality and the functioning of the interventions. Besides that, it helps municipalities gain a clearer picture of how they can enhance their existing integrated collaborations.

6.3.1 Enschede

Role Fulfillment

In Enschede, the implementers of the NDC, including the Sports Company and physiotherapy practice, encounter challenges in successfully implementing the NDC program. One reason cited for this is the lack of connection with other professionals within the municipality.

As quoted by a respondent:

"Last year, approximately 3 weeks before the program commenced, we established all our walking groups. Within that timeframe, we organized our walking groups, with a total of around 8 participants distributed among several groups. Most of these participants were approached by our team directly. However, we did not experience any sense of connection with other professionals involved in the municipality."

The sports company is confident in its capacity to fulfill its obligations related to assisting residents in adopting regular physical activity. However, they encounter difficulties in establishing connections with most GLI providers and other professionals. While they are successful in promoting structured movement among individuals, they not often refer to other professionals. General practitioners in Enschede have reported smooth participant referrals for the GLI. The provision of information and care is also successful. However, they have limited interaction with the sports company and the social domain, leading to fewer referrals. Referrals for background issues are presently made through the practice nurse focused on mental health care.

On the other hand, the GLI provider in Enschede has expressed satisfaction with the performance of the roles within the integrated collaboration. The GLI provider achieves success in executing the GLI and efficiently refers individuals to local sports facilities or welfare organizations. A key factor contributing to this success is the proactive attitude. While the GLI provider in Enschede acknowledges the proper performance of roles within the integrated collaboration, they also highlight difficulties in collaboration with other professionals, particularly the sports company. Finally, the municipality expressed that the network concerning the GLI and NDC is not well-established, and there is a deficiency in referrals between the sports, healthcare, and social domains.

To summarize, some professionals engaged in integrated collaboration demonstrate competence in carrying out some of their assigned roles effectively. However, there is room for improvement in the execution of the sports company's responsibilities, particularly concerning the GLI and NDC interventions. Moreover, the participation and involvement of the social sector in the collaboration are presently restricted. Despite some roles being executed, most of them are either not performed or carried out to a limited extent. Consequently, the degree of role fulfillment in Enschede can be considered as low.

Experienced barriers towards role fulfillment

The facilitators and barriers that professionals in Enschede are facing when performing their roles are showed in *Table 4*.

Based on the feedback provided by all the participants from the municipality in Enschede, it was consistently reported that the factor of time serves as a barrier to effectively perform their respective roles. This time constraint negatively impacts their ability to conduct thorough intakes or appropriately refer individuals to the relevant professionals.

One respondent expressed:

"Indeed, that is also one major obstacle because you have limited time and, of course, you don't only have time for the GLI. Having a meaningful conversation about it requires time, and that is often why I provide some take-home information instead."

Furthermore, the professionals expressed uncertainty regarding the role of the sports company and emphasized challenges in scheduling meetings with them. Additionally, participants identified potential barriers to access and participation, including the time of the day a the GLI sessions are scheduled, and the location of the program.

Experienced Facilitators towards role fulfillment

Several facilitators experienced by the professionals were identified. These facilitators include taking a proactive approach in performing one's role, ensuring a careful selection of participants, and utilizing effective referral software. These facilitators play a crucial role in improving the implementation and overall success of performing one's role. For instance, in situations where a sports professional isn't associated with a GLI, the GLI coach assumes a proactive role by guiding individuals toward local sports and exercise options. Equally important is the skillful selection of participants for the GLI group. This approach fosters increased motivation within the group, consequently resulting in enhanced outcomes.

In Enschede, it appears that most barriers that are experienced by the professionals are situated within the physical and social environment of the COM-B model.

Table 4 Barriers and facilitators in Enschede

	Enschede(N=5)			
	Barriers	N	Facilitators	N
Capability	Unclear how to collaborate integrally	1	Being proactive	2
	Difficult finding GLI providers	1	Going beyond the scope of your role	1
Motivation	Contact attempts failed	1	Recognizing the importance of integrated collaboration.	2
Opportunity	Limited time	5	Full focus on the GLI	2
	Role of sports company unclear	3	Referral software	3
			More and more attention to lifestyle	3
	Location or starting time intervention	3	Good selection of participants	2
	Meeting sports company often not possible	2		
	Background issues of people	2		
	No communication with GP	2		

Functioning of the GLI and NDC

Over the years, there has been a significant rise in GLI participants in Enschede. Alongside this growth in participants, there has been a decrease in the number of dropouts. Detailed data can be found in *Graph 1 and 2* on page 37.

As for the transfer to local sports and exercise offerings, the GLI provider estimates that 80% of the participants who initially took part in the GLI intervention continue to engage in structured exercise or sports activities at a local level even after the intervention has concluded.

As for the NDC, there has been a slightly growth in the number of participants. No specific data are available for the dropout rate in 2022. Nonetheless, one respondent mentioned that most individuals continue to engage in existing walking activities of sports company.

So based on the available data, both interventions show improvements, however, this improvement remains small, and looking at the size of the city, relatively few people participate.

6.3.2 Almelo

Role Fulfillment

In Almelo, both the GLI and NDC interventions are being implemented. The pharmacist in Almelo has observed a low patient turnout at their practice and feels that their professional recognition among colleagues is limited. Additionally, they have limited contact with GLI providers, but they actively participate in the NDC initiative, contributing to both recruitment and implementation efforts.

The GLI provider in Almelo reported successfully executing the GLI and receiving numerous referrals from general practitioners. However, conducting effective intakes was considered challenging. Referrals to the sports domain are frequent, and they establish good connections in this area. Nevertheless, referrals to the social domain happen infrequently.

The sports company is also successful in implementing the NDC, as they have been able to recruit a substantial number of participants. Furthermore, they excel in facilitating local sports and exercise opportunities, including collaborating with GLI trajectories. However, one area of concern is the lack of effective collaboration with GPs.

The sports company has expressed that GPs express a desire to refer their patients to a lifestyle counter for additional interventions. Unfortunately, the absence of such a counter creates difficulties in establishing collaboration with GPs.

A respondent expressed during the interview:

"The collaboration with GPs is quite challenging. The GPs have expressed their condition of having a single counter that encompasses all these initiatives. In terms of the GLI, referrals from GPs do occur, although it varies in effectiveness across practices. Larger practices that prioritize lifestyle interventions tend to refer more successfully."

Finally, the municipality acknowledges that the collaboration with the social domain is still in its early stages, indicating the need for further development and progress in this area. However, the municipality is actively involved and tries to bring parties together.

So, in Almelo, the professionals involved in the interventions demonstrate competency in their respective roles. However, it should be noted that the pharmacy is currently only participating in the NDC intervention and is not involved in the GLI. On the other hand, the GPs primarily focus on the GLI and do not participate in the NDC. There is limited collaboration with the social domain, and collaboration between the sports company and general practitioners is also limited. The degree of role fulfillment in Almelo seems reasonable, but there is still plenty of room for improvement.

Experienced barriers towards role fulfillment

As indicated in *Table 5*, most barriers lie within the opportunity domain, primarily stemming from environmental factors. Poor communication is reported, with moderate contact between the sports company and the general practitioners. Additionally, it has been noted that individuals' background problems act as a barrier to the effective performance of their roles, such as that of a GLI coach. In essence, individuals experiencing financial difficulties may be resistant to accepting meaningful support in making lifestyle changes. Similarly, professionals working with sports companies may encounter challenges in encouraging participants to become involved in local sports associations.

One respondent highlighted the role of background issues in this context:

"Yes, I believe it's due to motivation of the GLI participants. This lack of motivation may be associated with underlying issues, such as financial debt. You see, if someone is struggling with financial problems, they may prioritize resolving their debt over focusing on lifestyle changes."

Additionally, barriers are identified, including conflicting economic interests among the parties involved, which can hinder effective collaboration. Some professionals are only motivated to collaborate if there is a financial benefit involved. This can result in a lack of motivation to refer patients to professionals who can provide more suitable care or to fulfill their tasks and responsibilities adequately when there is no budget allocated. Furthermore, unclear responsibilities and the lack of clear start dates for the GLI interventions are also identified as barriers.

Experienced Facilitators towards role fulfillment

On the other hand, the facilitators mentioned include the promotional material of the NDC. Promotional materials such as flyers, posters, websites, and social media posts can be utilized to raise awareness about the NDC and attract participants in locations frequented by the target audience. Additionally, the ability to have a flexible role within the municipality of Almelo is acknowledged as a facilitating factor. This allows professionals to allocate more time to specific tasks or address responsibilities that may not completely align with their designated role.

Table 5 Barriers and facilitators in Almelo

	Almelo(N=7)	N	Facilitators	N
Capability	Motivation, being a snapshot in time, is inherently challenging to capture accurately.	1	Lifestyle background	2
	Limited Knowledge about GLI	1	Being Proactive	2
Motivation	Earns too little	1	Recognizing the importance of integrated collaboration.	2
Opportunity	Lack of communication	4	Full focus on the GLI	2
	Background issues of people	3	Having a free role	3
	Target group difficult to reach	2	Promotional toolkit for NDC	3
			Having a network	2
	Economical interests	2		
	People continue to exercise with physio	2		
	Unclear responsibility	2		
Location of starting time intervention	2			
Sports clubs not accessible to everyone	2			

Functioning of the GLI and NDC

Graph 1 illustrates a steady rise in the number of participants enrolling in the GLI program over the years. In 2023, Almelo is projected to surpass the national average in this regard. *Graph 3* displays a decline in the dropout rate. However, precise data regarding the utilization of local sports and exercise facilities are not available. Despite this, a respondent highlighted that access to these options is restricted since participants are now responsible for covering the costs after completing the intervention. This financial burden can be unfamiliar and challenging for the participants, thereby impeding their sustained engagement in physical activity.

A respondent stated:

“However, it is important to note that participants had to bear the financial burden themselves, which resulted in some individuals having to switch to a different location. This change in location was quite disappointing for them. It is worth mentioning that less than half of the participants ultimately ended up attending the same gym.”

Regarding the NDC, data is solely accessible for 2023 due to the absence of an NDC intervention in Almelo in 2022. The available data indicates a significant number of participants who have commenced the NDC program, reflecting positive engagement and interest. Even though the NDC is doing quite well for the first year, they are still below average in Twente given the large number of inhabitants. As of 2023, no dropouts have been reported, and it is anticipated that participants will continue in their current groups. However, due to the lack of clear data, definitive conclusions about dropout rates or program throughput cannot be drawn at this time.

In Almelo, the GLI intervention is functioning well, evidenced by a growing number of participants and a decreasing dropout rate. However, there are still some challenges with the flow of the intervention to local exercise. As for the NDC, it has shown a promising start in its first year, although its performance is slightly below average.

6.3.3 Oldenzaal

Role fulfillment

In Oldenzaal, professionals express overall satisfaction with their performance, and they believe that the municipality is making good progress. The GLI provider, in collaboration with other providers, carefully selects the most suitable GLI for everyone, and they feel confident in fulfilling their duties effectively. However, there have been limited referrals to other professionals.

The newly added pharmacy encounters challenges in fully executing its role due to limited recognition among other professionals. Conversely, the dietitian in Oldenzaal, responsible for conducting GLI intakes, expresses great enthusiasm for the GLIs. Nevertheless, the dietitian often encounters limited motivation among participants, making it challenging to assess their motivation levels. Moreover, the dietitian has no contact with the social domain and infrequently makes referrals. Despite these challenges, the dietitian excels in providing nutritional advice during the GLI sessions and feels they perform well in this aspect.

The neighborhood sports coach finds the process of joining a GLI to be seamless and successful, with a smooth flow towards local sports and exercise options. Additionally, referrals to the social domain are also progressing well. Lastly, GPs state that they can fulfill their role effectively and have reasonably good knowledge of how to collaborate with other professionals. However, it was mentioned that there are instances where it is not always clear where, when, and by whom a GLI process was initiated.

Role fulfillment in Oldenzaal is reasonable. However, to better fulfill the role of GPs, they could refer more selectively so that only suitable and motivated candidates are referred to the GLI program. Similarly, the dietitian should apply stricter criteria when selecting participants, focusing on the motivation of the participants. In addition, the role of the pharmacist can be better fulfilled through increased involvement in the GLI program. By actively participating and providing expertise, the pharmacist can play a more important role in improving the overall care of residents.

Experienced barriers towards role fulfillment

In Oldenzaal, background issues present barriers to the effectiveness of the interventions. A lack of motivation among individuals and the presence of misguided or peculiar motivations, such as Saxenda use, are identified as significant obstacles for GLI providers. Saxenda is a medication prescribed to people who are seriously overweight. It enhances the feeling of satiety, reducing hunger.[38] Individuals can receive reimbursement for this medication from their health insurer after participating in a GLI for one year. It was mentioned that in some cases, people only participate in the GLI to qualify for the drug, and they lack motivation to adopt healthy behaviors. Insufficient motivation of participants hinders the GLI coach in properly performing a GLI, the dietitian in properly performing intakes, and the neighborhood sports coach in motivating and facilitating local sports and exercise offerings.

Experienced facilitators towards role fulfillment

In Oldenzaal, certain factors are identified as facilitators. Firstly, having firsthand experience with obesity and overweight is seen as beneficial, as it leads to a quicker recognition of the importance of lifestyle and a more active referral process. Secondly, a background in sports and exercise is viewed as advantageous for effectively implementing the GLI and providing better guidance in these areas. Additionally, the presence of short lines of communication and collaboration is emphasized as a facilitator. This allows for seamless and efficient referral of patients to the appropriate professionals for targeted assistance. Clear agreements further enhance this process. The collaboration among various GLI providers is also highlighted as a facilitator. Competition has been eliminated, and a tailored GLI program is offered to meet everyone's specific needs. Lastly, there is a strong motivation to engage

individuals in lifestyle interventions, and having autonomy in performing one's role is mentioned as making the process easier.

Table 6 barriers and facilitators in Oldenzaal

Oldenzaal(N=8)				
	Barriers	N	Facilitators	N
Capability	Motivation difficult to determine	2	Sport and exercise background	2
			Experience with obesity and diabetes	2
Motivation	Earns too little	1	Being proactive	2
			Lifestyle has the highest priority	3
			People want to help get healthier	2
Opportunity	Background issues of people	3	Recognizing the importance of integrated collaboration.	2
			Having short lines with professionals	6
			Having a free role	3
			Several collaborating GLIs	3
			Clear agreements	2
	Motivation is Saxendra	2	More and more attention to lifestyle	2

Functioning of the GLI and NDC

Additionally, there is a consistent decrease in the number of dropouts annually *Graph 1* indicates a steady upward trend in the number of participants enrolling in the GLI program annually in Oldenzaal, resembling patterns observed in other municipalities. However, as of 2022, the number of GLI participants in Oldenzaal remains below the national average. However, it is important to acknowledge that the rate of increase in participants and decrease in dropouts is relatively modest. Despite the reduction, the overall dropout rate remains relatively high, representing 36% of the total influx. In terms of transitioning to local sports offerings, the neighborhood sports coach reports a very positive rate of approximately 80%.

Since the NDC has not been implemented in Oldenzaal, it is important to mention that there is currently no available data on the NDC.

Given the limited increase in intake, and the fact the number of dropouts is still high despite the slight decrease, it can be said that the intervention is not yet fully functioning.

6.3.4 Hellendoorn

Role fulfillment

The GLI coach, who is based at a physiotherapy practice, is actively involved in both the GLI and NDC programs. The feedback from the employee in the social domain indicates that the GLI program is running smoothly. The GLI coach receives a high number of referrals from general practices, indicating successful collaboration. This physiotherapist mentioned that he can also guide the NDC well and that it is also successful in guiding people to adjust their lifestyle.

The physiotherapy practice has been instrumental in driving the NDC program, but there has been limited interaction with other professionals in 2022. The GLI/NDC provider has not made significant efforts to engage with the social domain. Referrals to other professionals therefore rarely happen. However, the social domain itself expresses confidence in its ability to fulfill its responsibilities effectively. But even from them there are rarely references to a GLI/NDC. In 2023, there are indications that the collaboration in Hellendoorn regarding the NDC will improve.

According to one respondent:

"Unlike last year when I was the sole person driving the initiative and had to personally approach individuals every week for 20 weeks, we now have all the physiotherapists on board who will participate. They can register, and if everything goes well, the GP will also join the walking program. Additionally, our podiatrist and dietitians are also enthusiastic about participating in the NDC."

Based on the limited referrals and the moderate cooperation between professionals within the municipality, role fulfillment appears to be progressing at a slower pace. Nonetheless, respondents' feedback suggests a positive shift in Hellendoorn, indicating increased participation and involvement from multiple healthcare professionals in the NDC program.

However, it is essential to acknowledge the limitations of this case, given the small number of professionals interviewed in the municipality. As such, making generalized statements about overall role fulfillment within the municipality would be challenging.

Experienced barriers towards role fulfillment

In Hellendoorn, there is reported to be moderate collaboration among professionals, which poses challenges in terms of proper referrals and providing individuals with the appropriate support they need.

Experienced facilitators towards role fulfillment

As facilitators, it is mentioned that not being commercially oriented is important for the proper performance of the roles. This gives you a neutral role in cooperation, and money is not a motive to help the residents. It has also been indicated that they are motivated to perform their role because people are central, and that they want to help them.

Table 7 Barriers and facilitators in Hellendoorn

Hellendoorn(N=2)				
	Barriers	N	Facilitators	N
Capability	Including people too quickly	1	Not commercially minded	2
			Recognize social importance	1
Motivation	Earns too little	1	Proactively approach dropouts	1
	Finding GLI unproven to be effective	1	The people are central	2
			Recognizing the importance of integrated collaboration.	1
Opportunity	Limited collaboration with other professionals	2	Clear agreements	1
	Motivation is Saxendra	1	Good Foundation of participants	1
	People have to pay themselves for GLI	1	Having a free role	1
	Economic interests	1		
	Referral to resolve all issues	1		

Functioning of the GLI and NDC

In Hellendoorn, the initial years of the GLI program did not show significant success. However, in 2022, there was a notable increase in the number of participants, and there were no dropouts among the 35 participants in that year. Since the GLI programs had not yet ended, no information was known about the transfer from the GLI to local sports and exercise offerings.

Regarding the NDC program, there has been a high number of entrants. In 2022, there were 37 participants, and this number increased to 54 in 2023. In Hellendoorn, the NDC intervention performed far above average compared to the other municipalities. It was also indicated that there are very few dropouts at the NDC.

Among the participants in 2022, 17 continued to engage in walking activities after the intervention, although the information about the exercise continuation for the remaining participants is unknown.

A respondent stated:

“The people from the NDC that I guided then walked along with the walking event, the deep hell run, and then I left the walking group. For those who wanted to keep walking, I created a group app that I went out. I think that group consists of 16 or 17 walkers who walk together weekly.”

Based on the available data on intake, drop-out and throughput of both interventions, it can be concluded that the GLI is functioning moderate, and the NDC is functioning well.

6.3.5 Losser

Role fulfillment

The neighborhood sports coach in Losser is performing his role effectively by understanding individual needs and facilitating appropriate referrals. Nevertheless, the execution of the NDC program, which was initiated for the first time in 2022, faced challenges, including difficulties in recruiting participants and fostering cooperation with other professionals.

The dietitian encounters challenges with intake procedures. Nevertheless, she excels in her profession and effectively guides individuals towards adopting a healthier lifestyle.

The practice nurse in Losser expressed unfamiliarity with both interventions, suggesting a potential lack of awareness or involvement. However, the GLI coach indicated that there were full groups, suggesting there are enough referrals from general practices.

The employee from the social domain emphasized good collaboration with general practitioner practices and accessible consultations. However, the municipality acknowledged that overall cooperation within the municipality remains a challenge, as connecting different stakeholders proves to be difficult.

Despite the difficulties faced by the dietitian during the intakes and the practice nurse's unfamiliarity with the intervention, it seems that the degree of role fulfillment in Losser is relatively high.

Experienced barriers towards role fulfillment

Barriers mentioned in Losser are not other barriers that have previously been noticed by municipalities. Namely background problems among participants, limited time, and economic interests. However, a new barrier that has emerged is the sense of shame among participants. Due to this shame, participants are reluctant to utilize the available resources and assistance provided by the municipality. Moreover, existing sports clubs are not always accessible to graduates of the GLI and NDC programs, hindering the transition to local sports and exercise offerings and impeding sustainable behavior change.

Experienced facilitators towards role fulfillment

Limited facilitators have been identified. However, one facilitator that was frequently mentioned is the presence of short lines of communication. This facilitator enables efficient and effective coordination among professionals and stakeholders. Additionally, having a close-knit team within the organization is seen as a positive factor that promotes the effective performance of their respective roles.

Table 8 Barriers and facilitators in Losser

Losserl(N=6)		N	Facilitators	N
	Barriers			
Capability	Decline redirects	1	Good communicative skills	1
			Being proactive	1
Motivation	Seeking collaboration is time-consuming.	1		
Opportunity	Background issues of people	2	Having short lines with professionals	3
	Shame of participants	2	Close team	2
	Some sport associations are not yet available to all	2	Social domain well involved	1
	Limited time	2		
	Economic interests	2		

Functioning of the GLI and NDC

Graph 1 demonstrates a consistent annual increase in GLI participants, with a notable surge observed in 2021. Compared to the national average, and to the other Twente municipalities, the GLI intervention in Losser performs best. Although the number of dropouts remained relatively high until 2021, there has been a significant improvement in 2022. Furthermore, the flow of participants toward local sports and exercise options stands at a commendable 70%.

Regarding the NDC intervention, there has been a notable improvement among participants. The low dropout rate and satisfactory overall participation indicate successful engagement and progress within the program. Furthermore, the fact that all participants continued to participate in the existing walking group further reinforces the positive progression toward local exercise offerings.

Based on the data provided, it can be concluded that both interventions in Losser are functioning very well. The GLI intervention has shown a notable increase in the number of participants and a decrease in dropouts. The NDC intervention has also demonstrated significant improvement among participants, with a low dropout rate and satisfactory overall participation. These positive outcomes indicate that both interventions are functioning in the municipality of Losser.

6.3.6 Haaksbergen

Role fulfillment

In Haaksbergen, the professionals involved in the interventions express overall positive experiences. They are part of an umbrella organization that promotes effective collaboration among them. The GLI provider receives many referrals and makes appropriate referrals when needed. The neighborhood sports coach from the social domain has expressed her proficiency in guiding GLI participants towards local sports and exercise opportunities. Furthermore, it has been highlighted that her involvement in the social domain enables her to effectively assist and refer GLI participants to the social domain. According to the employee of the umbrella organization, the professionals have established good communication and the GLI program is running smoothly.

So, in Haaksbergen, the degree of role fulfillment is high. The professionals demonstrate effective performance in their respective roles, possess a good understanding of collaboration dynamics, and adhere to well-defined agreements.

Experienced barriers towards role fulfillment

In Haaksbergen, the professionals share a positive outlook on the current situation, indicating that things are progressing well. However, a couple of barriers have been identified. One of the barriers relates to the economic returns for the GLI coaches, suggesting that financial compensation or incentives may be a concern in their role. This highlights the importance of ensuring that GLI coaches receive adequate support and recognition for their work. Another barrier mentioned is the lack of financial support for the involvement of the neighborhood sports coach. This indicates that funding limitations may hinder the coach's ability to fully contribute to the interventions.

Experienced facilitators towards role fulfillment

Due to the umbrella organization in Haaksbergen, the professionals know each other very well personally. Having short lines is therefore also referred to as a facilitator. In addition, the facilitators, having experience and job satisfaction were mentioned. Finally, it has been said that they are all very motivated to help people and make them healthier. These factors contribute to their effective role performance within the integral collaboration.

Table 9 Barriers and facilitators in Haaksbergen

	Haaksbergen(N=3)			N
	Barriers		Facilitators	
Capability	-		Experience	2
			Being a positive person	1
Motivation	Earns to little	2	Helping people and making them healthier	3
			Job satisfaction	2
Opportunity	Visiting a GLI is not reimbursed	1	Having short lines with professionals	3
	Limited Financial resources	1	Well organized social domain	1
			Involvement of the umbrella organisation	1

Functioning of the GLI and NDC

In Haaksbergen, the NDC program is not active, but there have been a GLI intervention. *Graph 1* indicates a significant increase in the number of participants compared to 2020. Remarkably, despite

the higher number of participants, the dropout rate has remained consistently low. The GLI coach also reports an outflow rate of almost 90%. These data suggest that the GLI program in Haaksbergen is functioning effectively and yielding positive outcomes.

In Haaksbergen, the NDC program is not active as the professionals believe that the GLI program is sufficient to meet the goals of the municipality.

6.4 Overview

Role fulfillment

The interviews with professionals indicated that, in general, they believe they fulfill their roles to some extent. However, the study found that in certain municipalities, some professionals seemed to have a lower level of role fulfillment. This was observed in Enschede and Hellendoorn. In contrast, Losser and Haaksbergen had a high level of role fulfillment. In these municipalities, residents were well identified, and there was a broad referral to the appropriate professionals, with active involvement from the social domain. Oldenzaal and Almelo also showed a reasonable level of role fulfillment.

Across all included municipalities, general practitioners actively refer residents to GLI pathways, and GLI and NDC providers are making progress in implementing the interventions. However, there are only a few referrals from the GLI/NDC provider to other professionals, and challenges exist in establishing referrals from the social domain to general practitioners or conducting proper intakes. The involvement of the social domain remains limited in most municipalities, except for Oldenzaal and Haaksbergen, where the neighborhood sports coach, with a social background and strong connections within the municipality, plays a significant role in facilitating people to the social domain.

Experienced facilitators and barriers towards role fulfillment

During our analysis, we examined the most common facilitators and barriers reported by professionals in their respective roles. *Table 10* on page 37 provides an overview of the most frequently mentioned facilitators and barriers, along with their definitions. Additionally, the facilitators and barriers specific to each professional can be found in Appendix 10.4 offering a comprehensive understanding of the factors influencing their role performance. Most of the barriers are in the opportunity domain, while the facilitators are spread across all domains.

The barriers identified include participants' background problems, limited time availability of professionals, and poor participant motivation. These barriers are specifically experienced by general practitioners and GLI providers. GPs face challenges in identifying and referring participants to other professionals, while GLI providers encounter difficulties in implementing the GLI program effectively.

Another barrier that is frequently mentioned is the location and timing of the GLI program. Starting the program in the evening, for example, can exclude certain individuals who may also be interested in participating. This barrier affects both the GLI provider and the GP. This makes it more difficult for the GP to keep people motivated and therefore unable to refer people who would otherwise have wanted to participate. As a result, the GLI provider has less inflow, which may result in less group ties and less income.

One notable barrier that was identified is economic interests, mentioned by all participants working within the municipality or umbrella organization. In this context, economic interests refer to professionals performing certain roles only if they can financially benefit from them. This hinders the connection and collaboration between different parties, as economic interests sometimes overshadow professionals' intrinsic motivation. Aligning their interests with social goals becomes challenging due to this factor. Overcoming this barrier often necessitates significant financial resources.

Facilitators	Barriers
<p>Capability</p> <p>Being Proactive: Actively seeking collaborations and contact with both participants and other professionals.</p> <p>Experience: Having the right skills by performing the roles earlier.</p> <p><i>Opportunity</i></p>	<p>Estimating participants' motivation is difficult: motivation of participants is a snapshot and therefore difficult to estimate. Also, some professionals are already busy asking questions, which makes it difficult to include the motivation element.</p>
<p>Having short lines with professionals: Having good and clear connections with other professionals. This allows you to work better with each other and refer people.</p> <p>Having a free role: having a role that is not framed. The professional is given the space to perform his or her tasks and responsibilities.</p>	<p>Background issues of people: the problematic background situation of residents is the most frequently cited barrier by professionals. This barrier hinders the professionals from referring to the GLI, the proper implementation of the GLI and facilitating people to local sports and exercise offerings.</p> <p>Limited time: the time factor is also an often-mentioned barrier. As a result, professionals have less time to do a proper intake, look for a collaboration, or visit a GLI process.</p> <p>Economic interests: wanting to cooperate just to earn money is seen as a barrier. For this, cooperation becomes impeded when the money runs out.</p> <p>Start GLI: the location or time of day of giving a GLI can be experienced as a barrier by the professionals. An evening GLI may not work for other professionals, and a late afternoon GLI may not work for many working residents. In addition, for many residents it is a barrier to travel far for a GLI and prefer to have it all as close as possible to the door.</p>
<p><i>Motivation</i></p> <p>Helping people get healthier:</p> <p>It has been mentioned by several professionals that helping people to become healthier is a motivation for them to carry out their tasks and responsibilities.</p> <p>Recognize the importance of working together for the long term: recognizing the importance of working together is seen as an important source of motivation. This makes them more inclined.</p>	<p>GLI doesn't make much money: performing the GLI is currently not very lucrative for some professionals, or less lucrative than other activities. This sometimes demotivates to properly perform the tasks and responsibilities.</p>

Job satisfaction: the job satisfaction that the professionals experience working within the integrated collaboration is seen as a source of motivation.

Table 10 Explanation of facilitators and barriers

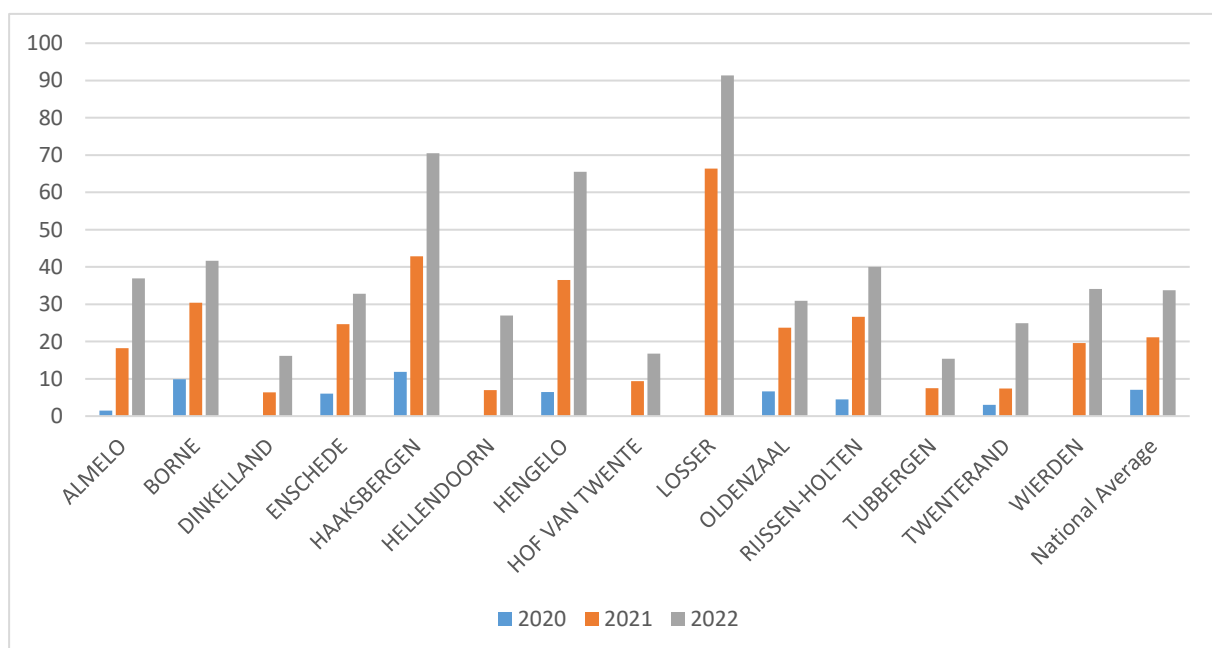
Conversely, having short lines of communication within the municipality and with other professionals is seen as a facilitator by sports companies and neighborhood sports coaches. This streamlined communication enhances the facilitation of participants' access to local sports and exercise offerings. Establishing efficient communication channels among professionals is viewed as essential for facilitating successful program implementation.

To ensure the effective collection of needs and the provision of suitable opportunities, it is crucial for the sports employee to have comprehensive knowledge of the activities available in the area and a strong familiarity with the community members. Professionals emphasize that having a free role, where they have the autonomy to make decisions and take appropriate actions, is an important facilitator for fulfilling their role effectively.

Functioning of the GLI and NDC

Regarding the GLI program, there is an annually increased number of participants in all the municipalities of Twente. In the 6 included municipalities, the GLI participants seem to be the most prominent. Borne, Rijssen-Holtén and Hengelo also show a reasonable influx of GLI participants. *Graph 1* illustrates the percentage of GLI participants per 10.000 residents in each municipality. This graph provides insight into the influx of participants in the GLI program. Out of the 14 municipalities in Twente, 7 are performing at or above the national average.

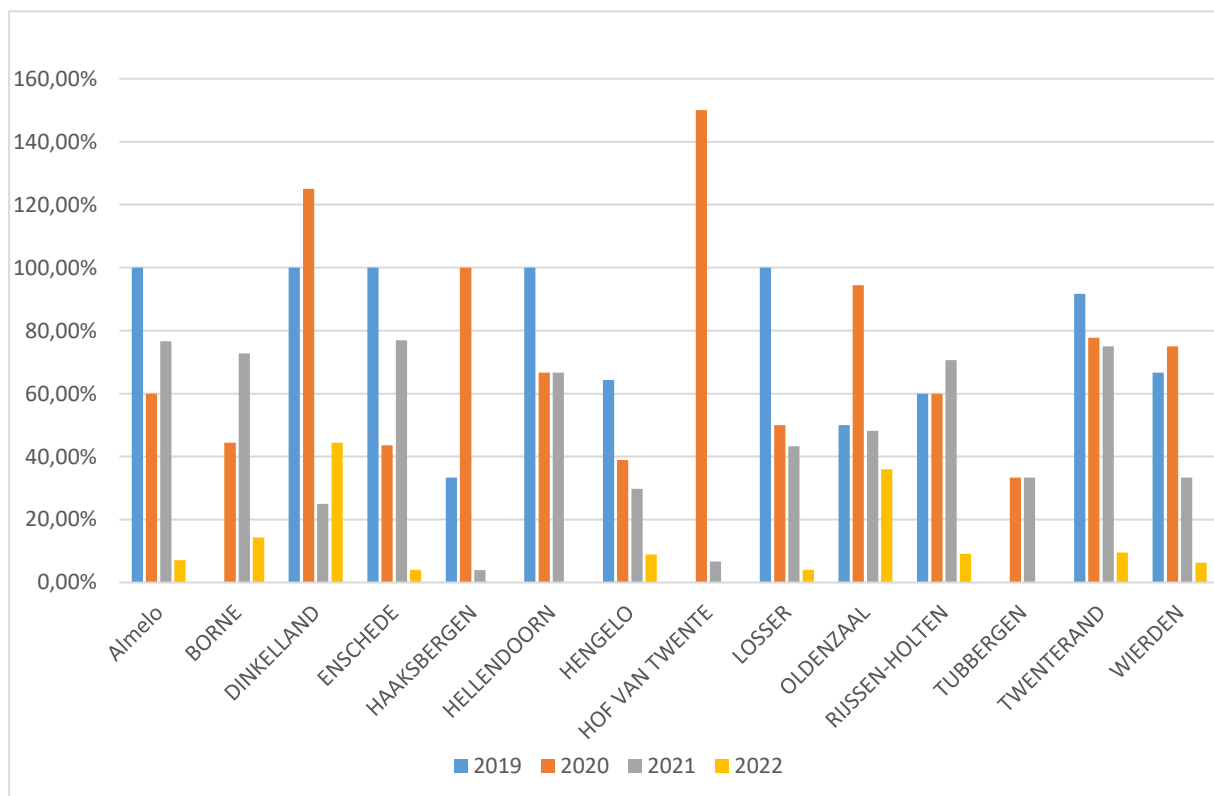
Graph 1 Number of GLI participants per 10000 inhabitants in Twente



However, it is challenging to draw conclusions about dropouts since the number of dropouts is dependent by the number of participants. To assess dropouts effectively, it is necessary to examine the dropout rate relative to the number of participants. *Graph 2* displays the number of dropouts from the GLI program in each municipality. These dropout figures are presented in proportion to the number of participants who initially entered the program and are insured by health insurance company Menzis. Oldenzaal and Dinkelland stand out with an increased number of dropouts. Given that the GLI program extends over a period of 2 years, it is possible for the dropout rate to exceed 100% in certain cases. This can occur when the number of individuals who drop out during a year exceeds the number of new participants entering within a given year.

Lastly, the progression towards local sports and exercise opportunities through a GLI is examined. Municipalities with an active GLI program report a good transition to local sport and exercise offerings, except for Almelo, which faces challenges with this flow.

Graph 2 Dropout rates in relation to influx GLI in Twente

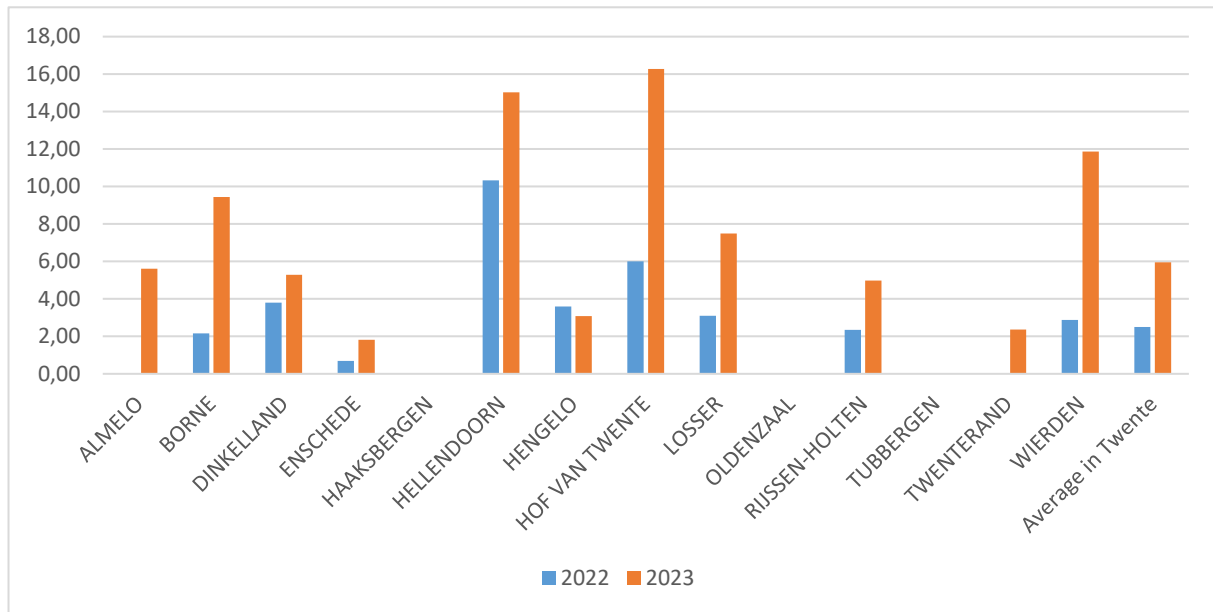


The NDC program was active in 11 out of the 14 municipalities. The number of NDC participants has increased in all municipalities. Hellendoorn and Hof van Twente have a significant number of residents participating in the intervention. It is hard to say anything about the dropouts in the NDC. In Hellendoorn and Losser it has been said that the dropouts were very low. The NDC providers do mentioned that a large proportion of the participants in walking groups continue to walk after the intervention has ended.

Graph 3 focuses on the NDC participants in the 14 Twente municipalities. Like *Graph 1*, this graph presents the NDC participants per 10,000 residents. 5 Municipalities have a higher intake compared to the average intake in Twente.

Overall, it can be said that the interventions function best in the municipalities of Losser and Haaksbergen, and that the interventions in Enschede function least well. In Oldenzaal the intake is reasonable, but there are still many dropouts. In addition, it is noteworthy that in all municipalities there is an improvement compared to 2020.

Graph 3 Number of NDC participants per 10000 inhabitants in Twente



Relation role fulfillment and functioning of the GLI and NDC

Finally, the analysis reveals clear insights into the relationship between the degree of role fulfillment and the functioning of the GLI and NDC interventions in the various municipalities. When comparing the functioning of the interventions across all municipalities in Twente, it appears that the GLI functions most effectively in Losser and Haaksbergen.

This study focused on analyzing six out of the fourteen municipalities in greater detail, considering that these municipalities had already established a certain level of integrated cooperation, which was expected to result in higher role fulfillment. When examining the GLI program's participant intake, it's evident that six municipalities surpass the national average. Among them, three municipalities had more advanced integrated cooperation in place. Three municipalities hover around the national average, specifically Wierden, Oldenzaal, and Enschede. On the other hand, five municipalities fall below the national average.

Notably, the six municipalities with more established collaboration score around or above the national average. This suggests a potential relation between role fulfillment and the success of the GLI program's participant intake.

The study also indicates that the dropout rate in the 14 municipalities until 2021 was relatively high. However, it emerged from the interviews that the decrease in dropouts may be related to GLI providers conducting more rigorous intakes and GPs making more targeted referrals. However, Oldenzaal stands out as an outlier with a consistently high dropout rate. This could potentially be attributed to the broader approach to referrals adopted by practice nurses and the insufficient evaluation of motivational factors during intakes by dietitians. Similarly, Dinkelland also experiences notably high dropout rates. In contrast, the remaining municipalities maintain relatively low dropout rates. Consequently, it appears that there might not be a direct relationship between the level of role fulfillment in municipalities and the dropout rates within the GLI program.

The presence of active neighborhood sports coaches or sports employees in certain municipalities, such as Losser, Oldenzaal, and Haaksbergen, is associated with an increased flow to local sports and exercise offerings after completing the GLI program. These professionals play a crucial role in sharing information about local options, understanding participants' needs, and guiding them towards suitable

activities, thus strengthening the connection between the GLI program and the local community and promoting sustained engagement in physical activities beyond the program.

Regarding the NDC intervention, the number of participants in Twente increased in 2023 compared to 2022. While the included municipalities do not significantly differ in NDC participation, interviews with professionals indicate that there is still room for improvement in terms of cooperation and collaboration regarding the NDC. A potential contributing factor is the lack of collaboration between the healthcare and sports sectors.

The success of the NDC program in 2022 was largely attributed to the enthusiasm and proactive approach of NDC providers. However, in 2023, the program's success was more widely supported by other professionals, potentially contributing to the increase in NDC participants. Although most NDC participants continue with their interventions, limited concrete data is available to make definitive statements in this regard.

The proper performance of professionals' roles has a significant impact on the functioning of the GLI and NDC interventions. There seems to be a relationship between the degree of role fulfillment and the functioning of the GLI and NDC interventions. In municipalities where role fulfillment is high, such as Losser and Haaksbergen, good functioning of the GLI and NDC is observed. On the other hand, in municipalities such as Enschede and Hellendoorn, where role fulfillment is somewhat lower, the GLI and NDC interventions seem to function less effectively, particularly in terms of participant inflow. This suggests that a high degree of role fulfillment by professionals within the integrated collaborations may have a positive influence on the functioning of the GLI and NDC.

In summary, specific professional roles play a crucial role in determining the success of these interventions. These roles directly impact key elements like participant enrollment, dropout rates, and the transition to local sport and exercise offerings.

For the GLI, the active involvement of general practitioners in referring suitable candidates, thorough intakes by GLI providers or dieticians, and effective facilitation of local sports and exercise options by neighborhood sports coaches are pivotal. Excelling in these roles may potentially lead to the optimal functioning of the GLI program.

Similarly, for the NDC intervention, the proactive efforts of NDC providers in establishing connections between sports and the healthcare sector are vital. When NDC providers excel in this role, the intervention tends to function more effectively.

7. Discussion

In this research, we aimed to understand the extent to which professionals involved in integrated collaborations fulfill their roles and have an impact on the functioning of GLI and NDC interventions. Additionally, the barriers and facilitators explaining the fulfillment of professionals' roles were explored.

Main Findings

The findings of this study indicate that the interviewed professionals have a good understanding of their roles and responsibilities in relation to the GLI and NDC. These roles align with each other and are consistent with the roles outlined in the network approach of PON (Partnerschap Overgewicht Nederland) and the theoretical framework.[39] The professionals also demonstrated awareness of each other's roles.

All municipalities in Twente have an increasing number of GLI and NDC participants. The number of dropouts at the GLI is also falling in every municipality. This is in line with the national GLI monitor.[40] Losser and Haaksbergen seem to function best when looking at the inflow, dropouts, and throughput of the GLI and NDC interventions. Enschede seems to perform somewhat less when looking at the GLI and NDC entrants. In Oldenzaal and Dinkelland, the intervention seems to function less in terms of the number of dropouts.

The role fulfillment in the municipalities of Haaksbergen and Losser appears to be high, and these are smaller municipalities in comparison to larger ones like Almelo and Enschede. The literature has shown that in larger municipalities, integrated collaboration can be more challenging due to compartmentalization.[41] In such settings, there tend to be formal boundaries between professionals, making collaboration more difficult. Additionally, communication between professionals may also be more challenging in larger municipalities.

Smaller municipalities may naturally experience a higher level of integrated collaboration to some extent. The "us knows us" principle may be more prevalent in these smaller communities, fostering better communication and collaboration between professionals. As a result, role fulfillment in these smaller municipalities could be influenced by these factors, leading to higher levels of role fulfillment. Therefore, the size of the municipality may play a significant role on the extent of role fulfillment in a municipality. The findings of this study appear to align with this notion.

Alongside the diverse barriers and facilitators mentioned, there are a few key ones that emerged consistently. These key facilitators include having short lines, being motivated to help residents, and taking proactive approaches. The facilitators span across the three domains of the COM-B model, indicating that various factors contribute to professionals' successful performance. Conversely, the key barriers involve the complex background issues of inhabitants, limited time, the lack of economic benefits in the GLI, and the challenge of estimating motivation. Most of the barriers fall into the opportunity domain of the COM-B model, suggesting that the experienced barriers may depend on the social and physical environment in which professionals operate. These findings align with existing literature on the barriers and facilitators of integrated collaboration. [42,43,39]

It is important to note that these identified barriers and facilitators do not necessarily prevent professionals from performing their roles. Instead, they provide insights into professionals' behavior and the contextual factors influencing their role performance. Understanding these barriers and facilitators can help develop strategies to address challenges and enhance the role fulfillment of the professionals.[43]

In municipalities where there was a higher level of role fulfillment, there was a matching facilitator - namely, having short lines of communication. This efficient communication between professionals likely played a crucial role in supporting their ability to fulfill their roles effectively. Conversely, in municipalities where role fulfillment was lower, the identified barriers were the limited amount of time

available to professionals and poor communication, which likely hindered their ability to collaborate and fulfill their roles optimally.

The evaluation of integrated collaboration in various municipalities has revolved around the extent to which professionals fulfill their roles. The findings indicate that true integrated collaboration is present in the municipalities of Oldenzaal, Losser, and Haaksbergen. In these municipalities, there is a well-established collaboration that involves a comprehensive assessment of individuals' needs, followed by appropriate referrals to the relevant professionals. The different domains work well together so that each professional can properly perform his expertise, and that the needs of the inhabitants are met. However, in the other municipalities, integrated collaboration is not yet fully developed. Professionals in these areas are primarily operating within their own respective domains, and there is limited collaboration and coordination between the different domains.

Finally, the proper performance of professionals' roles seems to impact the functioning of GLI and NDC interventions. Certain roles, such as GP referrals, thorough intakes by GLI providers/dieticians, and facilitation of local sports by sports coaches, play a crucial role in intake, dropout rates, and overall progress. When these roles are executed well, the interventions tend to function effectively. This corresponds with the study by Valentijn et al, which shows that clinical integration is very important for integral collaboration. Clinical integration requires a person-focused perspective to improve someone's overall well-being and not focus solely on a particular condition. Professionals should take proper account of the needs of individuals, so that services provided are matched to their needs.[23]

In the case of NDC, proactive connections with the healthcare sector are vital for successful implementation.

Nationally, various resources such as articles and guidelines have been made available to municipalities and umbrella organizations for improving collaborative efforts. A notable example is the guide developed by PON focusing on the network-based approach to address overweight and adult obesity.[38]

When combined with the insights from PON's guidelines, this study's findings provide practical tools to Twente municipalities, enabling them to improve role fulfillment in their municipality with the goal to achieve more healthy inhabitants.

Strengths and limitations

This study represents the first attempt to evaluate the integrated collaboration of the NDC and GLI interventions based on participant intake, dropouts, and flow to local sports and exercise offerings. Given the limited available information on the actual effects of integrated collaboration, a qualitative study was crucial in providing valuable insights.

One limitation of the study is that the analysis relied on claim data provided by Menzis, which may have its own limitations. Although Menzis is the largest health insurer with extensive coverage in Twente, it's important to recognize that the actual number of GLI dropouts may be higher than what the data indicates.[44]

One additional limitation of the study is that it only included individuals from municipalities where the integrated collaboration was already more established. This may limit the generalizability of the findings to other municipalities with less developed integrated collaboration. To gain a more comprehensive understanding of the relationship between role fulfillment and the functioning of the GLI and NDC, it would have been beneficial to include professionals from a broader range of municipalities, including those with less advanced integrated collaboration initiatives. This would have provided a more diverse perspective and allowed for a more nuanced analysis of the factors influencing role fulfillment and intervention effectiveness across different contexts.

Other limitations include the possibility of socially desirable responses from participants, potential overestimation of professionals' role fulfillment, and the underrepresentation of Hellendoorn municipality, pharmacists, and dieticians in the stud.[45]

It's essential to consider these limitations when interpreting the findings and to recognize that further research involving a broader range of professionals and a larger sample size is warranted to provide a more comprehensive understanding of the relationship between role fulfillment and the effectiveness of integrated collaboration in these interventions.

Alongside the mentioned limitations, this study also possesses several strengths. In addition to the quantitative data collected on the functioning of the GLI and NDC, in-depth discussions were conducted with professionals, allowing for a rich understanding of the situation in municipalities. The study involved a diverse range of professionals, ensuring a comprehensive perspective on integrated collaboration.

The decision to conduct one-on-one interviews instead of focus groups provided a deeper understanding of participants' personal opinions and facilitated the identification of barriers and facilitators. The extensive number of interviews allowed for the testing of certain findings with subsequent respondents, enhancing the reliability of the data.

These strengths contribute to a more nuanced analysis of the integrated collaboration in the GLI and NDC interventions, providing valuable insights into the experiences and perspectives of professionals involved in these programs.

Future research

To obtain a more complete understanding of the effectiveness of integrated cooperation, it is recommended to conduct a more extensive study that includes residents, and professionals from other municipalities as well. In addition to examining the functioning of the GLI and NDC, it would be beneficial to consider qualitative feedback from participants regarding their experiences and outcomes such as changes in quality of life or BMI. Furthermore, it would be valuable to assess the workload of healthcare professionals and the cost-effectiveness of integrated collaboration. These aspects are all important in gaining a comprehensive understanding of the effectiveness of integrated cooperation and contribute to promoting and sustaining collaborative efforts.

One possible approach to evaluate the quantitative effectiveness of the integrated collaborations is through Interrupted Time Series (ITS) analysis. ITS analysis involves analyzing data from before and after the intervention to determine whether the intervention, in this case, the implementation of integrated collaboration, has resulted in a significant change in the desired outcomes. By examining the sustainability of the intervention's effects over time, researchers can provide robust evidence of the effectiveness of population-level health interventions. ITS analysis is widely used in public health research and policy evaluation and can provide valuable insights into the long-term impact of integrated collaboration.[46]

Practical implications

The findings of this study provide valuable support for the theory that integrated collaboration among diverse professionals and organizations is crucial in addressing the issues of overweight and (pre)diabetes. These findings can also encourage professionals to perform their roles well and keep doing them.

Besides that, this study serves as an addition to the previous research by Hendriks et al. and aims to provide a better understanding of why professionals may or may not fulfill their roles effectively within integrated collaboration.[36]

Moreover, the results can contribute to the advancement of a regional network approach in the Twente region, fostering the establishment of integrated networks in municipalities where this is still lacking. This study offers useful information to support municipalities in improving or setting up integrated partnerships.

It is now clear for each municipality what the role fulfillment is like, and which factors ensure that professionals do or do not perform their role properly. This, in turn, can lead to improved coordination and cooperation among professionals, ultimately benefiting the overall effectiveness of healthcare interventions in the region resulting in more healthy residents.

The findings of the study align with the objectives of Twentse Koers, which seeks to enhance collaboration among the public, medical, social, and health sectors, all centered around the well-being of the residents.[47] The ultimate goal is to promote healthier years of life for Twente's inhabitants, while ensuring that care remains both accessible and affordable.

Based on the findings concerning role fulfillment, barriers, and facilitators, several practice recommendations can be suggested:

1. Engage in broad intake/Clinical integration: Initiating a broad conversation with residents is crucial to ascertain their genuine needs. Professionals like GPs, practice nurses, or individuals responsible for GLI intakes often perform this role.
2. Facilitate wide referrals: When a need lies beyond a professional's expertise, a suitable referral should be made to another competent professional.
3. Active involvement of neighborhood sports coaches: An active neighborhood sports coach, well-connected within the municipality, can effectively guide residents toward local sports and exercise options or link them to other necessary professionals.
4. Incorporating the social domain is crucial. This is a setting where, on one side, numerous individuals fitting the criteria for lifestyle interventions are present. On the other side, it's also a space for those who might not be prepared to begin GLI or NDC interventions yet.
5. Foster short communication lines: Establishing concise communication channels streamlines interaction between professionals, enhances communication, and expedites referrals.
6. Address economic interests: In many cases, collaborations face challenges due to economic interests. Transparency, clear agreements, and open communication can mitigate these issues, enabling collaborative parties to collectively find solutions and minimize potential hindrances.
7. Recognizing the importance of integrated collaboration: Understanding the significance of integrated collaboration acts as a facilitator, a point consistently emphasized. When professionals comprehend the value of working collaboratively, they are intrinsically motivated to execute their roles effectively.
8. Proactive attitude of collaborative partners: The proactive approach of collaborative partners is repeatedly cited as a crucial facilitator. This proactive stance encourages professionals to reach out to each other promptly, even in the absence of a local driving force.

8. Conclusion

This section addresses the research question:

"To what extent do professionals, involved in integrated collaboration, fulfill their roles and having an impact on the functioning of the GLI and NDC, and what are the barriers and facilitators that explain the fulfillment of professionals' roles?"

The main findings suggest a relationship between proper execution of professional roles and the functioning of GLI and NDC interventions. However, certain roles appear to have a greater influence on intake, dropouts, and throughput. These include the GP's referral role, effective intakes by GLI providers or involved dietitians, and proper facilitation to local sports and exercise options by neighborhood sports coaches in the case of GLI. For NDC, the proactive engagement and connection with care by the NDC provider are crucial. It should be noted that the performance of other roles is not necessarily less important, but this research does not provide sufficient evidence to make definitive conclusions in that regard.

The key barriers experienced by professionals include background issues among residents, limited time, the financial aspect of GLI, and the challenge of assessing motivation. Key facilitators identified are short lines, motivation to assist residents, and proactive approaches. These identified key barriers and facilitators should be taken into consideration when improving current integrated collaborations and establishing new integrated partnerships. Doing so will help maximize the effectiveness of GLI and NDC interventions.

In conclusion, municipalities exhibiting higher levels of role fulfillment among professionals also demonstrate improved functionality of the GLI and NDC interventions. Specifically, when roles involving GP referrals, intake processes conducted by GLI providers, and the facilitation of local sports and exercise opportunities by neighborhood sports coaches are effectively fulfilled, the functioning of the GLI intervention appears to be more enhanced. In the case of the NDC program, emphasis is placed on proactive engagement and seamless connection with care by the NDC provider. This highlights the critical role that comprehensive role fulfillment plays in contributing to the overall success and impact of integrated healthcare collaborations in these interventions.

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10. Appendix

10.1 Subsidy application province

The grant application for the projects has incorporated the specified roles of the professionals and organizations involved. These defined roles outline the responsibilities and contributions expected from each party.

Gemeente	Sportbedrijf	Huisarts en zorg(groep)	Paramedici	GGD	Menzis	
<ul style="list-style-type: none"> Opdrachtgever en medefinancier Onderdeel maken van beleid en begroting (voor de duur van de afspraken) Verbinding leggen tussen de sectoren sport, zorg, welzijn en werk en inkomen Borgen van participatie en inzet van organisaties en partijen (die onder de verantwoordelijkheid van de gemeente vallen zoals de buurtsportcoach/het sportbedrijf en de welzijnsstichting) Koppeling maken met bestaande initiatieven die aansluiten bij deze visie, projecten en interventies Ondersteunen in de realisatie van een duurzame regionale en lokale aanpak 	<ul style="list-style-type: none"> Aanspreekpunt voor (zorg)professionals mbt GLI's (huisartsen, wijkteams, wijkverpleging) Loketfunctie voor inwoner mbt GLI's: intake en verwijzen (in nauwe samenwerking met leefstijlcoaches en aanbieder valpreventie) Sportbedrijf als onafhankelijke en laagdrempelige afzender in communicatie naar inwoners Inwoners begeleiden naar structureel bewegen Verbinding met lokale sportverenigingen mbt aanbod en overdracht Monitoring (op klantniveau) en evaluatie	<ul style="list-style-type: none"> Betrokken in integrale aanpak Signaleren en verwijzen (cruciaal voor werving en duurzame inzet van de interventie bij inwoners) (actieve) deelname in een dorps/wijkgerichte aanpak 	<ul style="list-style-type: none"> Betrokken in integrale aanpak Bieden van specifieke ondersteuning zoals diëtetiek en/of fysiotherapie Begeleiden van deelnemers tijdens de interventie (Kwetsbare) inwoners includeren 	<ul style="list-style-type: none"> Opdrachtgever/nemer en medefinancier Bijdrage aan monitoring en evaluatie (zie hoofdstuk 5) Coördinerende rol; werving en (tijdelijk) in dienst nemen projectleider(s) en regio coördinator Verbinding met bestaande rollen en taken, zoals beleid, gezondheidsbevordering en epidemiologie Betrokken in integrale aanpak; stimuleren verbinding tussen de sectoren publieke gezondheid, sport, zorg en welzijn Waar nodig ondersteunen van andere partijen zoals de gemeenten 	<ul style="list-style-type: none"> Opdrachtgever en medefinancier 	
		Welzijn	Leefstijlcoach			Provincie
		<ul style="list-style-type: none"> Kwetsbare inwoners includeren Begeleiden van deelnemers tijdens de interventie (actieve) deelname in een dorps/wijkgerichte aanpak 	<ul style="list-style-type: none"> Betrokken in integrale aanpak Intake, opstart en begeleiden van deelnemers tijdens de interventie (in geval van de gecombineerde leefstijl interventies) 'spin in het web' tijdens de interventie, verbindende en coördinerende rol voor de deelnemers (in geval van de gecombineerde leefstijl interventies) 			

10.2 Framework underlying causes obesity

Adult patient with obesity								
Clinical Signs and symptoms	Young age of onset Hyperphagia Red hair Hypopigmentation Extreme weight difference between family members	Young age of onset Dysmorphic features Developmental delay Autism or ADD Short stature (Poly-) syndactyly Retinal abnormalities Severe myopia Congenital deafness Nephropathy	Cranial radiotherapy/ Head trauma/ Surgery Neurological abnormalities Hyperphagia Decreased vision	Acne Hirsutism Irregular menses Acanthosis nigricans Erectile dysfunction Post- pregnancy Menopause	Bradycardia Muscle weakness Cushingoid features History of radiotherapy or severe head trauma	Weight increase related to initiation or dose increase of a drug with weight gain as a potential adverse effect	Severe repeated binge-eating with or without inadequate compensation behavior Depressive complaints	Unhealthy food intake Lack of exercise Average sleep < 7hrs Disturbed sleep Snoring/apnea Shift work Alcohol use Stress Smoking cessation Sociocultural background Meal timing Sedentary lifestyle
	Cause	(Mono-)genetic or syndromic	Hypothalamic	Endocrine	Medication	Mental disorders	Lifestyle	
Examples	Defect or deficiency: MC4R Leptine (R) POMC Prohormone convertase-1	Prader Willi Bardet Biedl Albright 16p11.2deletion	Post-radiation therapy Post-surgery Hypothalamic tumor Malformation	PCOS Hypogonadism Post pregnancy weight retention Menopause	(Cyclic) Cushing's syndrome Hypothyroidism Growth Hormone Deficiency	Antidepressants Antipsychotics Anti-epileptics (local)corticosteroids (some) β -blockers Insulin	Binge-eating disorder Bulimia Nervosa Depression Other specified feeding and eating disorders	Hypercaloric intake Lack of exercise Alcohol abuse Nocturnal eating OSA Repeated (very) low calorie diets with yo-yo effect

10.3 Topic list

Introductie

Geachte heer/mevrouw,

Allereerst bedankt voor uw tijd en voor het feit dat u wat meer wilt vertellen omtrent de samenwerking omtrent de GLI/NDC. Mijn naam is Lars Oomkes en ik studeer Health Sciences aan de Universiteit Twente. Het interview zal zo'n 45 minuten duren. Deelname aan dit interview is geheel anoniem en vrijwillig, en u kunt ten alle tijden ervoor kiezen om niet meer deel te nemen aan dit onderzoek. Het onderzoek zal worden opgenomen met als doel om het te transcriberen. Hierna zal de opname verwijderd worden. Alle gegeven antwoorden zullen alleen voor dit onderzoek gebruikt worden en zullen niet verstrekt worden aan derden. Heeft u alles begrepen, en geeft u hiervoor toestemming?

-Opname starten-

Heeft u alles begrepen, en geeft u hiervoor toestemming?

Namens de Twentse Koers doe ik een afstudeeronderzoek naar het samenwerken omtrent de GLI en NDC. Deze interviews worden gehouden met de betrokken professionals binnen een integrale samenwerking van een bepaalde gemeente. Het doel van deze interviews is te achterhalen welk effect het integraal samenwerken heeft op het functioneren van de GLI en NDC. Om de GLI en NDC goed te laten functioneren is het belangrijk dat er genoeg mensen instromen, dat er zo min mogelijk mensen uitvallen, en dat ze na afloop doorstromen naar het lokale sport/beweegaanbod. Hiervoor is het belangrijk dat de professionals in de gemeente goed met elkaar samenwerken. Hiervoor ga ik met de betrokken professional het hebben over zijn of haar rol binnen deze samenwerking. Het gaat in dit interview te allen tijde over uw eigen perceptie en u kunt daarom ook geen goede of foute antwoorden geven.

Nummer	Vragen	Doorvragen	Opmerkingen
	www.twentsekoers.nl		31-08-2023
1	Welke functie heeft u binnen de gemeente?	<ul style="list-style-type: none"> - Organisatie? - Leeftijd? - Werkervaring? - Belang integraal samenwerken? - 	
3	Wie zijn er betrokken bij de samenwerking omtrent de GLI in uw gemeente?	<ul style="list-style-type: none"> - Wat is de rol/taken/verantwoordelijkheden van iedere betrokkene? 	
4	Wie zijn er betrokken bij de samenwerking omtrent de NDC in uw gemeente?	<ul style="list-style-type: none"> - Wat is de rol/taken/verantwoordelijkheden van iedere betrokkene? 	
5	Wat is uw eigen taak binnen de integrale samenwerking?	<ul style="list-style-type: none"> - Doorvragen op de voorbedachte rollen van de professional.(theoretisch kader) - Verschillen deze rollen tussen de GLI en NDC? 	<ul style="list-style-type: none"> - Extra genoemde rollen noteren. - Bij gemeente en sportbedrijven is het namens de organisatie, bij de andere professionals is het namens het individu zelf.
6	Hoe beïnvloeden deze taken het functioneren van de GLI en of NDC?	<ul style="list-style-type: none"> - 	<ul style="list-style-type: none"> -
7	Wat ziet u als belangrijkste taak omtrent de GLI ?	<ul style="list-style-type: none"> - Waarom ziet u dat als belangrijkste taak? - En is deze rol hetzelfde als bij de NDC? 	<ul style="list-style-type: none"> - Deze rol eerst uitvragen, daarna eventuele andere rollen uitvragen. - Extra genoemde taken noteren
8	In hoeverre lukt het u om deze taak te vervullen?	<ul style="list-style-type: none"> - En de rest van de taken?(Eerder genoemd + theoretisch kader) - Wanneer lukt dit wel en wanneer niet? - Hoe heeft dit een invloed op het functioneren op de GLI/NDC? 	
9	Wat zijn de belangrijkste factoren die u belemmeren in het vervullen van deze taak?	<ul style="list-style-type: none"> - Waarom zijn dit belemmeringen? - Op welke manier belemmeren deze factoren u in het vervullen van uw taken en verantwoordelijkheden? 	Capaciteiten, mogelijkheden, motivatie

		<p>COM-B-Model</p> <ul style="list-style-type: none"> - Zijn er ook belemmeringen als het gaat om vaardigheden, mentale skills, tijd, geld, materialen, regels, omgeving/netwerk, motivatie? 	
10	Gelden deze belemmeringen ook bij het vervullen van uw andere taken en verantwoordelijkheden bij het samenwerken?	<ul style="list-style-type: none"> - Voor welke wel, en welke niet? - Waarom is dat? 	
11	Wat zijn de belangrijkste factoren die het makkelijker maken deze taak te vervullen?	<ul style="list-style-type: none"> - Op welke manier zorgen deze factoren ervoor dat het vervullen van uw taken en verantwoordelijkheden makkelijker wordt? <p>COM-B-Model</p> <ul style="list-style-type: none"> - Zijn er ook factoren als het gaat om vaardigheden/skills, mentale skills, tijd, geld, materialen, omgeving/netwerk, motivatie? 	Capaciteiten, mogelijkheden, motivatie
12	Maken deze factoren uw andere taken en verantwoordelijkheden bij het samenwerken ook makkelijker?	<ul style="list-style-type: none"> - Voor welke wel, en welke niet? - Waarom is dat? 	
	De volgende vragen (12 tm 14) worden alleen aan de interventie aanbieder gevraagd.		
13	Doen er voldoende mensen mee?	<ul style="list-style-type: none"> - Zijn dit ook de juiste mensen? - Hoe komt dit? 	
14	Vallen er vaak mensen uit?	<ul style="list-style-type: none"> - Waar komt dat door? 	

15	In hoeverre stromen de deelnemers ook door naar lokaal sport/beweegaanbod?	<ul style="list-style-type: none"> - Om hoeveel mensen gaat dat? - Hoe komt dit? - 	
16	In hoeverre krijgt u doorverwijzingen?	<ul style="list-style-type: none"> - En vanuit wie komen die? - Vanuit het Sociale Domein? - Vanuit Paramedici? - Vanuit huisartsen? - Vanuit de interventie aanbieder? 	Bedoelt om te checken in hoeverre de professionals van elkaar ervaren dat een andere professional zijn rol uitvoert
17	Wat is het belangrijkste dat moet gebeuren om de integrale samenwerking met betrekking tot de GLI en NDC succesvoller te maken?		Perceptie van de professional over de gehele integrale samenwerkingen
18	Heb ik nog dingen gemist, of heeft u nog iets toe te voegen?		

Afsluiting

Nogmaals wil ik u bedanken voor uw openheid en uw tijd. Zal ik met u afspreken dat na afloop van dit onderzoek, ik het via de mail naar u toe stuur?

Voor overige vragen kunt u altijd contact via mijn mailadres met mij opnemen.

10.4 Facilitators and barriers per professional

	Facilitators	Total	Pharmacy	Dietitian	Municipality/umbrella organisations	GLI provider	GP/practice nurse	Social domain	Sports company / neighborhood sports coach
Capability	Being proactive	7	2	1		3	1		
	Experience	6				2	2	1	1
	Background in sports and exercise	4				3			1
Motivation	Helping people get healthier	10		2	1	2	1	2	2
	Recognize the importance of working together for the long term	6		1	1		2	2	
	Intrinsic motivation	6	1	1			1	1	2
	Job satisfaction	6	1		2	3			
Opportunity	Having short lines with professionals	11	1	2		2	1	1	4
	Having a free role	9			2	3	1		3
	Involvement in umbrella organisation	5	2				1	1	1
	Good referral POH'ers	5	1	2		2			

	Barriers	Total	Pharmacy	Dietitian	Municipality/umbrella organisations	GLI provider	GP/practice nurse	Social domain	Sports company / neighborhood sports coach
Capability	Estimating motivation is difficult	3				1	2		
Motivation	GLI doesn't make much money	4		1		1		1	1
Opportunity	Background issues of people	13		2		4	3	1	3
	Limited time	11	2	2	2	1	2		2
	Start GLI	8		1		3	3		1
	Economic interests	7			5			1	1
	Poor motivation participants	7		1		3	2		1
	No communication with GP	6			1		2		3
Unclear responsibilities	6				1	1		4	