

Solving Challenges in Mental Healthcare Considering Human Factors

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Abstract—The mental healthcare sector is coping with several complexities, like long access times and low trust of clients. In this paper, we investigate the causes of and possible solutions for these complexities, while considering human factors. The six root causes are overtreatment, low situational awareness of planning staff, cherry-picking, unusable procedures, limited mental care knowledge among General Practitioners (GPs), and heterogeneity of clients. To solve these, establishing a collaboration between different care providers is important. Additionally, a new digital system could improve the situational awareness of therapists and planning staff. In developing and implementing these measures, it is important to take into account the stakeholders and to evaluate the ideas regularly to ensure acceptance, usability, usefulness, and trust.

Keywords—mental healthcare, human factors, access times, waiting lists, overtreatment, collaboration, situational awareness, trust.

I. INTRODUCTION

Access times in mental healthcare are a persistent problem, while waiting for treatment can worsen the client's condition, especially in this sector. In the Netherlands, the maximum acceptable access times are bounded by the so-called 'Treeknorms'. In the mental healthcare sector, care providers and health insurers agreed on a Treeknorm of four weeks between the application and the initial consult and an additional ten weeks between this consult and the start of the treatment. However, these norms are often exceeded [1], reducing the satisfaction and trust of the clients. This is a complex problem to solve because many stakeholders are involved and many factors, such as overtreatment [2], low situational awareness of planning staff, and limited knowledge of General Practitioners on mental care providers [3], impact this problem.

In this paper, we investigate its causes and possible solutions by analysing the mental healthcare system and creating a framework of this system showing the relationships between the factors that affect the problems of the long access times and low trust of patients. Using this framework, we develop a plan for effectively implementing these solutions. For this study, we build on the knowledge that is already used in other healthcare sectors and apply it to the mental healthcare sector. Additionally, we carefully consider human factors, which are especially important in a socially-oriented system like mental healthcare.

In Section II, we present related work from other healthcare subsystems. In Section III, we describe a summary of the causes of the long access times and the low trust of clients, as

well as the relationships between these causes. In Section IV, we more closely investigate the six root causes and propose solutions to them. Finally, we conclude the work in Section V by proposing solutions and directions for further research.

II. RELATED WORK

In a study on a care program for older adults with dementia and depression in the United States, researchers showed that it is crucial for caregivers to build a relationship with their clients. This way, they can establish trust, which is important because it creates an openness that enables mental support. Additionally, a problem that appeared in this study was that staff used workarounds because not all systems were usable. Therefore, they sometimes needed to do duplicate work. Furthermore, scheduling was a complex task and did result in suboptimal schedules, which also result in a waste of time [4].

Scheduling challenges in combination with human factors are the subject of more studies. Guinery et al. [5] state that in service provision it is important to not solely aim for efficiency because this will increase 'failure demand'. Failure demand is unnecessary demand, so unnecessary work. Instead, they look at the whole system and suggest several access strategies, like pre-booked appointment scheduling or home visits. Different clinics can use different strategies because the choice for appointment strategies is always based on a trade-off. Guinery et al. also suggest that nurses can sometimes take over a task from a specialist to create more capacity. Further, in scheduling, it is important to take human factors into account. This way, human errors can be prevented. For instance, considering staff fatigue levels in scheduling can significantly reduce these levels [6]. Additionally, taking into account human factors, like the nurses' skills or their compatibility, can strengthen the teamwork, causing the staff to work more efficiently [7].

An algorithm for scheduling staff, in their case in operating rooms, while taking into consideration the staff's wellbeing, is designed by Roland et al. [8]. They show the possibility to simultaneously focus on financial and human resources. For scheduling, Discrete Event Simulation could be used as well. This technique can provide insights into the workload and quality of care, while still being a simulation instead of a test in a real environment. So, this is a cost-effective and safe way to evaluate changes in the planning strategy [9].

The aforementioned studies touch upon some important factors to consider when designing a health care system. We

should pay attention to them when investigating the causes of the complexities in the mental healthcare sector specifically. For instance, also in mental healthcare, staff having workarounds can indicate that the system is not designed properly. Additionally, solutions that are used in other healthcare sectors should also be investigated in the mental healthcare sector. For instance, the pooling of capacity that Guinery et al. [5] suggest regarding nurses, could also be a solution in mental healthcare. We use these lessons in the remainder of this paper to apply them to the mental healthcare sector.

A. Planning and scheduling in mental healthcare

Next to the literature on human factors in scheduling challenges, we also reviewed the literature on planning and scheduling techniques in the mental healthcare sector. A study by Carey et al. [10] in Australia suggests that letting clients determine when and how often they need an appointment can be equally effective and more efficient than the current system in which the practitioners determine the frequency and number of appointments. This patient-led appointment scheduling system seems to have the same health outcome, but with fewer appointments. Therefore, it can reduce access times. However, to know if these results also apply for the Netherlands, additional research is needed, because of the different culture and financing system. Additionally, this scheduling solution includes care-related considerations that should be taken into account.

Van den Berg-Vreeken [11] reduced access times for a mental health organisation in the Netherlands by creating a blueprint schedule to provide clarity regarding whether there are vacant appointment slots. Furthermore, the study modelled the process as a Markov Decision Process to determine which patient types should be assigned to which practitioner types. This is a useful method for organisations in which some practitioner types form a bottleneck, whereas the other types have sufficient capacity.

Other initiatives to reduce access times in mental healthcare include the study of Weaver et al. [12], in which the Toyota Production System was used to let employees cooperate in identifying improvement possibilities in the organisation. As a result, the number of phone calls needed before the first appointment was reduced, thereby reducing wasted capacity, which enabled shorter access times. Jones et al. [13] reduced access times by a so-called ‘triage day’. Instead of spending much time reviewing the referral letters to determine the treatment plan, the paper introduced the use of a triage day in which many real-life intakes are performed. Next to a reduction of the access times, this also reduced the no-show rate. The relation between these two variables was shown by Gallucci et al. [14], who observed that among clients with access times of at most seven weeks, reducing access times reduces the no-show probability. Orme and Boswell [15] in turn studied the factors that influence pre-intake drop-out rates, such as age, access time and gender.

B. Planning and scheduling in healthcare

In healthcare in general, more research is done on planning and scheduling. For instance, cyclic appointment schedules can be used to cope with a fluctuating demand of scheduled and unscheduled patients while balancing access and waiting times [16]. Further, distributing the capacity among clients with different urgencies is studied by Zhou et al. [17]. They used a nonlinear mixed-integer programming model to distribute scarce MRI capacity fairly while also considering revenue. This situation differs from the situation in mental healthcare organisations, because rejecting clients would harm their reputation. Patrick and Puterman [18] also consider patients with differing urgencies, but without the option of rejection. They show that in case the capacity is not much bigger than the average demand, scheduling patients at the latest acceptable moment, eventually in overtime, results in a schedule that manages the difference in urgency best with regard to the access times. However, if the capacity is much lower than the average demand, as is the case in many mental healthcare organisations, this will result in enormous overtimes. At an online operational level, Schütz and Kolisch [19] used an iterative dynamic programming model to decide whether to accept or reject a request while maximising the expected profit, which can also be the health outcome. The outcomes of the model were stored in a lookup table and used in a Discrete Event Simulation (DES) to evaluate the effects. Additionally, the authors compared the performance of the model to the performances of four heuristics.

Capacity allocation is also studied by Zhou et al. [20], who developed a multi-objective stochastic programming model for the allocation of ward capacity. They solved this model using DES and linearised the model to be solvable by several algorithms, among which is an ϵ -constraint algorithm. A method to manage a general practitioner’s workload was introduced by Zander et al. [21]. They used Integer Linear Programming models to determine which new patients a practitioner should accept to keep his expected workload balanced with his capacity, considering the age and number of past visits of the patients. Further, Elkhuizen et al. [22] studied reducing access times by first eliminating the backlog by adding temporary capacity and afterwards keeping the access times low by adding structural capacity.

Finally, Bikker et al. [23] reduced access times for cancer patients by designing blueprint schedules for doctors to allocate the capacity to the several treatment types. They did this by first optimising the schedule using an integer linear programming model that considered the static parameters and thereafter evaluating the schedule using DES to include the dynamic parameters.

C. Planning and scheduling in unstable systems

In the mental healthcare sector, demand structurally exceeds capacity, meaning the system is unstable. Other systems dealing with instability are the kidney allocation system and the US public housing system. Bandi et al. [24] created a method to determine the access times in these kinds of systems to

give more clarity to patients and people that are waiting for a house. Bassamboo and Randhawa [25] designed an alternative to the First Come, First Served (FCFS) policy in overloaded systems. Based on the amount of time a customer already waited, they predict his willingness to wait longer. Using this information in a scheduling policy, they reduced the queue length, abandonment ratio and access time. Stolyar and Tezcan [26] also created a model to determine which customer to help next. Their model bases this choice on the customer-specific reward. To the best of our knowledge, no studies are performed on reducing access times in unstable systems in which balking of clients is not common.

To summarise, we found that in the mental healthcare sector only limited research is performed on planning and scheduling. In the healthcare sector in general, more research is done, but these studies assume stable systems or reject demand that exceeds the capacity. Therefore, they do not treat the difficulties that mental healthcare organisations are facing regarding the long waiting lists and access times. We have not found studies considering unstable systems when reducing access times.

III. THE PROBLEM

To analyse the problems and their causes in mental healthcare, we created the problem cluster shown in Figure 1. The issues addressed in the figure are extracted from literature, the news and from our observations and conversations in a Dutch mental healthcare organisation. In the figure, we can see that all problems lead to the final problem of a low trust of clients, which is a serious issue, as Heiden et al. [4] show. When we go back in the causal chain, we see that this low trust is caused by the long access times and by the fact that a client is treated by many different therapists [27]. The causes of the long access times are overtreating [2] on the one hand and low situational awareness of planning staff on the other hand, because the low situational awareness causes a less efficient use of the available capacity. Additionally, the fact that a client meets many therapists is caused by the heterogeneity of the clients and the limited knowledge of General Practitioners on mental care providers [3]. Furthermore, both the long access times and the high number of therapists might be caused by procedures that are not easily usable [4], a cause which needs more research and can differ between mental healthcare organisations, and by “cherry-picking”, which means that some mental care providers choose to only treat clients with easy problems while referring more complex cases to bigger organisations [28]. The different causal factors do also interrelate. For instance, we see that the fact that many therapists treat the same client causes work to be performed in duplicate, which increases the workload, which already is very high [29]. This in turn motivates staff to leave, which causes that clients again get a new therapist. In the end, we observe six root causes. These are the causes that we should take a closer look at.

IV. SOLUTIONS TO THE SIX ROOT FACTORS

To solve the challenges mental healthcare is facing, we should investigate the six root problems and generate solutions to them.

A. Overtreating

Overtreating occurs if clients are treated for an unnecessarily long time. It might be that there is no suitable treatment for the client, but therapists do not like giving up on their clients. In other cases, the therapist might continue treatment, while the client may already be recovered [2]. In this case, the therapist can be too careful and worried about a possible relapse of his client.

To reduce overtreating, firstly, it is important that therapists are aware of their possible tendency to overtreat. This can be done by comparing the average client cycle times of different therapists. In doing this, it is important to take into account differences between clients, because some disorders are easier to treat, while others are more complex and unpredictable. Additionally, in comparing therapists, it is important to consider privacy issues. Therapists that turn out to overtreat might feel attacked if it is noticed and this can affect their working ethos. So, it is important to create a safe environment in which therapists feel they can learn from each other and in which it is appreciated if they are open about their weaknesses. In an environment like that, development, improvement and growth can be realised. Secondly, reducing overtreatment can be realised by handing clients over to a General Practitioner when they are in a stable condition. To encourage this transfer, a close collaboration between the practitioner and the therapist is important [30].

B. Low situational awareness among planning staff

The low situational awareness among planning staff results in gaps in the practitioners’ schedules. In multi-therapist practices, the therapists might need to notify the planning staff themselves when one of their clients has finished his treatment process. If the therapist does not immediately do this, no new client from the waiting list will be scheduled, which results in gaps, and therefore time waste. We can distinguish three levels within situational awareness: perception, comprehension and projection [31]. In this case, the main problem can be classified as a comprehension problem. The manager knows the relationship between the manual work, the planning and the gaps in the schedules, but just does not know the current situation. Therefore, the planning staff can also not project the current situation to the future, which is a projection problem. So, it is important to make sure the current situation is comprehended to enable planners to create a suitable schedule for the next weeks. This can be done, for instance, by creating a system that automatically notifies the planners if a therapist can take a new client. Another solution is to create reminders, for example in the form of a monthly email or a poster, to remind the practitioners to notify the planners. This can increase the situational perception of the practitioners. However, with this solution, there is a risk of alarm fatigue. Therefore, automation

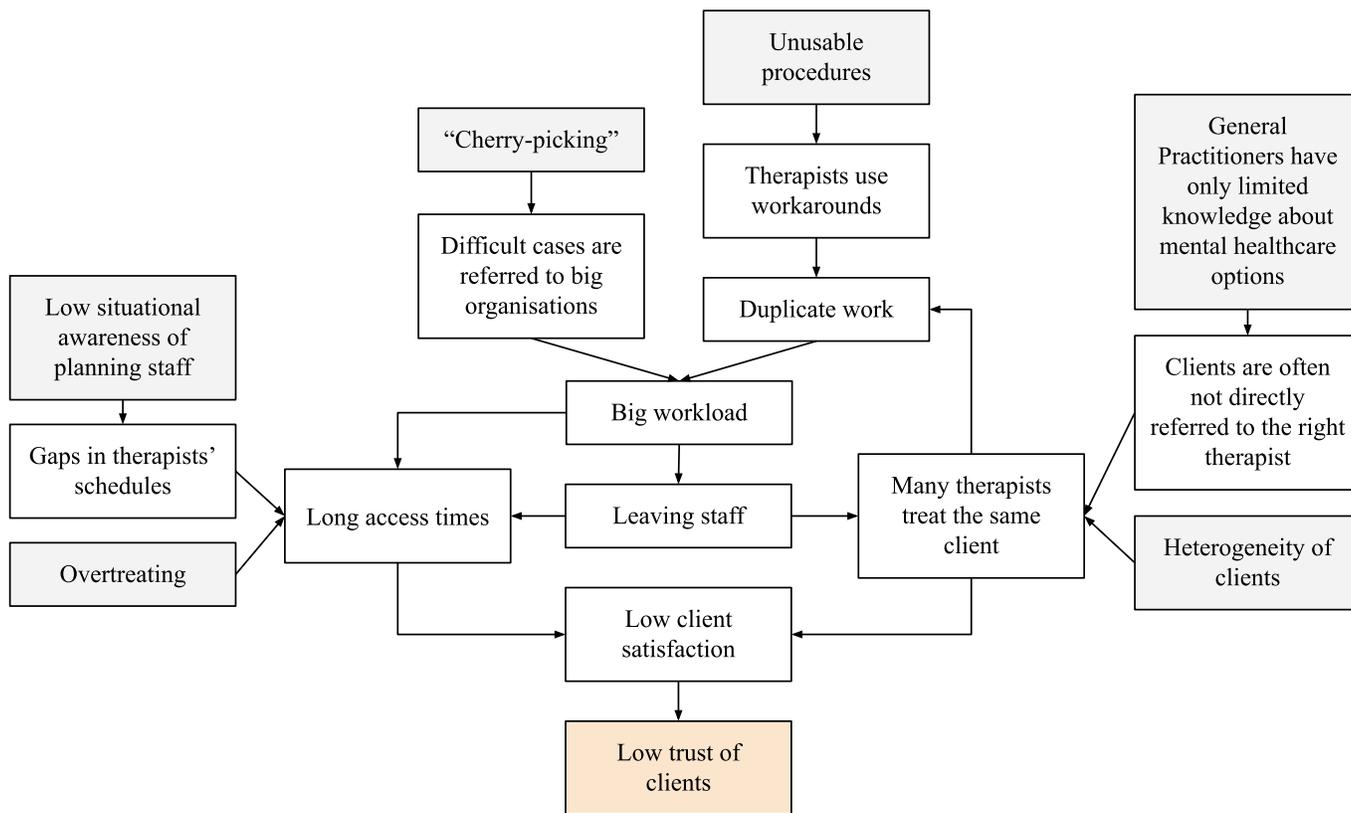


Figure 1. Mental healthcare problem cluster

is more likely to be effective. Nonetheless, the system should be developed with care and evaluation and participation of stakeholders should be part of the design process to ensure the system is effective.

C. "Cherry-picking"

The practice of cherry-picking among care providers can be explained by its financial attractiveness. Namely, up to the end of 2021, due to the national care funding system, short treatments with a high chance of success were more profitable than lengthy treatments with less or slower success. The advantage of this system was that care providers had an incentive to provide a high quality of care and limit overtreatment. However, it is hard to fairly benchmark care providers based on their success because mental diseases are all different and cover a wide range of complexities. Therefore, the chances of success differ much and it is not desirable that clients with more complex problems are not helped. To give providers an incentive to stop cherry-picking, the national care funding system should be adapted or legislation should

require care providers to accept more clients with complex problems. The first, however, appeared to be difficult because objections related to cherry-picking were made against the national care funding system without success [32], because the Dutch Healthcare Authority stated that care providers are allowed to specialise in certain treatments. Nonetheless, since 2022 a new national care funding system is in place, which promises to make cherry-picking less attractive [33]. Forcing care providers to accept more clients with complex problems is difficult to implement because it would complicate the referrals that are needed when it turns out another provider offers a more suitable treatment for a client.

D. Unusable procedures

The fact that therapists might deliberately or instinctively use workarounds for procedures indicates that these procedures are not well-aligned with the needs of the therapists or clients. This misalignment can be observed, for instance, if procedures are performed on paper instead of on the computer or if procedures are even totally ignored. Some reasons for

working on paper instead of in a computer program can be that the computer program is difficult to use or that it has flaws. Additionally, working on a computer can feel more impersonal, while working on paper seems to offer more flexibility [4]. Another workaround can be that therapists who use standardized questionnaires reword the questions [4]. This indicates that the questions might not be formulated correctly. This can either cause incorrect answers of clients if they misinterpret the question or it might hinder correct comparisons between clients of different therapists. These incorrect comparisons are then caused by the fact that researchers think the questions are standardized, whereas, in reality, the clients answered different questions because their therapists reformulated them. Additionally, workarounds can be used if the staff simply does not understand the procedures well enough to use them. All in all, it would be useful to further investigate which procedures are not usable enough and how considering human factors can improve the usability and usefulness of these procedures. This can either be done by adapting the procedures or by training staff. Although training staff can seem the easiest solution, it might just be extinguishing the fire. Creating an intuitive, useful system will be more effective if it is possible [34].

E. Limited knowledge among General Practitioners

If General Practitioners (GPs) do not know what mental healthcare providers have to offer, it is hard for them to refer their patients to the most suitable therapist. Therefore, clients might end up at the wrong therapist, where they will be on the waiting list for several weeks. After that time, they have an initial consult in which it turns out they should be referred to another therapist. There, the waiting process starts again. This is not desirable. We again find that a low situational awareness is at the heart of the problem. The perception of GPs is insufficient. To solve this issue, we could train GPs. However, the downside of this is that it improves the situation just temporarily, because the options for mental care are evolving and changing. Instead, in Limburg, a region in the Netherlands, a regional triage panel has been established. People from different backgrounds, ranging from several mental health organisations to the local government, together decide which organisation is most suitable to help the client [28]. This way, knowledge is combined, a client has a higher likeliness of being referred to the most suitable organisation and his access times at less suitable therapists are reduced.

F. Heterogeneity of clients

Mental difficulties are very heterogeneous. They cover a wide spectrum of symptoms and they evolve in many different ways. Therefore, it is not always clear which treatment will be successful. So, in the end, clients are treated by many different therapists. Each unsuccessful treatment lowers the clients' trust in the care system. In addition, the fact that they need to tell their situation repetitively to their new therapists is not beneficial for their satisfaction with the system. The reduction of trust should be minimised because trust is important in

mental care [4]. If clients do not trust their therapists or their treatment, the treatment will be less successful, because trust is needed to encourage honesty and effort of the clients, which increase the chance of success.

However, the heterogeneity of clients is uncontrollable. Nonetheless, mental health specialists could develop so-called 'care paths'. These are standardised treatment plans for several different mental issues. Clients might not fit perfectly within these standardised paths, but the paths can still help in decision making. They can roughly show which therapy or medication a client should receive, after which the therapist can adapt the plan to the specific client. At a later stage, even artificial intelligence could be used to suggest care paths for a client. However, both with and without artificial intelligence, the risks of under- and overtrust by therapists should be acknowledged [35]. These risks could be dealt with, for instance, by motivating or forcing therapists to first come up with a plan themselves that they can later check against the standardised path. However, this increases the workload. Instead, therapists could be encouraged to first choose a care path, which saves time, and then adapt the care path to the needs of their specific client, which decreases the chance of overtrust. Whether this indeed pays off should be evaluated carefully.

V. CONCLUSION

The mental healthcare sector is coping with several complexities, like long access times and low trust of clients. In this paper, we outlined several causes and their interdependencies. The six root causes are overtreatment, low situational awareness of planning staff, cherry-picking, unusable procedures, limited knowledge among GPs, and heterogeneity of clients. These factors should be addressed to reduce workloads and access times and to increase clients' trust and satisfaction.

A. System development

To address the issues mentioned previously, it would be useful to create a system to improve situational awareness among therapists and planning staff. The system should keep track of the number of clients of therapists and it should notify the planning staff when they can assign a new patient to a therapist. Additionally, this system could compare the average client cycle times of different therapists to make therapists aware of their possible tendency to overtreat clients. Furthermore, standardized care paths, and eventually artificial intelligence, can be included in this system to support decision making. Hereby, the risk of over- and undertrust should be considered. Additionally, in designing such a system, it is important to let stakeholders participate in the design process and to prototype and evaluate the system repetitively to ensure that it is usable. This way the system is more effective and therapists are more likely to accept the system instead of developing workarounds that can cause duplicate work or errors.

B. Collaboration

Additionally, the mental health sector can benefit from collaboration between care providers. A regional triage panel

can help to improve the success of the first referral of clients and a close collaboration between therapists and GPs can encourage a timely handover of the client from the therapist to the GP. In both approaches, trust among the stakeholders is crucial. Therefore, it is important they participate and think along in establishing these collaborations.

C. Future research

Some other aspects should be investigated further. It would, among others, be useful to investigate which procedures are not functioning properly. This can be done by observing whether staff uses workarounds. If procedures turn out to be unusable, projects can be started to improve the procedures. Hereby, user participation is important to ensure the procedures serve their purpose.

Finally, it would be useful to study whether and how the national care funding system could be further adapted to avoid cherry-picking, while still enabling to refer patients to other care providers if needed.

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