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Reducing missed physiotherapy appointments through an Electronic Appointment Scheduling System: A quality improvement intervention study in western Rwanda

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Abstract

Background: Missed physiotherapy appointments in low-resource settings disrupt continuity of care, delay rehabilitation outcomes, and reduce health service delivery efficiency due to inadequate follow-up and communication gaps between health care providers and patients. This study evaluated the effect of an Electronic Appointment Scheduling System (EASS) in reducing missed physiotherapy appointments within a Community-Based Rehabilitation (CBR) health program.

Methods: A participatory quality improvement intervention study with pre-post evaluation design was conducted at Ubumwe Community Center in Rubavu district, Rwanda. We recruited 282 clients, 13 staff and 3 administrators to identify factors contributing to missed appointments using questionnaires, focus group discussion and review of appointment records. Based on root cause analysis, the EASS integrating electronic scheduling, physical appointment cards, short message and phone call reminders, caregiver education and structured staff responsibilities was implemented. Post intervention data were collected for 281 clients and missed appointment rates before and after implementation of EASS were compared.

Results: The missed physiotherapy appointment rate decreased from 35.1% before the to 6.9% after EASS implementation, representing an absolute reduction of 28.2% points and an approximate 80% relative reduction ($p < 0.001$). Improvements in attendances of appointments were consistent across diagnostic categories, including high-need groups such as children with cerebral palsy. Appointment adherence remained consistently higher throughout the six-month post-intervention period.

Conclusion: The EASS significantly improved physiotherapy appointment adherence in a CBR program. Low-cost interventions integrating an appointment scheduling system and electronic reminder systems may strengthen rehabilitation service utilization and continuity of care in resource-limited health systems.

Introduction

Appointment adherence is a critical determinant of treatment effectiveness in any health system and services delivery including physiotherapy, as consistent attendance enables progressive therapeutic dosing, functional recovery, and prevention of complications among patients with chronic or disabling conditions [1]. Missed appointments disrupt continuity of care, delay rehabilitation outcomes, and reduce the efficiency of service delivery [2]. Evidence from high-income settings shows that poor appointment attendance is associated with prolonged recovery time and increased health care costs [3–6]. Consequently, appointment adherence has been identified as a key quality indicator of health care quality and the good health system performance [7].

Missed appointments are disproportionately high in low-resource settings, where, the health systems face constraints related to workforce shortages, weak follow-up mechanisms and patients' transportation barriers such as poverty [8, 9]. In Kenya, approximately 42% of participants have been reported to miss scheduled appointment [9]. In Community-Based Rehabilitation (CBR) programs, inconsistent appointment adherence can undermines long-term functional recovery for persons with various chronic health conditions, while reducing the efficiency of already constrained rehabilitation services [10]. Studies from sub-Saharan Africa report missed appointment rates exceeding those observed in high-income settings, highlighting the urgency of context-specific interventions tailored to community-level rehabilitation models [10, 11]. Although missed appointments are often attributed to patient-related factors, evidence highlights the role of health system barriers [12]. Inefficient scheduling practices, inadequate communication between health providers and patients and the absence of reminder systems have been identified with little attention to delivery of rehabilitation services as major contributors to outpatient missed appointments [12–14]. Several interventions including structured scheduling tools, Short Message Services (SMS) reminders, telephone calls and appointment tracking systems can significantly reduce missed appointments in outpatient settings [13, 15]. For instance, a study conducted in Poland reported that SMS and telephone call reminders reduced missed appointment in mental health services from 18.55% to 7.01% [13]. These approaches are particularly promising in low-resource settings due to their scalability, low cost, and adaptability to existing health service structures [14].

Despite growing evidence on appointment adherence interventions, limited research has specifically examined their effectiveness within physiotherapy services and CBR programs in low-resource contexts, particularly in sub-Saharan Africa [15]. Furthermore, Few studies apply participatory approaches that engage healthcare providers in identifying system-level solutions [16]. This study

presents a critical evidence gap, as CBR programs serve vulnerable populations with disabilities and with chronical health conditions who require sustained health assistance but often face systematic barriers to consistent service utilization.

At Ubumwe Community Center (UCC) Rubavu, high rates of missed physiotherapy appointments were routinely observed and reported, compromising service efficiency and patient outcomes [17]. In response, an Electronic Appointment Scheduling System (EASS) was designed and implemented as an organizational intervention. This study assessed the impact of Electronic Appointment Scheduling System in reducing missed physiotherapy appointments at UCC Rubavu. This system has the potential to improve physiotherapy service utilization and continuity of healthcare in in the setting and in Rwanda at large.

Material and methods

Study design and setting

This study was conducted as a participatory quality improvement intervention study with a pre- and post-evaluation design combining quantitative and qualitative approaches to assess the effectiveness of an Electronic Appointment System (EASS) in reducing missed physiotherapy appointments from September 2023 to August 2025. The study was implemented at Ubumwe Community Center (UCC) located in Rubavu District, Western Province of Rwanda. UCC is a community-based rehabilitation facility providing physiotherapy and other rehabilitation services to individuals with disabilities and chronic functional conditions. The EASS interventions was integrated into the routine physiotherapy service delivery within the community-based rehabilitation program.

Study population and recruitment

The study population consisted of physiotherapy clients receiving rehabilitation services at UCC and healthcare personnel involved in physiotherapy service delivery and program administration. During the baseline phase, 282 physiotherapy patients, 13 physiotherapy staff members and 3 program administrators were included in the baseline assessment and root cause analysis aimed at identifying factors contributing to missed physiotherapy appointments. In the post intervention phase, 281 physiotherapy patients were included in the evaluation of appointment adherence following the implementation of EASS. The sample size was determined pragmatically based on the number of eligible patients attending Rehabilitation services at UCC during the period of the study. This approach enabled the evaluation of EASS under routine service delivery conditions.

Eligibility Criteria

Physiotherapy clients with scheduled appointments recorded in the physiotherapy registers at UCC during the study period were eligible for inclusion. During this study, only staff members involved in appointment scheduling, physiotherapy services delivery and follow-up were included in the study. Clients with incomplete records as well as appointments unrelated to physiotherapy services were excluded from the study.

Baseline assessment and root cause analysis

A baseline assessment was conducted to identify the determinants and underlying causes of missed physiotherapy appointments. Data was collected through a structured questionnaire to physiotherapy adult patients and caregivers, focus group discussions with physiotherapy staff and review of physiotherapy appointments registers. The questionnaires collected information on barriers to appointments, including health conditions, weather constraints, and appointment reminders. Patient satisfaction and delivery service were assessed using a Likert Scale. Staff-related factors were evaluated using Workload Indicators of Staffing Need (WISN) [18]. The focus group discussions were guided with audio recorded semi-structured interview questions to explore existing barriers to appointment adherence and challenges related to scheduling and follow-up practices, while appointment registers were reviewed to characterize the baseline patterns of missed physiotherapy visits. Root causes of missed appointments were analyzed using a fishbone diagram [19], Fig. 1. Additionally, staff training records, infrastructure availability and tools of communication were also assessed.

Development of Electronic Appointment Scheduling System

Based on the findings of the baseline assessment and root cause analysis (Supplementary Table S1), potential interventions were therefore identified and prioritized using a decision matrix (Supplementary Table S2). An Electronic Appointment Scheduling System was identified as the key intervention to be implemented. Next, a team, composed of staff including software developer and administrators, concentrated on developing and enhancing the Electronic appointment scheduling management system, including the electronic appointment information system, use of reminders, appointment cards, and patient training. The Electronic Appointment Scheduling System (EASS) was built as a web-based application: a browser-based interface for day-to-day use, backed by a secure cloud data layer (Convex) that stores client records, appointment and attendance data, and progression information in one place so staff can manage the full scheduling workflow from intake through follow-up (see Supplementary Figure S1 and S2).

Regarding electronic appointment information system, the electronic module includes the soft individual assessment workflow with patient information structured for follow-up: a summary / follow-up view, individual appointment records per client, and a central table of booking records for all clients. Authorized users access the system through authenticated accounts; data are maintained in a single integrated database so that appointments, reminder preferences, and attendance can be tracked consistently across the facility.

Physical appointment cards

Use of physical appointment cards for patients supports the management of missed appointments. The health provider proposed using cards as a reminder so that clients who are able to read can remember the exact time of return. All clients were given a physical appointment cards which help patients remembers the exact date and time of their next visit and were used in conjunction with EASS. The reminders was used to remind client before the appointments which supported the implementation to ensure a client receive appointment information on right time by the provider while through EASS health provider coordinated the process in the organized manner ensuring patients health status is well updated, appointments were properly scheduled, recorded and follow up. This enhanced the effectiveness of the system to minimize the missed appointments in physiotherapy and health information management by the providers.

Use of reminder methods

The team established the use of both text messages and phone calls. Each client was given the opportunity to choose the most suitable reminder method to support their autonomy in treatment, and the provider records that choice in the system. The team identified all clients and their contact information in the system. Each client was asked to confirm their preferred method of receiving reminders: SMS, phone call, or Not applicable for those who did not wish to be reminded. Clients who were able to read, as well as those who needed assistance with reading, were encouraged to choose phone calls. Those who were unable to read were advised to contact the nearest community health worker for assistance with reminders, while those who could read were contacted directly through both SMS and phone calls.

Confidentiality, security, and ethical handling of information

To ensure the confidentiality and security of patient information, all data recorded in the Electronic Appointment Scheduling System are strictly protected and managed according to ethical standards of healthcare information management. EASS operates as a secure web application with role-based permissions so that only authorized staff involved in patient care and administration can view or change records. Use of the system requires sign-in; information sent between users' devices and the service is protected with standard encrypted connections (HTTPS), and hosted backend services follow established practices for protecting operational health-related data. All users are required to maintain strict confidentiality regarding patient information. In addition, physical documents such as appointment cards and records are kept securely and used only for clinical follow-up purposes. These measures are intended to keep patient information private, confidential, and protected throughout the implementation of the appointment scheduling management system.

Post intervention

During post intervention, the team in physiotherapy department collected the data over six-month period during the implementation to assess changes in the missed physiotherapy appointments as it was done in baseline. The data source and tools used in pre-intervention period were employed in the same client's files, appointment status was recorded in the new system EASS, the percentage of missed appointment was recalculated versus all scheduled appointments using the formula. In baseline, our sample was 282 clients, while during the intervention one client died and lost in follow-up and sample was 281 in post-intervention. At the sixth month of the intervention, the pre and post intervention results were compared to study effectiveness of EASS in decreasing the missed appointment in the physiotherapy.

Statistical analysis and data management

Quantitative data were entered into Microsoft Excel and imported in Statistical Product and Service Solutions version 27.0.1 software (SPSS Inc., Chicago, IL, USA). Descriptive statistics, including frequencies, percentages, means and standard deviations were used to summarize findings. Chi-square tests were applied to compare pre-and post-intervention missed appointment rates and to assess associations between sociodemographic, health conditions and appointment adherence. Significance was fixed at $p < 0.05$. Qualitative data of Focus Group Discussions was analyzed and assisted to complement the quantitative findings.

Results

The outcome of this study is depicted in Fig. 2. Using the Electronic Appointment Scheduling System (EASS), the present study aimed to reduce the mean missed physiotherapy appointment rate from 35.1% in February 2024 (M6 pre-intervention) to 10% by August 2025 (M6 post-intervention). The findings demonstrate that, over the six-month post-intervention period, the mean missed-appointment rate declined substantially from 35.1% to 6.9%, exceeding the predefined target. This reduction was statistically significant ($p < 0.001$). Improvements in appointment attendance were observed across patients with different health conditions. For example, among patients with cerebral palsy, missed appointments decreased from 48 (17.0%) in the first month of the pre-intervention period (September 2023; M1 pre) to 10 (3.6%) in the final month of the post-intervention period (August 2025; M6 post). Similar reductions were observed across other diagnostic categories, indicating a consistent improvement in appointment attendance following implementation of the EASS.

Socio-demographic and clinical characteristics of study participants

Table 1 summarizes the characteristics of patients who were assessed in both pre and post intervention. A total of 282 participants were assessed during the pre-intervention period and 281 during the post-intervention period, with no significant difference in overall sample size ($\chi^2 = 0.01$, $p > 0.92$). Gender distribution remained stable across the two periods, with females accounting for 44.7% pre-intervention and 44.3% post-intervention ($p > 1.00$). In contrast, the age distribution differed significantly between the pre- and post-intervention groups ($\chi^2 = 11.9$, $p < 0.018$), with an increase in the proportion of children aged 1–5 years and a decrease in adolescents aged 13–16 years in the post-intervention period. Employment status also showed a significant change, with the proportion of employed participants increasing from 21.3% pre-intervention to 29.4% post-intervention ($\chi^2 = 6.2$, $p < 0.013$). Educational attainment did not differ significantly between the two periods ($\chi^2 = 4.9$, $p > 0.29$). However, the distribution of underlying health conditions differed significantly between the pre- and post-intervention groups ($\chi^2 = 18.7$, $p < 0.001$), although cerebral palsy remained the most prevalent condition in both periods.

Table 1
Variables in pre-and post-interventions and their significance

Variables	Pre, n (%)	Post, n (%)	*p*-value
Total	282	281	0.92
Gender			
Female	126 (44.7%)	125 (44.3%)	
Male	156 (55.3%)	156 (55.3%)	
Age Group			0.018
1–5	110 (39)	135 (48.0)	
6–12	76 (27)	69 (24.5)	
13–16	35 (12.4	17 (6.0)	
17–21	28 (9.9)	23 (8.2)	
22 +	33 (11.7)	37(13.1)	
Employment			0.013
Employed	60 (21.3)	83(29.4)	
Unemployed	222 (78.7)	198 (70.2)	
Education Level			0.29
None	101 (35.8)	101 (35.8)	
Primary	83 (29.4)	82 (29.1)	
Informal Education	60 (21.3)	60 (21.3)	
Secondary	35 (12.4)	35 (12.4)	
University	3 (1.1)	3 (1.1)	
Health conditions			
Cerebral Palsy	144 (51.1)	143 (50.9)	
Paralysis	18 (6.4)	18 (6.4)	
Erb's palsy	10 (3.5)	10 (3.5)	
Motor retardation	11 (3.9)	11 (3.9)	
Musculoskeletal Disorders	99 (35.1)	99 (35.1)	
Key: χ^2= Chi-square, Pre = pre-interventions, post = post-interventions			

Intervention outcomes

Table 2 summarizes missed-appointment outcomes before and after the intervention. During the pre-intervention period, missed appointments were frequent, with an average monthly missed-appointment rate of 35.1% across the six months. In contrast, during the post-intervention period, the average monthly missed-appointment rate declined markedly to 6.9%. Across all months, the post-intervention period consistently showed substantially fewer missed appointments compared with the pre-intervention period. This represents an absolute reduction of 28.2 percentage points and an approximate 80% relative reduction in missed appointments following the intervention. The difference between pre- and post-intervention periods was statistically significant ($p < 0.001$). Analysis of monthly trends further demonstrated a sharp and immediate decline in missed-appointment rates following implementation of the intervention, with rates remaining uniformly low and stable throughout the post-intervention period. These findings indicate that the intervention was associated with a substantial and sustained improvement in appointment attendance.

Table 2
Comparison of outcomes before and after the intervention

Category	Pre-intervention (Average % missed appointment = 35.1%)						Post-intervention (Average % missed appointment = 6.9%)					
	M1	M2	M3	M4	M5	M6	M1	M2	M3	M4	M5	M6
Overall, n (%)	95 (33.7)	107 (37.9)	93 (33.0)	95 (33.7)	99 (35.1)	105 (37.2)	27 (9.6)	19 (6.8)	16 (5.7)	18 (6.4)	23 (8.2)	13 (4.6)
Gender												
Female	37 (38.9)	41 (38.3)	46 (49.5)	38 (40.0)	42 (42.4)	40 (38.1)	11 (40.7)	10 (52.6)	7 (43.8)	9 (50.0)	14 (60.9)	6 (46.2)
Male	58 (61.1)	66 (61.7)	47 (50.5)	57 (60.0)	57 (57.6)	65 (61.9)	16 (59.3)	9 (47.4)	9 (56.2)	9 (50.0)	9 (39.1)	7 (53.8)
Health conditions												
Cerebral palsy	48 (50.5)	50 (46.7)	41 (44.1)	39 (41.1)	48 (48.5)	43 (41.0)	19 (70.4)	10 (52.6)	13 (81.3)	10 (55.6)	16 (69.6)	10 (76.9)
Paralysis	20 (21.1)	21 (19.6)	17 (18.3)	21 (22.1)	13 (13.1)	13 (12.4)	1 (3.7)	1 (5.3)	0 (0.0)	0 (0.0)	1 (4.3)	0 (0.0)
Erb's palsy	2 (2.1)	1 (0.9)	1 (1.1)	3 (3.2)	5 (5.1)	9 (8.6)	1 (3.7)	0 (0.0)	2 (12.5)	0 (0.0)	1 (4.3)	2 (15.4)
Motor retardation	6 (6.3)	8 (7.5)	9 (9.7)	7 (7.4)	8 (8.1)	6 (5.7)	0 (0.0)	1 (5.3)	0 (0.0)	1 (5.6)	0 (0.0)	0 (0.0)
Musculoskeletal disorders	19 (20.0)	26 (24.3)	25 (26.9)	25 (26.3)	25 (25.3)	33 (31.4)	6 (22.2)	7 (36.8)	1 (6.2)	7 (38.9)	5 (21.7)	1 (7.7)
Other / Unspecified	0 (0.0)	1 (0.9)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

Note: The average missed-appointment rate decreased from 35.1% in the pre-intervention period to 6.9% post-intervention, representing an absolute reduction of 28.2 percentage points and an approximate 80% reduction in missed appointments. This difference was statistically significant ($p < 0.001$). The pre-intervention period covered September 2023 to February 2024 (M1–M6), while the post-intervention period covered March 2025 to August 2025 (M1–M6)

Discussions

The intervention was associated with a substantial and sustained reduction in missed appointments. Despite some differences in participant characteristics between periods (age, employment status, underlying conditions), gender and education remained comparable, supporting reasonable baseline similarity. The magnitude and consistency of improvement suggest a true intervention effect rather than random variation.

Our study demonstrated that Electronic Appointment Scheduling System was substantially and statistically significant reduction in missed physiotherapy appointments within the UCC Community-Based Rehabilitation (CBR) program. The mean of missed appointment rate declined from 35.1% pre-intervention to 6.9% post-intervention, representing an absolute reduction of 28.2 percentage points and an approximate 80% relative reduction ($p < 0.001$). The consistency of improvement across diagnostic categories and patient groups suggests a true intervention effect rather than random variation. Baseline comparability in gender and education further supports the internal validity of the findings.

Although differences were observed in age distribution, employment status, and underlying health conditions between the two periods, these variations are consistent with the dynamic nature of CBR programs and community-based service utilization. The stability of gender and education levels strengthens comparability. The reductions in missed appointments were observed across all clinical conditions, including high-need groups such as children with cerebral palsy, indicating that the intervention addressed system-level barriers rather than condition-specific factors [10, 20].

The observed reduction from 35.1% to 6.9% represents a level of improvement that is both statistically and clinically significant. From a service delivery perspective, a missed appointment rate below 10% is considered an indicator of efficient outpatient service organization in many health systems [7, 21]. In low-resource rehabilitation contexts, where reported missed appointment rates often exceed 25–40% [10, 11], achieving a rate of 6.9% represents a trans-formative improvement in service efficiency and continuity of care.

Comparatively, international studies evaluating reminder and scheduling interventions report reductions typically ranging from 30% to 60% relative improvement [13, 21]. For example, a study in Poland using SMS and phone call reminders in mental health outpatient services reduced missed appointments from 18.55% to 7.01%, corresponding to a relative reduction of approximately 62% [13]. The approximately 80% relative reduction observed in this study exceeds many reported effects in literature, likely due to the integrated nature of the EASS, which combined electronic scheduling, physical appointment cards, SMS reminders, phone calls, caregiver training, and structured staff responsibilities, rather than relying on a single intervention component. This integrated, multi-component design is consistent with systems theory in healthcare quality improvement, which emphasizes that complex problems such as non-attendance require multi-level interventions addressing communication, organization, accountability, and patient engagement simultaneously [22].

The findings of this study are consistent with global evidence demonstrating the effectiveness of appointment scheduling and reminder systems in reducing missed appointments [14, 20, 21]. Studies in outpatient medical services have shown that SMS reminders alone can reduce non-attendance by 20–50% [21], while combined reminder strategies notably SMS, phone calls, scheduling optimization, achieved greater reductions [13, 14]. However, most existing studies focus on hospital outpatient clinics and general medical services rather than rehabilitation and physiotherapy settings [15]. This study therefore fills an important evidence gap by demonstrating that structured organizational interventions are equally effective in CBR physiotherapy programs, where attendance is critical for functional recovery and long-term outcomes.

In sub-Saharan Africa, missed appointment rates in outpatient and rehabilitation services are often reported to exceed 30–40%, compared to 5–15% in high-income settings[10, 11]. For example, studies from rural rehabilitation programs report default rates above 35% due to transport barriers, weak follow-up systems, and poor communication structures[10]. By reducing missed appointments to below 7%, this study demonstrates that context-specific, low-cost organizational interventions can close this gap, challenging the assumption that high default rates in low-resource settings are unavoidable.

Furthermore, the participatory quality improvement approach used in this study aligns with evidence showing that staff engagement and stakeholder participation enhance the sustainability and effectiveness of health system interventions [16, 22]. Unlike top-down technological solutions, the EASS was co-designed with staff, administrators, and service users, increasing ownership, feasibility, and long-term integration into routine service delivery.

This study findings have important implications for rehabilitation policy, health system strengthening, and CBR program design. First, they demonstrate that missed appointments should be conceptualized as a health system performance problem, not merely a patient compliance issue. Organizational interventions such as structured scheduling, reminder systems, and integrated follow-up mechanisms should be incorporated into national rehabilitation and primary healthcare guidelines[7, 20]. Second, the scalability and low-cost nature of EASS components notably physical appointment cards, SMS reminders, basic digital scheduling tools, and structured staff roles make this model highly suitable for low-resource settings[14].

Clinically, improved appointment adherence directly supports better rehabilitation outcomes through continuity of care, progressive therapeutic dosing, and prevention of functional regression [1, 2, 14]. In CBR contexts, where long-term engagement is essential for disability management, improved attendance also enhances caregiver education, adherence to home-based exercises, and psychosocial support integration[10, 15]. At the program level, reduced missed appointments improve service efficiency, staff productivity, and resource utilization, contributing to stronger health system performance and sustainability [6, 7].

Strengths include the participatory design, mixed-methods approach, and use of routine service data. Limitations include the single-site pre-post design without a control group and the lack of long-term sustainability assessment, which may limit generalizability and causal inference.

A major strength of this study is the use of a mixed-methods, participatory quality improvement design, combining quantitative analysis with qualitative insights from staff and service users. This approach strengthened the validity of root cause identification and intervention selection [5, 16]. The use of objective appointment records and standardized data collection tools also enhances reliability and reduces recall bias. Several limitations should be acknowledged, first, the study used a pre–post design without a control group, which limits causal inference. Although the magnitude and consistency of the effect strongly suggest an intervention impact, unmeasured external factors cannot be completely excluded. Second, long-term sustainability beyond the post-intervention period was not assessed, and future studies should evaluate whether improvements are maintained over multiple years. Despite these limitations, the large effect size, statistical significance, consistency across patient groups, and alignment with existing evidence strongly support the effectiveness of the EASS intervention.

Conclusion

The EASS intervention was highly effective in reducing missed physiotherapy appointments within a CBR program, the intervention achieved an approximately 80% relative reduction in missed appointments, demonstrating that organizational and system-level interventions are highly effective in improving service utilization and rehabilitation continuity in low-resource contexts. This study provides strong evidence for integrating structured scheduling and reminder systems into community-based rehabilitation services to strengthen health system performance and patient outcomes.

Declarations

Ethical approval and consent to participate

Ethical approval was obtained from the University of Rwanda, College of Medicine and Health Sciences Institutional Review Board with Reference Number CMHS/IRB/325/2025. The permission to carry out the study was granted by UCC Administration with Reference Number UCC/28204/2025. The written informed consents were obtained from legally adult participants. Those aged below eighteen, the informed consent to participate was obtained from the parents or legal guardians. Confidentiality was maintained by anonymizing data, and participation was voluntary. All procedures involving participants were carried out in accordance of ethical principal of the Declaration Helsinki [23].

Consent for publication

Not applicable

Conflicting and competing interests

Authors declare no conflicting and competing interests

Authors' Contributions

VWN contributed to the conceptualization, study design, methodology, data collection, data analysis, and drafting of the original manuscript. AN contributed to the study design, methodology, supervision, and critical revision of the manuscript. AK contributed to the methodology, data analysis, and manuscript review and editing. ELN contributed to data collection, data management, and manuscript review. LR contributed to data analysis and interpretation of results. CRG contributed to methodology, supervision, and critical revision of the manuscript. SD contributed to data collection, coordination of field activities, and manuscript review. EB contributed to data collection and data management. JM contributed to supervision, validation of findings, and manuscript review. LRu contributed to overall supervision, project administration, and final approval of the manuscript. All authors read and approved of the final manuscript.

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Data availability and sharing statement

All data generated in this study are included in this manuscript. However, the dataset will be made available by the corresponding author : nderewilliam@gmail.com upon reasonable request.

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Figures

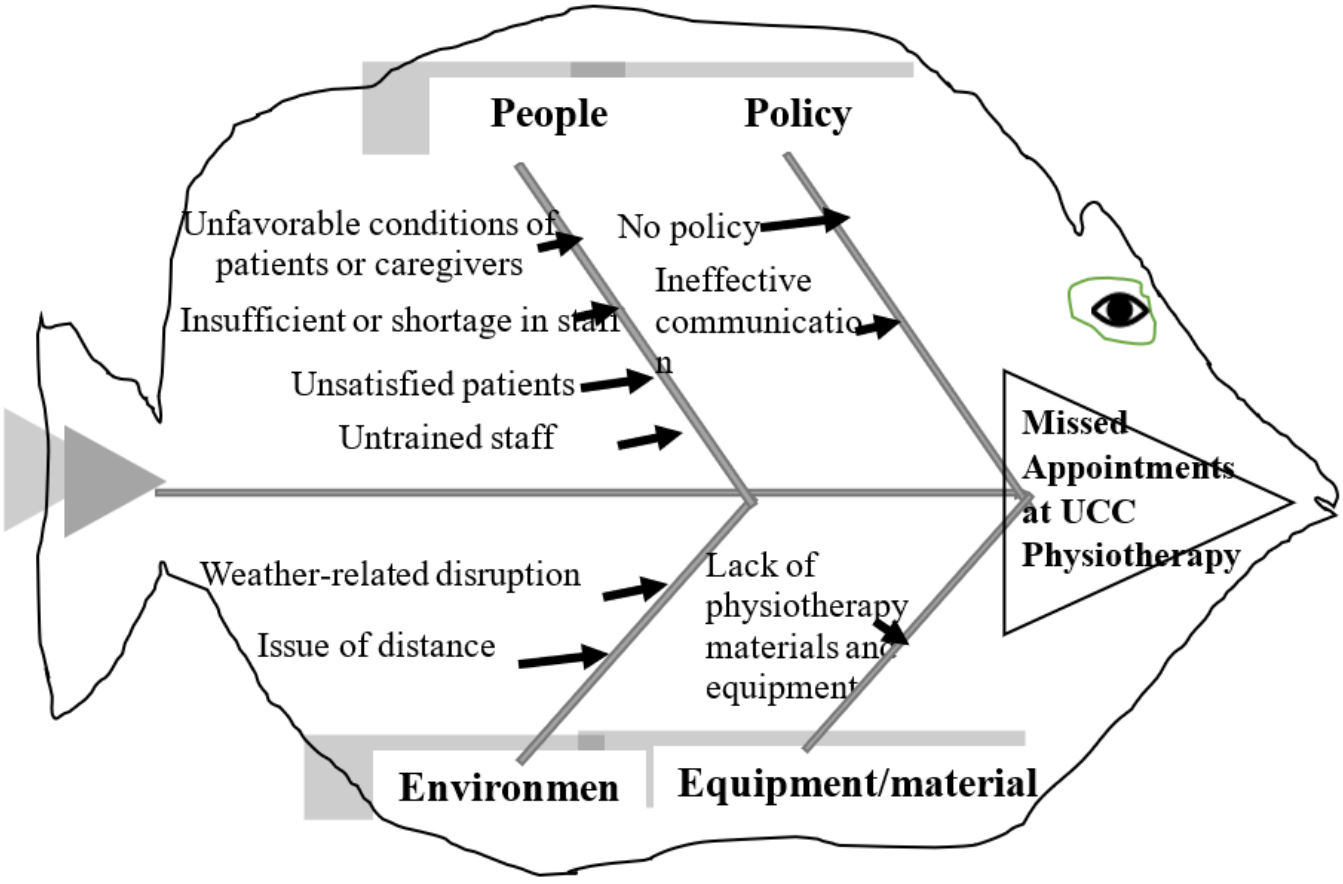
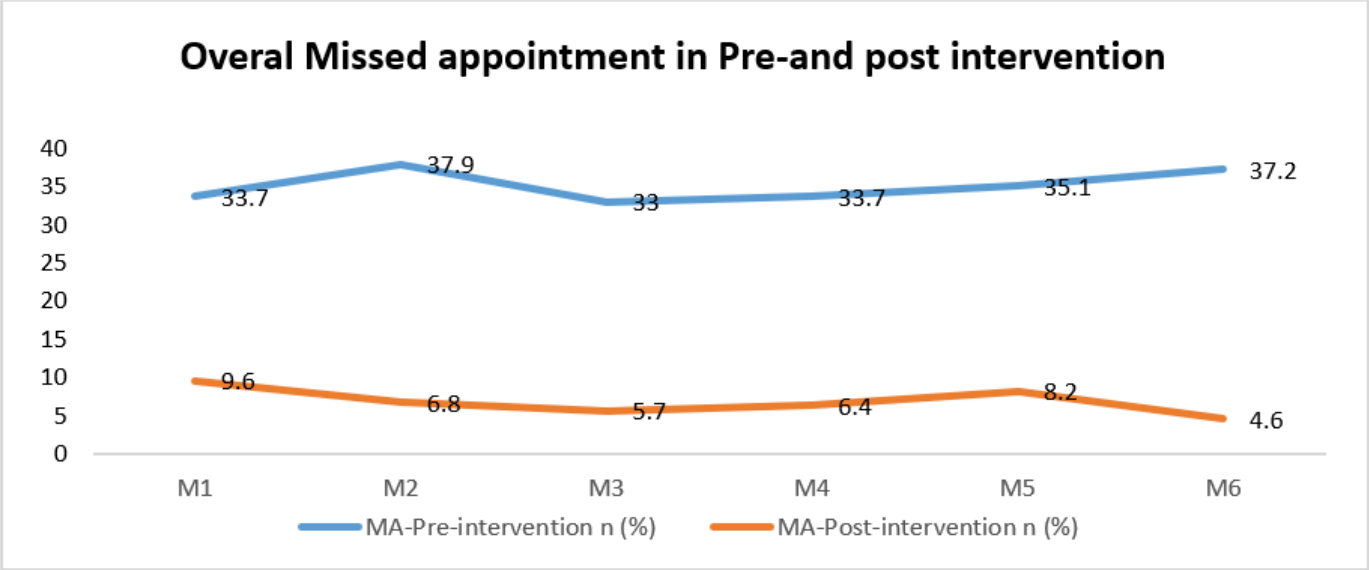


Figure 1

A fishbone diagram with all possible causes



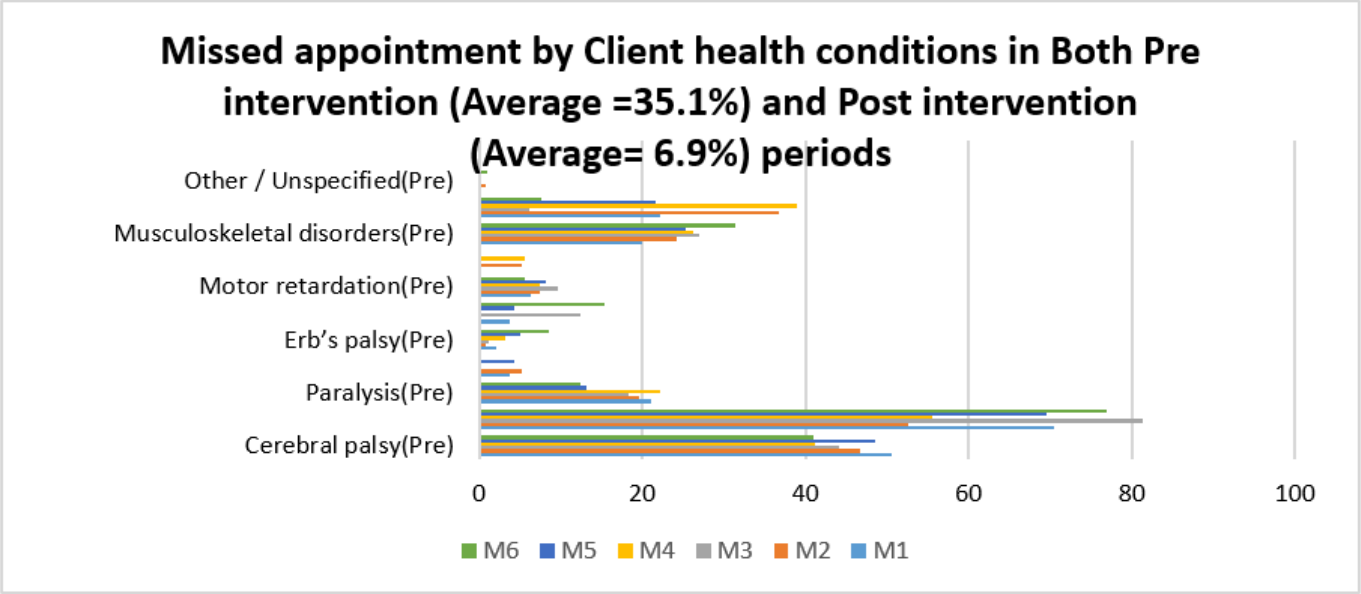


Figure 2

Missed appointment by Client health conditions in Both Pre-intervention (Average =35.1%) and Post intervention (Average= 6.9%) periods

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