

Evaluating the use of nystatin oral drops in a paediatric tertiary hospital in South Africa: A Medicine Use Evaluation

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Nicole Hoffman, winner of the Life Healthcare best podium presentation

Introduction

It is estimated that more than 50% of prescribed medicines are dispensed or prescribed inappropriately worldwide, while half of the patients do not take their medication as prescribed.¹ Antimicrobial resistance is a global growing crisis, driven by irrational medicine use and inappropriate prescribing.²

Pharmacists should take a leading role in promoting the safe use of medicines, given their specific expertise. Rational medicine use (RMU) can be improved by following evidence-based guidelines, which will ultimately promote the patient's health in the most effective way. When the challenge of guideline implementation is overcome, evidence-based guidelines will not only lead to quality care, but will also serve as a blueprint for health care professionals to provide a set standard of care to all patients.³ Constant monitoring of medicine use is essential to promote RMU.⁴

A medicine use evaluation (MUE) is a quality improvement intervention based on on-going, systematic, criteria-based evaluation of medicine use.⁵ A MUE consists of an investigative phase (measuring and defining medicine use; identifying medicine use problems and measuring the impact of interventions) followed by an interventional phase (problem solving, consensus building and activity implementations towards improving medicine use). A decision to conduct a MUE is based on whether a specific medicine item meets any of the following criteria: high expenditure, high usage, high-risk or problem-prone (inappropriate use). In essence, an MUE represents a plan-do-study-act (PDSA) cycle, as depicted in Figure 1.

The South African Standard Treatment Guidelines (STGs) and Essential Medicines List (EML) for Paediatric Hospital Level⁶ as well as those for the Primary Health Care (PHC) Level⁷ both recommend the use of nystatin oral drops for the treatment of oral candidiasis.

Nystatin oral drops (20ml/unit) featured at number 126 (out of 1000) on the ABC analysis for February 2016 at Red Cross War Memorial Children's Hospital (RCWMCH). For the year 2016 the total spend on nystatin oral drops accounted for R30 816.

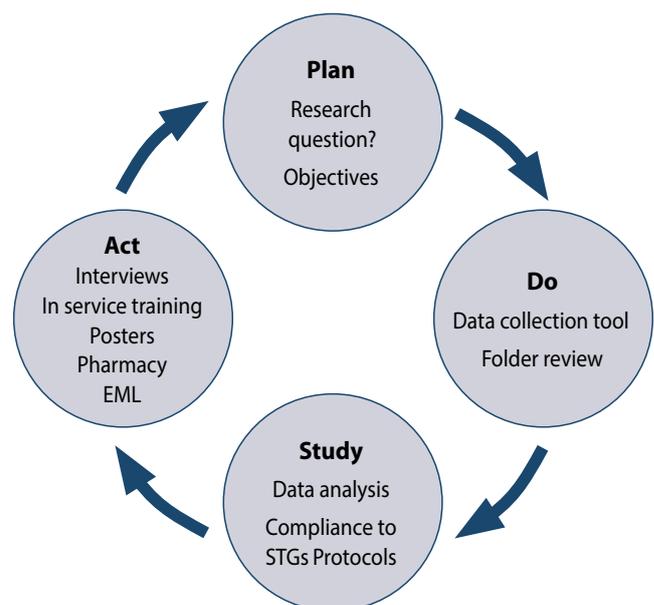


Figure 1: The Plan-Do-Study-Act (PDSA) Cycle of quality improvement

Oral thrush is generally regarded as a primary health care disease, except in high-risk patients, such as immunocompromised patients and those using long-term antibiotics or immunosuppressant medications. As a tertiary paediatric institution was not expected to encounter such a high usage of a primary health care medicine, a MUE was considered to be necessary.

Methods

Phase 1 was a retrospective folder review, while phase 2 was a post-analysis multicomponent education intervention. The analysis of the data collected in phase 1 informed the design of phase 2, by identifying non-compliance with the STG and assisting in identifying appropriate interventions to ensure changes in prescribing patterns and RMU. The PHC Level 2014 STG was used for the education intervention since this was the most recent and updated version available.

The study site was RCWMCH, and the sample was a convenience sample of the first 107 available patient folders. The study population included both in- and out-patients less than 18 years of age. The MUE was conducted between 1 September 2014 and 30 June 2016. The MUE criteria were based on the STG/EML for Paediatrics Hospital level (2013) and PHC level (2014), as shown in Table 1.

Table 1: MUE criteria	
INDICATIONS	
Oral candidiasis (Oral thrush)	
Oesophageal Candidiasis	
DOSAGE	
1ml	
0.5ml	
Other	
FREQUENCY	
6 hourly	
4 hourly	
Other	

Approval for the MUE was granted by hospital management and supported by the Pharmacy and Therapeutic Committee (PTC) at RCWMCH.

Results and Discussion

The demographic profile of the sample is shown in Table 2.

Table 2: Demographics		
Parameter	Total number of folders (n)	Percentage (%)
Sex		
Male	53	49.5
Female	54	50.5
Age		
0 - 1	35	32.7
1 - 2	22	20.6
2 - 5	22	20.6
5 - 9	13	12.1
9 - 15	9	8.4
15 - 18	6	5.6
Co - morbid conditions		
HIV	11	10.3
Tuberculosis	4	3.7
Liver Transplant	16	14.9
Renal Transplant	8	7.5
Cancer	1	0.9
Other	62	57.9
Not noted	1	0.9

A total of 107 patient folders were reviewed. As expected, the largest proportion of cases (33%) was under the age of 1 year. Such patients are more prone to infection, since their immune system is not yet fully developed.¹ Oral thrush is an opportunistic infection and immunocompromised patients are at a higher risk.

The recorded indications for nystatin oral solution are shown in Figure 2.

Only 26 folders (24.3%) indicated oral candidiasis (OC) as a specific diagnosis. As a result, 76% of the cases reflected that nystatin was

■ Oral Candidiasis ■ Oesophageal Candidiasis ■ Other mouth conditions ■ Other

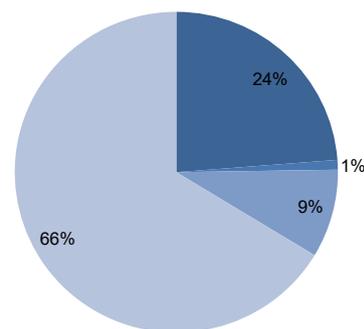


Figure 2: Indications for the use of Nystatin

being prescribed for a condition that was outside the STGs. However, it must be noted that the diagnosis of oral conditions is difficult in children. It may be challenging to distinguish between OC and other mouth conditions (listed in 12% of cases), including herpes infection, mouth ulcers and milk deposit. Other indications (66%) include any other non-EML indications, including the use of nystatin in compliance with informal protocols and for no specific diagnosis.

The specific OC and non-OC (and hence non-EML) diagnoses or reasons for prescribing nystatin are shown in Figure 3. Antimicrobial therapy included anti-viral, antibiotic and antifungal treatment.

Local RCWMCH protocols state that nystatin should be used during antibiotic therapy (which was recorded for 54% of cases), as prophylaxis after liver and renal transplant (23%), following caustic injury of the oesophagus (5%) and during prolonged nasogastric intubation (4%).

In the renal and liver transplant protocols, nystatin is used as prophylaxis for OC, which can lead to severe systemic fungal infection. Interviews with doctors revealed that in the absence of nystatin use, a greater percentage of children developed OC with poor outcomes. Higher dosages are required in the first 3 months of treatment as higher doses of immunosuppressant medications are prescribed.

For OC as a noted diagnosis, only 3 folders showed compliance with the prescribing recommendations as set out in the PHC Level 2014 (i.e. 1 ml 6 hourly for 7 days).

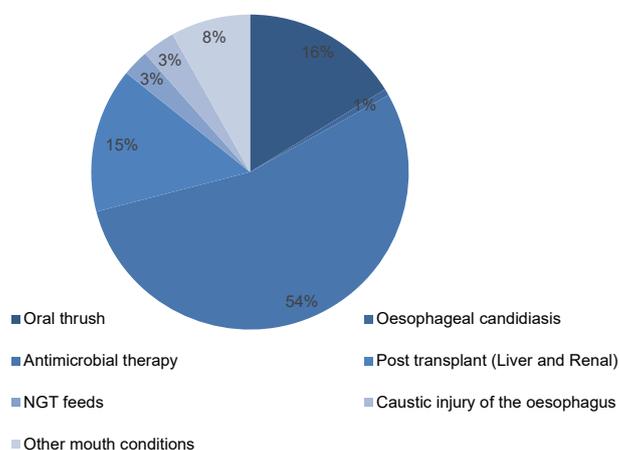


Figure 3: Specific and Non-EML indications for the use of nystatin

Since April 2016, the tender price of nystatin oral solution has doubled per unit (20ml bottle) from R7.43 to R15.16. Unchecked inappropriate use will have a significant impact on fungal resistance, will not realise intentions for best practice, will misguide training and will not provide opportunity for remediation. As RCWMCH is a teaching hospital, it is imperative to ensure best practice and training. There are also challenges with the supply of nystatin by those awarded the tender. Effective RMU is therefore a priority. The volume of issues and expenditure on nystatin at RCWMCH between 2015 and February 2017 is shown in Table 3.

Table 3: Nystatin consumption for the period 2015 - 2017

Year	2015	2016	2017 (Jan & Feb)
Quantity (20ml unit)	5 889	5 674	515
Value (R)	42 862	54 458	6 613
Average Monthly Usage (AMU)	490	472	257

Intervention

Based on the identified non-compliance with STGs, posters were designed to assist prescribers to distinguish between the differential diagnoses of OC. The posters included an algorithm to follow when dealing with OC, based on the PHC level 2014 STG. In-service training sessions were held at various meetings to share the results of the MUE, to create a context for the training aid, and to distribute the posters. The issue of limited and incomplete medical notes was raised at the PTC. Another intervention was an immediate recommendation to pharmacy management to request recording and review of local hospital-specific protocols.

Recommendations

Pharmacists should take responsibility, be responsive and be actively involved in a multidisciplinary team to ensure RMU.

Training sessions should be implemented with the aim of personal development and to ensure quality improvement. Training should be versatile, including face-to-face training, multidisciplinary ward rounds, antimicrobial stewardship ward rounds and in-service training.

STGs should be more thorough and clear to ensure optimal patient health outcome. During this MUE we noted and reported the inconsistency between the different STGs. The Pharmacy Department should also request all existing protocols from all clinical departments,

as these may have a greater impact on practice than the national STGs, especially at tertiary institutions.

The PTC should be responsible for developing and maintaining local clinical guidelines, initiating MUEs, leading quality improvement projects, selection of the most safe and cost-effective medication and reporting and preventing of adverse drug reactions⁴

Limitations

The absence of a multidisciplinary structure impeded the success of this project. The absence of formal written protocols limited the evaluation of nystatin use at RCWMCH and made it difficult to draw valid conclusions. Time constraints also made it difficult to do a second folder review to evaluate the success of the MUE, limited the available time for training session and for distribution of the posters.

Conclusion

Inappropriate medicine use is a crisis that should be addressed with urgency to ensure rational use of resources. Nystatin is merely an exemplar of the larger problem, used here to illustrate the concept of RMU. The results from this MUE showed that staff at RCWMCH were not compliant with the national STGs. This should be addressed to ensure optimal patient health outcomes. As the custodians of medicine, pharmacists are at the forefront of ensuring RMU. It is imperative that this philosophy is embraced by all pharmacists, in order that subsequent MUEs yield the desired outcome of correcting prescribing and dispensing in compliance with evidence-based guidelines.

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