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RESEARCH

Optimal management of children on antiretroviral therapy (ART) in primary care: a quality improvement project

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Introduction: With the large volumes of human immunodeficiency virus (HIV) positive patients in South Africa, one clinical management strategy has been to task shift. This means that previously hospi-centric HIV services have devolved to primary health care (PHC) clinics. The referral pattern is true for paediatric patients as well. With the added complexity of managing children, there was a concern in the research district that children were not being optimally managed at PHC level.
Method: A quality improvement project was initiated to assess HIV-positive children's management at PHC clinics and to implement an intervention to improve this care.
Results: The initial audits of 624 children in the district revealed that only 66.6% of children had undetectable viral loads (VLs). Other poor indicators were lack of regular blood results, omission of prophylactic isoniazide (INH) and cotrimoxazole etc. Documents were disorganised and not standard across the district. The intervention sought to place the local clinic doctor as the champion in each clinic. A reorganised file was planned where all the care elements would be clearly present.
Conclusion: Post intervention, it was clear that where individual doctors took on the challenge of quality improvement there were significant process changes. Results are discussed in detail.

Keywords: child HIV, doctor involvement, primary health care, quality improvement

Introduction

The national guidelines for the management of children on antiretroviral therapy (ART) in South Africa have been revised three times in the last five years.[1–3] This indicates a rapid responsiveness to evidence emerging from literature and research. It also creates a challenge in terms of practical implementation as health care providers need to remain informed and current. The initial guidelines indicated the fast tracking for initiation of children on ART, within one week, if they were tested positive and were under one year old. Neonates were given prophylactic treatment if they were exposed during pregnancy and tested at six weeks and if positive, started on ART. Both these guidelines have subsequently changed to include all babies exposed to HIV having a polymerase chain reaction (PCR) at birth and all HIV-positive children, regardless of CD4 counts, aged under five being started on ART. Blood monitoring has changed as well since 2010. Initially the viral load (VL) was done on initiation of ART and was also used for confirmation of HIV infection in children less than 18 months old. Children less than five years old required a VL every sixmonths and those more than five years old, yearly. This then changed to: no VL at initiation, but after six months for all children and then yearly if the VL was suppressed.

The major drug change was that abacavir (ABC) replaced stavudine (D4T) as a first-line drug for all age groups. Children needed a suppressed VL before a single drug swap could be done.

There is a solid body of evidence that where drug management is started early, the outcomes are superior.[4–9] The intensified monitoring and changed drug regime supported this argument.

There is less literature published regarding the optimal management of children who have been diagnosed with HIV, regarding the systems within which this should occur. In the research district, because children are considered more complex to manage than adults, they were initiated on drug treatment and monitored for a number of years at hospitals under close supervision by doctors. This has been found to be unsustainable. A systematic review[10] done to examine task shifting to maximise good HIV care showed increased access to ART, better quality of care and improved adherence to be some of the positive outcomes found when hospi-centric, doctor-dominated care was moved to primary care and replaced by nurse-driven management. The positive outcomes of increased enrolment at primary care level have been reported in a number of other papers.[11–14] According to Suthar *et al.*, 'Partial decentralization into primary health facilities improved retention (RR 1.05, 95% CI 1.01–1.09) and reduced mortality (RR 0.34, 95% CI 0.13–0.87). Full decentralization improved retention (RR 1.12, 95% CI 1.08–1.17) and led to comparable mortality'[12] [p. 1]. In Zambia[13] there is evidence that 'Care provided by clinicians such as nurses and clinical officers can result in good outcomes for HIV-infected children in primary health care settings in sub-Saharan Africa. Mortality during the first 90 days of therapy is high, pointing to a need for earlier intervention.'[13] An interesting finding from Rwanda was 'growing evidence of positive synergies between HIV care and the delivery of other primary health care'.[14]

The South African Antiretroviral Treatment Guidelines 2010[2] [p. 28] say: 'As the ART programme has expanded, and the pool of expertise increased, PHC facilities are now expected to be able to initiate and provide ART for both adults and children. Care for an

increasing number of children should be provided at PHC level and by nurses.' This practice was followed in the research district since 2013 and most children who had been managed at the hospitals in the district were down-referred to clinics.

After a number of years, it became apparent to the district clinical specialist team (DCST)[15] and the family physicians (FPs) in the district that the care HIV-positive children were receiving was not standard across the district, nurses were reluctant to initiate treatment and there was little insight into the best practices at a primary care level. A local non- governmental organisation (NGO), Wits Reproductive Health Institution (WRHI), the FPs and the DCST decided to do a quality improvement (QI) project in order to assess the situation and to develop interventions for improvement.

QI is a management strategy encouraged by the Department of Health.[16] In the DCST handbook[17] clinical governance, through audits and other means, has a particularly important emphasis. The value of QI is that it is both research and action[18,19] if rigorous methods are followed. In most countries the concept of QI has been formalised and become part of daily practice.[20–26] The above-mentioned role players agreed on this method to assess the child ART situation and to decide collaboratively on interventions to improve services.

Method

Standards set by the team were for 80% of the children at PHC clinics to be virologically suppressed and for 80% of the files to well organised and include the necessary stationery. It was also decided to monitor the nutritional status of children although a standard was not originally set for this.

The QI was initiated with a baseline file audit of 31 primary care facilities in the district from February to May 2014 using an audit tool created by the team.

The variables chart included clinical, laboratory and nutritional information. This would be followed by a focused multi-faceted intervention and the audits would be repeated in 12–18 months to assess the outcomes. The team comprised DCST members, FPs and WRHI members initially and PHC doctors were involved as the QI developed.

Inclusion criteria were the files of all HIV-positive children up to the age of 14 who were being managed at primary care level. Confidentiality was managed through the avoidance of names of patients or clinics. As this is a service-improvement initiative, formal ethics approval was not sought.

Process

Phase one

Outcome of first audits: The files of 624 children at 31 of the 37 clinics in the district were audited. Those clinics not involved were undergoing maintenance or had indicated that they had no children on their registers.

General findings in the district reflected trends in each subdistrict. The best performing subdistrict consisted of down-referred patients from an excellent tertiary service. This may have contributed to the relatively complete records and good outcomes in this subdistrict and masked the actual PHC influence on care.

Ages of children across the district showed very few new initiations in babies, which correlates with fewer infections and the national success of the EMTCT programme (Figure 1). The bulk of the children on ART are over five years old. This trend continued through 2015 with the greatest number of children on treatment above five years of age. This reflects the globally increasing numbers of adolescents on ART: children who had been perinatally infected and are now growing into adulthood. A shift in the paediatric population statistics has occurred, as previously most children did not survive till the age of five.

The worst-performing subdistrict in 2014 showed all their clinics having VL suppression rates under 80% (Figure 2). Although children's VL levels are generally higher at initiation of ART, and thus still detectable by six months, this generalised poor performance is of great concern. At two clinics in this subdistrict, the VL suppression rates were 50% or less. This may presage a problem of resistance, which has financial and health consequences for the district and is extremely risky for the patients. It is also one of the early-warning indicators of resistance.

The regular monitoring of children in particular is a cornerstone to effective management of ART. Figure 3 shows the 2014 and 2015 district pattern in terms of suppressed VL levels; whether this blood was taken annually; the CD4 results across the district as well as full blood counts for children on AZT and

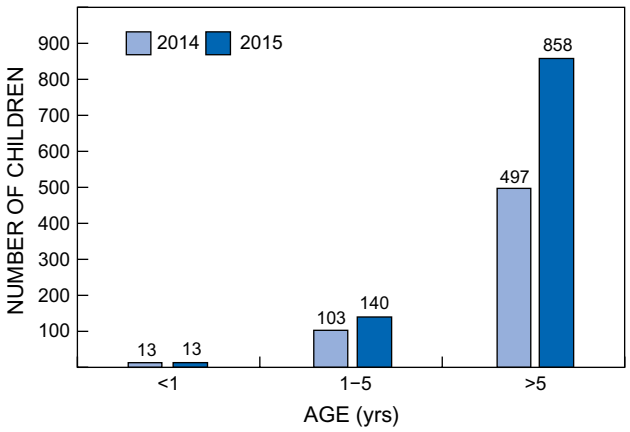
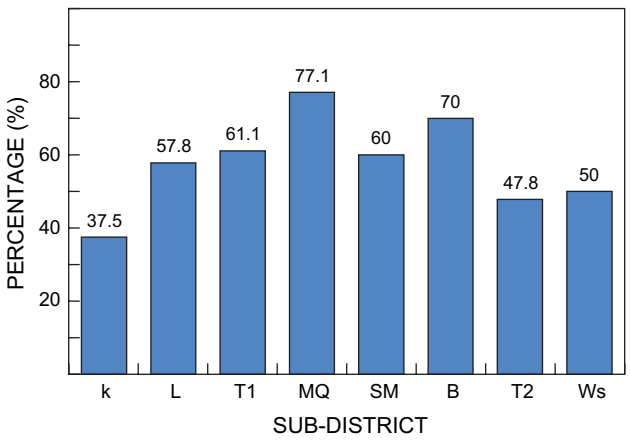


Figure 1: Child ages in the district (2014/2015).



[K, L, T1, MQ, SM B, T2, Ws are clinic abbreviations for anonymity]

Figure 2: Suppressed viral loads of children in one subdistrict (2014).

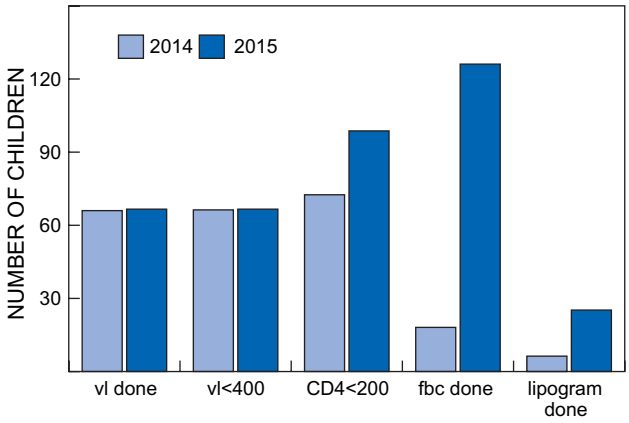
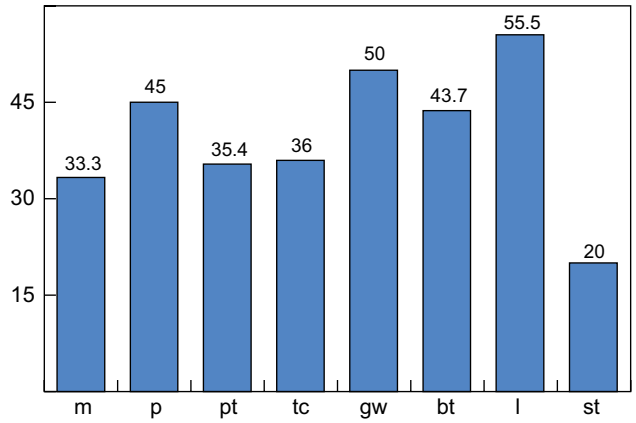


Figure 3: Monitoring and outcomes of children on ART in the district (2014 and 2015).



[m, p, pt, tc, gw, pt, bt, l and st are clinic abbreviations for anonymity]
Figure 5: Normal weight for age in one subdistrict (2014).

under five years of age, and lipograms for children on PIs. Most children are being seen on a monthly basis, which is often unnecessary. In spite of this, suboptimal levels of blood tests are being done and immunological outcomes are not acceptable. However, all aspects of monitoring did improve from 2014 to 2015.

Preventative treatment such as cotrimoxazole and INH were also assessed and implementation was poorly done. This was linked to the poor documentation of whether or not the child had had a TB contact. Should this information be unavailable, it is impossible to assess whether the child qualifies for INH or not.

Figure 4 shows that children were weighed fairly regularly. Heights, however, were seldom measured.

In older children the heights are essential to monitor stunting. More than 50% of children had an abnormal (low) weight for age. This confirms other local findings where early nutritional status is permanently affected by HIV infection if not managed aggressively in the early stages of the illness.

In Figure 5 one subdistrict showed that all except one clinic contained more underweight than normally nourished children. One clinic in a very vulnerable area indicated that only 20% of children fell within the accepted weight range.

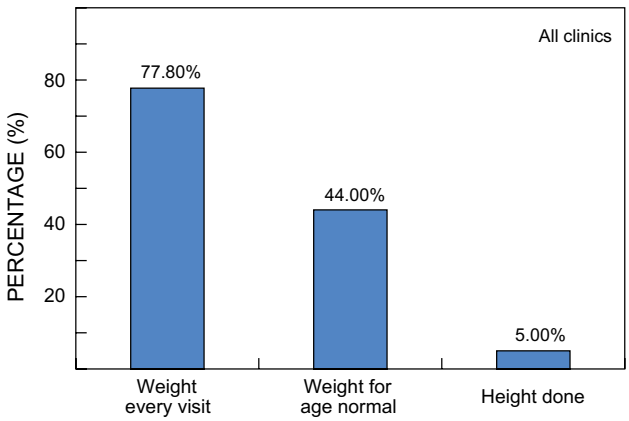


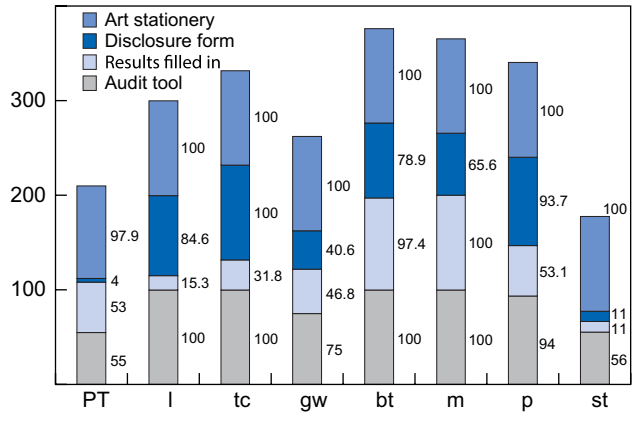
Figure 4: Nutritional measurement across the district (2014).

Intervention

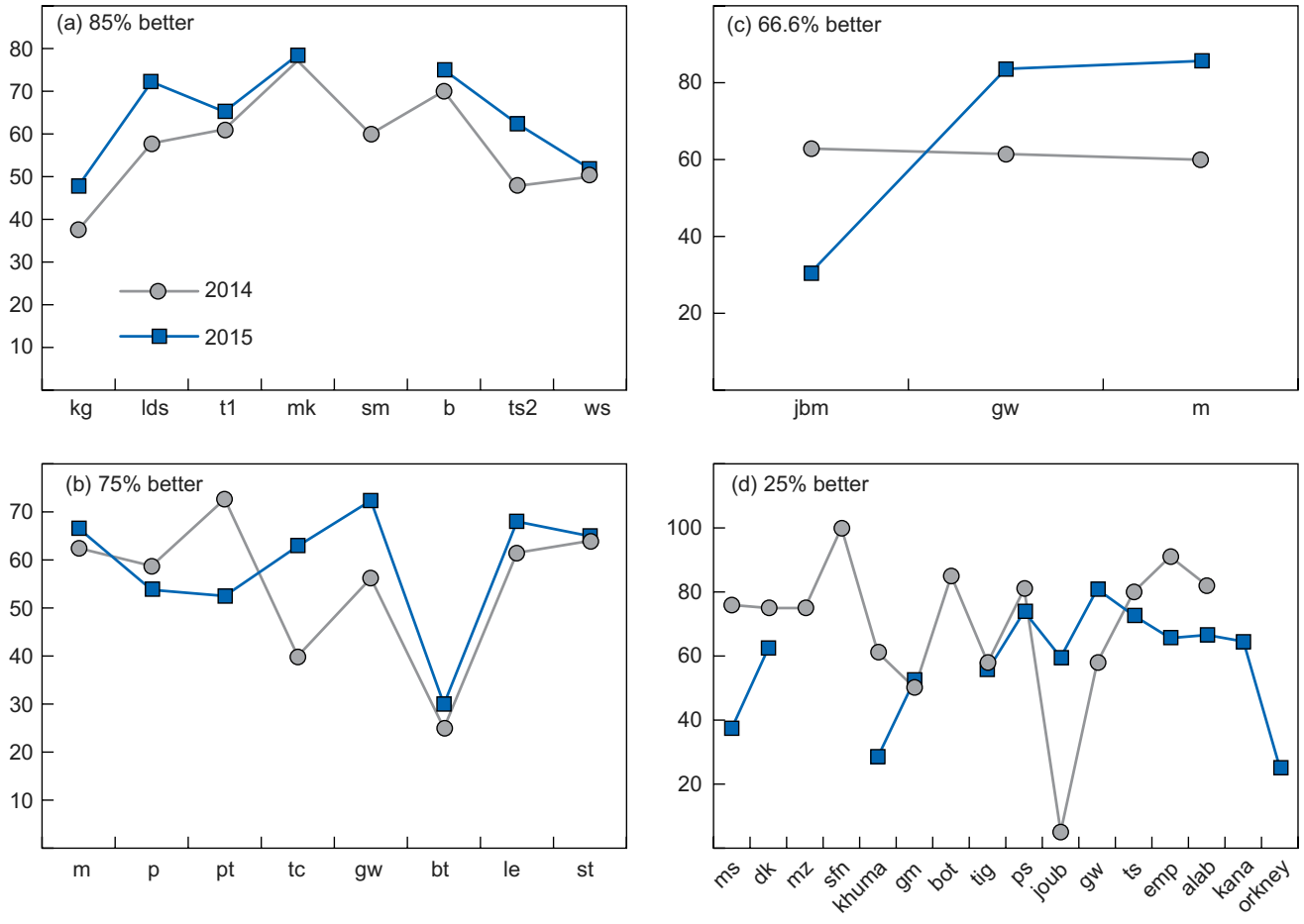
After debating the audit findings, the QI team agreed upon an intervention called 'Adopt a clinic', which included the following. Doctors were requested to be champions at individual clinics which they 'adopted' and a workshop was arranged where the results of the initial audit were shared and a strategy was planned. Weekly file audits were to be done by clinic doctors on the files of children seen that week. An audit tick sheet was created to be inserted in the file to organise the file and check that all the necessary items had been done. Where gaps were found these needed to be highlighted in the file and discussed with the staff caring for the children. It was also decided that a fast queue should be organised for ART children and that all children lost to follow-up should be traced through the community health workers (CHWs). The possibility of providing stable children with 2–3 months' supply of ART was another option considered in consultation with the district pharmacist.

Phase 2

The original standards of 80% VL suppression and 80% of organised patient documentation were revisited. The main outcome standards for phase 2 were to have the paediatric HIV stationary available in all the files; to have the files properly organised, with each file including a growth chart to monitor the weight and height of the children; and to monitor bloods according to the latest guidelines.



[PT, l, tc, gw, bt, m, p, st are clinic abbreviations for anonymity]
Figure 6: Availability of stationery in files in one subdistrict.



[All the abbreviations are abbreviated clinic names for anonymity]

Figure 7: Comparisons between 2014 and 2015 suppressed VLs in four subdistricts.

In three subdistricts the audit material was found in many of the files and the organisation of files had improved greatly (Figure 6). Overall 80% of clinics complied with the use of this stationery, which does not mean that it was always complete or correct.

Outcomes for one subdistrict

The key indicator of care, the suppressed VL, is illustrated in the three subdistricts where there had been active participation in the project. The subdistrict that had not involved doctors in the management of children on ART performed much more poorly, as can be seen in Figure 7. However, the average VL suppression rate across the district had not changed at all. The original average was 66.6% and the follow-up average was 66.6% across the 31 clinics monitored. This still falls far short of the 80% being striven for.

This figure shows that in the three subdistricts (A, B, C) where the intervention had been initiated, 85%, 75% and 66.6% of facilities had improved VLs from 2014 to 2015, as compared with subdistrict D where little had been done, which reflected only 27% of facilities having improved VLs.

An analysis was also done of the six clinics all found in one subdistrict, where there was no evidence at all of audit stationery versus the six clinics across the other three participating subdistricts, with the highest evidence of audit stationery. This is demonstrated in Figure 8.

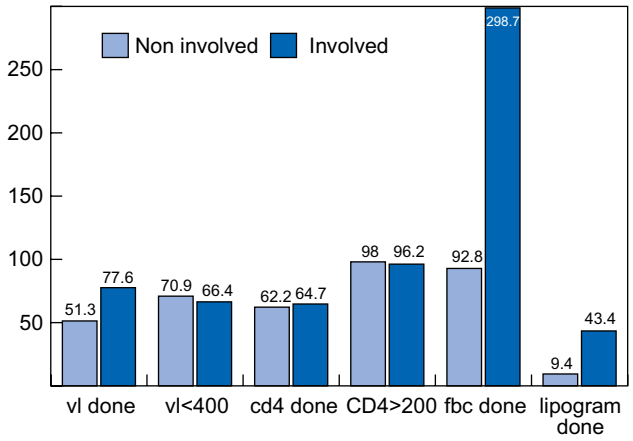


Figure 8: Six clinics with no evidence of audit stationery versus six clinics with best audit stationery.

It is interesting to see, if one compares these, that the clinical outcomes are actually slightly better in the non-involved clinics and the monitoring in the involved clinics. The confounding factor in these non-involved clinics is that they are part of a subdistrict where children had been down-referred later to clinics from a highly functioning paediatric OPD where excellent results were attained due to ongoing adherence counselling and rigorous management of the complexity of child ART. The

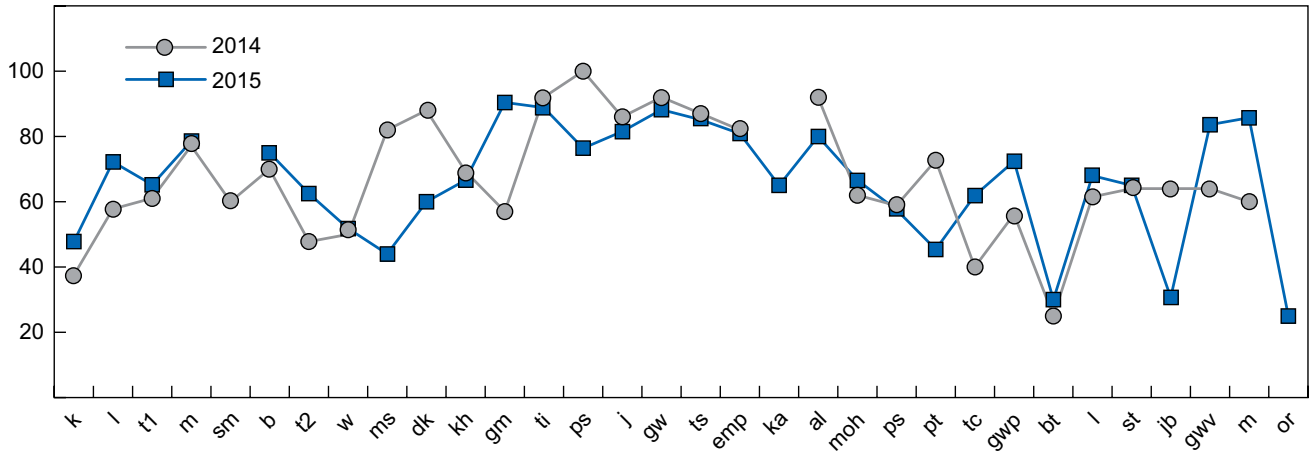


Figure 9: Virological suppression between clinics 2014/2015.

children who arrived at the clinics in this subdistrict had very good VLs and CD4s as a result. However, as the year progressed, the results deteriorated and only a few clinics showed evidence of increased viral suppression.

Some 65.5% of clinics indicated improvement of VL suppression across the district (Figure 9). Monitoring of patients through bloods and screening procedures, e.g. WHO staging, TB risk and eligibility for cotrimoxazole and INH, improved across the district from 2014 to 2015.

Discussion

There were a number of unforeseen variables that impacted on this QIP and its outcomes from Phase 1 to Phase 2. A few of these were national interventions like the 700 Clinic electronic patient system, the appointment and resignation of some NHI doctors who had been very actively involved in the project and the stockouts of abacavir and zidovudine syrups for a number of months. These are key drugs in the paediatric ART programme, and children had to either take a 'drug holiday' or be changed to a second regime. These issues have all impacted negatively on the project whereas the improved availability of stationery for ART children probably positively influenced some of the indicators.

The involvement of doctors appears to have had a positive impact on the clinics where they were collaborating with child ART management. This is reflected especially in the VL suppression improvements in the three subdistricts where the project was running well as opposed to the subdistrict where it had been applied in a very limited manner. In the intervention clinics it was also clear that monitoring of bloods, TB screening and WHO staging was much better implemented than in the non-involved clinics. The annual FBC was over-utilised in all the subdistricts and the lipograms improved significantly. In all the clinics CD4 counts had improved with most clinics managing nearly 100% of children having CD4 counts > 200. This may be as a result of a clinical and immunological stabilisation in the population of HIV-positive children, most of them having been on ART for a number of years.

The area of concern is in the deterioration in a subdistrict where monitoring and outcomes had initially been excellent. This has been flagged and specialist leadership sought to tackle the problem in the next cycle of the QI.

Plans for the following improvement cycle, as a spiral of ongoing QI, will include using the Three Interlinked Electronic Registers (TIER.Net), a stronger role for data capturers and CHWs in the follow-up of defaulters and capturing accurate information, modification of the audit tool with an emphasis on the VL suppression and less on WHO and CD4, and other criteria that do not directly reflect VL suppression.

Conclusion and recommendations

The absence of doctors in quality improvement projects in PHC in health could be a barrier to excellent clinical care. However, where there is doctor involvement at clinics, quality improvement should be part of the job description. There does have to be a continuing cycle of mentoring and monitoring to keep the process active.

Task shifting in a paediatric ART programme in particular can be effective if patients continue to be closely monitored and PHC nurses are regularly supported by a PHC doctor.

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