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- SA Association of Hospital and Institutional Pharmacists
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The Pharmaceutical Society of South Africa,
435 Flinders Avenue, Lynnwood, 0081
PO Box 75769, Lynwood Ridge, 0040
Tel: (012) 470 9550, Fax: (012) 470 9556
www.pssa.org.za
E-mail: nitsa@pssa.org.za

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SAPJ Author Guidelines

Thank you for choosing SAPJ in which to publish your paper.

Aims, scope and review policy

SAPJ is aimed at the continuing professional development of the South African pharmacist in a variety of practice settings, including clinical pharmaceutical care practitioners in a community or hospital pharmacy environment, and pharmacists in academic and industrial practice.

The journal accepts specific clinical reviews on self-medication topics (symptomatic therapy) and information on prescription medication (therapy in clinical context), and provides pharmacists with essential information for referring customers for early medical attention should it be required. SAPJ further recognises that the role of the pharmacist continually evolves to meet the needs of the population. An example of this is the provision of accessible, basic primary health care services in community pharmacies.

Papers dealing with medicines safety issues, including the safe and appropriate prescription, administration and use of medication as well as pharmacovigilance, are strongly advocated in SAPJ. SAPJ further supports pharmacists in transforming the pharmacy into an accessible, basic primary health care facility for preventing and treating primary health care conditions through diagnosis, screening and treatment.

The journal is currently indexed by Google Scholar via www.sapj.co.za and enjoys wide international exposure. An 'electronic long, paper short' policy will be followed for original papers where abstracts of original papers are featured in the printed copy with the full version available online.

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5. All co-authors have made significant contributions to the manuscript to qualify as co-authors.
6. Ethics committee approval has been obtained for original studies and is clearly stated in the methodology.
7. A conflict of interest statement has been included where appropriate.
8. A title page has been uploaded as a separate supplementary file and the submission adheres to the instructions to authors in terms of all technical aspects of the manuscript.

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Article sections and length

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Original research:	3 200–4 000 words
Evidence- based pharmacy practice:	3 200–4 000 words
Reviews:	2 400–3 200 words
Case studies:	1 800 words
Scientific letters:	1 200–1 800 words
Letters to the editor:	400–800 words

For a full version of the SAPJ author guidelines, please visit www.sapj.co.za

Pharmacist-initiated management of antiretroviral therapy (PIMART) – a win for South Africa

Natalie Schellack

Sub-Saharan Africa has the world's largest HIV epidemic, accounting for 70% of the global human immunodeficiency virus (HIV) disease burden with one in every twenty adults (5%) infected yearly. More specifically, South Africa currently has 8.2 million people living with HIV/acquired immunodeficiency syndrome (AIDS). Every year, at least 200 000 people are added to this population. While South Africa has made great strides in the provision of treatment with more than five million people on treatment, with the largest national HIV programme in the world, it has yet to reach the Joint United Nations Programme on HIV/AIDS (UNAIDS)'s 95-95-95 strategy, to ensure that 95% of persons living with HIV and Aids (PLWA) are aware of their status, 95% of these individuals are on treatment, and 95% of those on treatment are virally suppressed.

Following the World Health Organization's (WHO) policy recommendation of 'universal' access to antiretroviral therapy (ART), South Africa was among the first African country to adopt the policy and has officially been implementing the policy since September 2016 (National Department of Health, 2016). Achieving the Joint United Nations Programme on HIV/AIDS (UNAIDS)'s 95-95-95 strategy would require intense domestic and international financial investments, massive social mobilisation, and commitment from all levels of government, professional bodies, and civil societies.

Have we reached this yet? At the 11th SA AIDS Conference in June 2023, Health Minister Joe Phaahla said that 94% of people with HIV in SA knew their status, but only 77% were on antiretroviral treatment. Integral to understanding this challenge is the healthcare worker shortages that South Africa faces, with shortages of doctors and other healthcare professionals, particularly in rural and under-resourced areas where the need for health care is often greatest.

Considered within the ethical framework of utilitarianism, *"a consequentialist theory that determines morality based on the outcomes of interventions. The principle of utility asserts that the moral course is one that maximises value over disvalue and seeks the greatest benefit for the greatest number".* South Africa and its healthcare workers are compelled to provide the greatest benefit (of scarce resources, in this case ARVs) for the greatest number. On an individual level of benevolence, the benefit of access to a scarce resource should be considered a morally acceptable choice.

Pharmacist-initiated management of antiretroviral therapy (PIMART) was approved by the South African Pharmacy Council (SAPC) in 2021, with the aim of improving access to antiretroviral therapy, inherently practising distributive justice through egalitarianism (reducing inequalities of distribution), sufficientarianism (maximising the numbers of those who have enough), and prioritarianism (giving priority to those who are in more unfavourable circumstances) – thus making ARVs accessible to diverse communities, enabling better viral suppression and long-term disease management.

Why was PIMART initiated? In 2017, despite programmes such as nurse-initiated management of antiretroviral therapy (NIMART) and treatment points through other clinicians, the insufficient capacity of the then current workforce tasked with the management of HIV became apparent as the nation kept missing targets and HIV-related deaths contributed a large number of national mortalities.

Against this background, the SAPC was approached by the National Department of Health (NDoH) to consider and implement an intervention that would ensure that patients have increased access to antiretroviral medicines for the purposes of providing pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP) to arrest the rising number of HIV infections. The NDoH proposed at the time that the SAPC, as the regulator of pharmacists, petition the South African Health Products Regulatory Authority (SAHPRA) to potentially down-schedule certain medicines indicated for the treatment of HIV, for the purposes of PrEP and PEP. The motivation was to down-schedule such medicines to Schedule 2, as this would enable pharmacists to prescribe and dispense such medicines without a prescription by another authorised prescriber, as part of PIT in terms of Sections 22A(5) and 22A(6) of the Medicines and Related Substances Act, 101 of 1965 (Medicines Act).

Having considered the options, the SAPC resolved that the most appropriate approach would be to expand the already existing pharmacist-initiated therapy (PIT) intervention, together with supplementary training that focused on PIMART. Once a pharmacist had undergone such supplementary training, they would be required to apply for a PIMART permit issued by the Director General: Health, in terms of Section 22A(15) of the Medicines Act. This would legally enable such pharmacists to prescribe and dispense ART medicines

for PrEP, PEP and, where appropriate, first-line ARV therapy. Factors which motivated the need for supplementary training, as opposed to a blanket down-scheduling of the identified medicines, included training that would emphasise the distinction and limitations that would be necessary for a pharmacist to treat comprehensively as part of PIT, or refer a patient to the most appropriate healthcare practitioner when necessary.

The Independent Practitioners Association Foundation (IPAF) filed an application in the North Gauteng high court in February 2022, seeking review and dismissal of the SAPC's decision to implement PIMART through the publication of a Board Notice, which detailed the PIMART scope of practice, the competency standards the PIMART pharmacist would be required to have and the criteria for the approval for a PIMART supplementary training course. The implementation of PIMART was put on hold by the legal challenge of the IPAF, which represents doctors in private practice. The IPAF leveraged this challenge based on their preconceived idea that pharmacists would be encroaching on the domain of doctors and asked the Court to set aside the SAPC's decision to introduce PIMART into the scope of practice of suitably trained pharmacists. Further to this in its application, the IPAF argued that the provision of PIMART services falls within the domain of medical doctors and that pharmacists do not have the required training and competencies to provide these services. The IPAF further argued that the SAPC does not have the legislative mandate to introduce PIMART, that the SAPC's reasons for implementing PIMART were not adequately explained, and that the SAPC's procedures for implementing PIMART were not procedurally fair and did not provide adequate opportunity for interested parties to comment.

What was the collateral damage of this legal challenge from the IPAF, when the NDoH requested pharmacists to collaborate with other healthcare workers (HCWs) in meeting the UNAIDS goal, and in 2021, when the PIMART board notice was published? HIV-cases in South Africa increased by 910 000 persons, from 7,32 million to 8,23 million PLHIV. On average, 227 500 new infections occurred every year during this period alone. According to data from the Department of Home Affairs and Statistics South Africa, HIV remains one of the top five underlying causes of all natural deaths in South Africa. This crisis has been worsened by less-than-optimal adherence rates (estimated at between 63–83% [Moosa et al. 2019]) and a lack of access to testing and treatment services.

The financial collateral damage of the delay in providing equal access to antiretrovirals, is the HIV budget which has grown exponentially over the years. The NDoH spent more than R20 billion on HIV alone in the fiscal year 2019–2020 (NDoH Annual Report, 2019/2020) – more than any other disease that existed before the novel coronavirus (COVID-19).

It is important to note that the initiation of PIMART is not unique to South Africa. Pharmacists in South Africa have been providing PIT across the health spectrum and most HIV/Aids healthcare services for as long as any other personal healthcare worker (HCW) group has. For instance, patients may access HIV testing, and emergency post coital contraception, pregnancy testing, urine test analysis, patient wellness in respect of sexual health. In addition, occupational post-exposure HIV prophylaxis for healthcare workers at the pharmacy, in line with Primary Care Drug Therapy algorithms (first introduced in 1995). As such, PIMART adds to these services by allowing pharmacists to provide PEP and PrEP as well as dispense first-line ART to uncomplicated and non-immunocompromised HIV-positive persons.

Internationally various countries are managing HIV and Aids by utilising all their health workforce, including pharmacists to make an impact on the global efforts to combat HIV and Aids. The following countries, amongst others, have programmes similar to PIMART.

- United States of America has a programme called Pharmacist-Administered, Antiretroviral Therapy Adherence Clinic that offers initiation or re-initiation, management of ART and adherence, monitoring of adverse reaction.
- Within Africa, Nigeria has a programme called Global HIV/AIDS Initiative Nigeria (GHAIN) which offers screening, testing, initiating and management of ART.
- Malaysia has a programme called Pharmacist Independent Prescriber that allows pharmacists to assess and then proceed with the initiation and management of ART and adherence monitoring.

The judgment in the IPAF case was handed down by Judge Elmarie van der Schyff on 14 August 2023 — almost two years after legislation introducing PIMART was published by the SAPC (Board Notice 101 of 2021 was published on 13 August 2021). While PIMART has been delayed for two years by the IPAF's legal challenge, Judge Van der Schyff's judgment included amongst others the following:

- Regarding encroaching on the medical doctors domain – *"competition, per se, does not limit or curtail the rights of medical practitioners to continue providing the services that they currently provide,"* further stating that *"even if the assumed competition is regarded to affect family practitioner's rights adversely, the alleged adverse effect it holds for medical practitioners has to be considered against the need to expand primary healthcare services aimed at preventing and treating HIV".*
- The IPAF's argument that the SAPC is not mandated to introduce PIMART was dismissed by Judge Van der Schyff stating that *"the SAPC is empowered to prescribe the scope of practice of the various categories of persons registered in terms of the Pharmacy Act".* She added, *"The development and implementation of PIMART does not expand the existing scope of practice of pharmacists that generically provide for PIT [pharmacist-initiated therapy] and PCDT [primary care drug therapy]. It introduced a specialised category of PIT and PCDT focused on preventing and treating HIV".*
- The IPAF's arguments that the introduction of PIMART was procedurally unfair and the decision for its implementation was not properly explained, arbitrary, or capricious, were also rejected by Judge Van der Schyff. She said that *"…through its collaboration with the Southern African HIV Clinicians Society, whose members include numerous medical doctors, the development of PIMART was given great exposure".*

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- She also stated, *"The need to widen access to first-line ART [antiretroviral therapy] and TPT [TB preventative therapy] on a community level is not a figment of SAPC's imagination, but a dire need that is also evinced in other countries".*
- The IPAF's contention that pharmacists are not adequately trained to provide PIMART was also rejected by Judge Van der Schyff stating, "*The PIMART training course was developed to ensure that pharmacists who successfully completed the training would be 'suitably qualified to safely and effectively assist in providing ART'".* She adds that *the PIMART training course was 'developed by suitably qualified experts in the field, which experts include medical practitioners'".*

It is important to realise that PIMART will not be free. Pharmacists will be able to charge the single exit price for the medicine plus a professional fee, as set by the SAPC. The cost of treatment in the private sector, therefore, could be a barrier to people who use government facilities. Despite having to pay for the medicine, the hidden expenses of getting treatment, such as travelling to a government facility and waiting in line, add considerable cost to treatment, which could make getting medicines at a private pharmacy attractive. In future, these costs may be mitigated by public-private sector models, for example the National Immunisation Programme that provides free childhood vaccines to both private and public institutions. This intervention (private/public partnership) in South Africa, through routine childhood immunisation, is reported to avert an estimated 2.5 million deaths annually. We hope to see the same results through this partnership with ARVs.

Pharmacists that were successful in completion of their supplemental training must apply for a PIMART permit in terms of Section 22A (15) of the Medicines and Related Substances Act, 101 of 1965 from the Department of Health.

In addition to the acts and services which form part of the scope of practice of the pharmacist as prescribed in terms of Regulations 3 and 4 of the Regulations relating to the practice of Pharmacy (GNR 1158, published on 20 November 2000), a pharmacist who has completed the PIMART supplementary training, and once they are in possession of a PIMART permit in terms of Section 22A(15) of the Medicines and Related Substances Act, 101 of 1965, may be allowed to perform consultations and provide the relevant treatment to the patients at a pharmacy or in an approved primary healthcare setting.

PIMART is a victory for South Africa, as health care through pharmacies is typically more accessible from people's homes, schools, and workplaces, has better opening hours than clinics and general practitioners and can provide greater anonymity to their patients. HIV/AIDS has no preference to demographics, however visiting a pharmacist to access treatment for an uncomplicated case may not only be destigmatising, but may reduce the cost incurred by transport, amongst other things, from the pharmacist to the GP. Thus, by making ARVs accessible to diverse communities, there will be better viral suppression and long-term disease management. Having said that men and adolescents face unique challenges in accessing HIV-testing and treatment, we hope that PIMART may provide a destigmatising environment, in public and private healthcare settings.

PIMART may also help scale up PrEP and PEP usage for adolescents, and young women who seek emergency contraception in private pharmacies in South Africa. Besides seeking emergency contraception, young women commonly visit pharmacies for family planning services and to vaccinate their infants and young children, which provides further opportunities to discuss and offer PrEP.

PIMART is designed to foster collaboration with other healthcare professionals (including nurses and doctors) in the provision of HIV care that is aimed at increasing accessibility to prevention and treatment in line with the national treatment guidelines. Having the pharmacist on board as part of the healthcare team, therefore reaching more patients, is a win for all.

President's Message

Opportunities abound!

Joggie Hattingh
PSSA President

Although as a country and as a profession, we are staring enormous challenges in the face, opportunities abound. How do we even begin to prepare and how to change challenges into opportunities? Except for constant loadshedding (by now maybe old news), there is artificial intelligence (AI) that is both improving and threatening to overtake human intelligence and decision making. How do we make sure that we utilise AI to the benefit of the profession and to the benefit of our patients?

Universal Healthcare is becoming more of a reality with the CUPS (Contracting Unit for Primary Health Care Services) being piloted all around. Are we pro-actively engaging to ensure our inclusion and participation in the process? Then of course, the time for the PSSA National Executive Director (ED) to retire is almost upon us, with all the changes that goes with it. It would be a huge blow to lose the corporate memory and years of knowledge and experience of a highly talented and devoted Executive Director, yet an opportunity arises to bring new ideas and energy into the PSSA, while we still have the opportunity to tap into the wealth of knowledge and experience of the outgoing ED.

Under such trying circumstances, it takes something more than intelligence to act intelligently and although it is said that we should never allow our emotions to overpower our intelligence, we should also never ignore the voice of our emotions. Our emotional intelligence will guide us through each and every difficult situation, if used in combination with our intelligence. The two are not opposites, they complement each other, they allow us to navigate troubled waters without losing our moral compass or drowning in despair.

We need to stand for what we believe in, boldly and without any excuse. We must own up where we failed and show the strength of character and emotional intelligence, to face our own failures and learn from them. This is the core of any future success individually and as a profession.

Society has fallen into the blame-trap. If I were unsuccessful in an interview, it is because I'm white or if the shoe fits, because of racism. Hardly ever will there be an admittance that the successful candidate scored higher than I did. And if I am reprimanded for disrespectful conduct and demoted, it is because the manager doesn't like me! This kind of conduct does not bode well for future leadership. Fortunately, within the profession we have a very positive Young Pharmacists' Group that fosters and mentors our future leaders and allows them to grow positively! Just have a look at the list of young pharmacists SAAHIP posted during June, it is so inspiring.

Irrespective of where we are at mentally, we have to become more self-aware and understand how to recognise the red flags in our own behaviour. We need to know where to access support and how to vent our frustrations without negatively influencing those around us.

This will help us in regulating our moods and thus our reactions and impulses. It will also enable us to keep our motivation up and hold onto our passion for our profession and the best interest of our patients. We will be able to maintain our empathy for our patients and colleagues. To do this effectively we constantly need to improve our proficiency in managing relationships and building networks. Only as a united profession will we be able to optimise the bountiful opportunities coming our way.

Should this be our focus and our approach, we may realise that what seemed to be the dark days of crisis, has blown over and looking back we may see, much of what threatened our sanity now looks like a storm in a teacup. Time heals almost everything, and it certainly gives perspective!

To be able to move ahead, even after events that were personally exhausting or embarrassing, make peace with the past, don't allow it to spoil the present.

As long as we act with integrity, even if the outcome is less than positive, accept it, learn from it and move on. Don't compare your life and tribulations with others, it is a different journey.

Irrespective of what life throws at us, there will be numerous opportunities, personally and professionally. It mostly depends on how we look at the situation, that determines whether we see a threat approaching or an opportunity.

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The professional benefit of membership of the PSSA

As pharmacy student members become pharmacist interns, they become paying members of PSSA. The fee for interns and community service pharmacists is reduced by 50% of the pharmacist membership fee to support these members with the transition into the profession. In the beginning of each year, the PSSA reviews the membership status of these members to monitor advancements to further professional designations. Once the team processes such changes, these intern members receive invoices for the pro rata membership fee payable. Statements are emailed monthly to those members who have not paid their membership fee. If PSSA membership fee is still unpaid by 31 August, these members are removed from the membership database.

Similar to the above process, with the change from student to intern, there is a change in the scope of practice that the person may participate in and as a result, the risk profile for indemnity insurance changes as well. Should a student not update their change in scope of practice with PSSA, it will impact possible claims against your indemnity insurance policy as you have then practiced at a higher scope (intern) than what your policy covers (still student).

PPS indemnity insurance is an exclusive benefit to PSSA paid up members only. Should your membership be cancelled due to non-payment, you will no longer qualify for indemnity insurance and your PPS indemnity insurance policy will not renew.

With the transition from intern to community service pharmacist (CPS), there is no financial implication for the membership fees or indemnity insurance premiums as interns and CPSs are covered within the same insurance risk category.

Lastly, once community service pharmacists complete the compulsory year, they are registered as pharmacists and commence employment at any employer of their choice. It is essential to inform the PSSA of the change in scope of practice and to ensure that your indemnity insurance cover is in-line with your current scope of practice. The membership status from there will remain pharmacist, regardless of the practice setting you work in, but your indemnity cover may vary between employers e.g. public / private sector. The rating table can be viewed on the PSSA website (https://www.pssa.org.za/professional-insurance.html).

Pharmacist's assistant members

The PSSA constitution makes provision for pharmacist's assistants as associate members of the PSSA. As a result, upon joining the PSSA, pharmacist's assistants receive various member benefits to support them throughout their careers and professional interactions. According to Good Pharmacy Practice rules, it is compulsory for pharmacist's assistants to have professional indemnity insurance in their personal capacity. PSSA together with iTOO provides reliable professional indemnity insurance cover for pharmacist's assistants with affordable premiums. The indemnity form can be downloaded from the PSSA website.

Similar to pharmacists, pharmacist's assistants have the following benefits:

- Professional indemnity insurance is cost-effective and comprehensive to suit a diversity of practice settings and levels of cover
- Continuing Professional Development through CPD evenings, online webinars, symposiums, workshops and conferences
- PSSA/Alpha Pharm distance learning programme, which covers five relevant diseases per year, is available at a reduced rate
- National promotion of the invaluable role of the pharmacist and pharmacy support personnel as part of the healthcare team to other health professionals and the public through initiatives such as Pharmacy Month and World Pharmacists Day
- Liaises on behalf of the profession with the government (National Department of Health, Heads of Pharmaceutical Services and the Minister of Health) and other health-related professions and councils (SAPC, BHF, SAHPRA, WHO and FIP)
- Interaction and benchmarking with colleagues in the same sector of the profession (academia, community, hospital and institutional, industry) or same geographical area (branch) and also exposure to other sectors of the profession through joint events
- Advice and support which is only a phone call or email away from various experienced staff of the Society
- Reliable information and relevant news communicated through:

- South African Pharmacist's Assistant Journal
- PSSA website
- Electronic newsletters
- Social media

- Professional legal services, including assistance with human resource-related issues through telephonic labour law advice and referral to suitable legal representation
- Books and reference publications are available at preferential rates to members. The PSSA Pharmacy Law Compendium, published by LexisNexis, is available to PSSA members at 10% discount
- Reviewing and addressing healthcare legislation such as the Medicines and Related Substances Control Act, Pharmacy Act, National Health Insurance, Medical Schemes Act, Dispensing fee, etc.
- International best practice guidelines are made available through membership of the International Pharmaceutical Federation (FIP) and Commonwealth Pharmacists Association (CPA)
- Attend any meeting of the Society, Branch or Sectoral Division, or by invitation any Executive Meeting of the Branch or Sectoral Division Committee
- Take part in any discussion on any matter at a general or special meeting of the Branch or Sectoral Division

Associate members may not:

- vote on motions at a branch or sector meeting
- nominate and vote for members during a branch or sector meeting
- be nominated or appointed to any branch or sector committee, or be selected as Councillor to General Council at the PSSA AGM
- use the abbreviation MPS (member of the Pharmaceutical Society) as this is only for use by ordinary members

During the second half of 2023, the PSSA is planning to visit a number of Skills Development Providers to address their learners about PSSA and the benefits we offer. PSSA believes that we are stronger together and that all pharmacist's assistants can benefit from becoming a PSSA member. For more information or to schedule a time with PSSA to address pharmacist's assistants, contact Mariet at mariet@pssa.org.za.

Save the date

You are reminded to save the dates 1 to 5 September 2024, reserve a spare bedroom with family or friends, and book your flights to Cape Town to attend the 82nd FIP World Congress on Pharmacy and Pharmaceutical Sciences.

Do not delay any bookings or budget prioritisation until it is too late. A short webinar series between October 2023 and February 2024 is planned to assist you with the necessary information you may need to attend this once-in-a-lifetime event.

Sponsorship and exhibition opportunities will be available soon and shared with all members.

For any other queries or more information, contact Mariet at mariet@pssa.org.za.

The PSSA/Alpha Pharm distance learning programme 2023

The PSSA/Alpha Pharm distance learning programme continues to offer pharmacists useful, practical, up-to-date information that enables them to provide optimal pharmaceutical care to their patients.

Module 3 – New updates on heart failure for the pharmacist

This module provides a broad overview of the latest approach to the treatment and management of chronic heart failure, which takes into account the important and beneficial effects of new classes of medication that have become available. Pharmacists need to acquaint themselves with these updated guidelines in order to be able to communicate with doctors about the latest treatment regimens and to refer patients timeously to minimise disease progression.

As a pharmacist, you are ideally positioned at the "heart" of patient care. Often being more accessible to patients than the doctor, many pharmacists have established relationships with their patients. In this position, you can contribute to heart failure care by helping to optimise treatment, advising patients about preventative care and non-pharmacological interventions, and referring patients to their doctor as appropriate.

It is also important for a pharmacist to check all medications prescribed for a patient and screen for any possible or potential drug interactions. This may occur when a new treatment is added to the patient's regimen, in which case the prescribing doctor should be notified as appropriate. In addition, as a pharmacist, you can make patients aware regarding their use of over-the-counter medications, such as NSAIDs or any other medication that may interfere with their treatment for heart failure.

For more information about this programme, contact Gill or Glynis at Insight Medicine Information on 011 706 6939 or email: cpdalphapharm@insightmed.co.za.

The PSSA/Alpha Pharm clinical education programme 2023 for pharmacy staff

The PSSA/Alpha Pharm pharmacy staff clinical education programme continues to offer front-shop assistants or pharmacist's assistants up-to-date information that enables them to provide optimal pharmaceutical care to their patients. All pharmacy staff need to be familiar with the use of unscheduled medicines and should be reminded of when it is necessary to refer the patient to the pharmacist.

Module 3, 2023 – Worm infestation

Most parasitic infestations are more common in tropical or subtropical areas and in rural or developing areas.

Parasitic worms have plagued humans since before our earliest recorded history. Infestation is most frequent in children and women. In pregnant women, worm infestation produces anaemia and the risk of bearing children with low birth weight. Children who are infested suffer from stunting of growth and impaired mental development due to poor absorption of nutrients and anaemia. This occurs because the worms feed on the host's tissues, especially blood, leading to the loss of iron and proteins.

This module covers the more common parasitic worm infestations, the signs and symptoms of such infestations and their prevention and management.

If you would like to participate in the PSSA/Alpha Pharm pharmacy staff clinical education programme, please contact Gill or Glynis for further information on 011 706 6939 or email: cpdalphapharm@insightmed.co.za.

Passing the Baton: Farewell from the Steering Committee of 2022/23

Introduction

"'Did we serve our community'" – *Alexander Wehmeyer YPG PRO 2021/22*

If there is one thing that this Steering Committee (SC) did well amongst other things, it was to bring more young people to the doors of the PSSA. We would like to thank everyone that was involved in the success of this term with a special thanks to all the provincial representatives who assisted with the meetings, mentorship programme, and health awareness campaigns. The SC could not have achieved this without your support! We are confident that the team that will soon grab the baton that we received will run the marathon and continue with the good work that began long before us.

Left to right: Nelson Mabusela (Chair), Ntombizodwa Luwaca (Public Relations Officer), Roslita da Silva (Project Coordinator).

Successes

- Brent Sin Hidge and Alexander Wehmeyer of the 2021/22 SC designed the logo for the PSSA conference 2022 and assisted with editing the programme
- Successfully hosted a YPG evening and facilitated an exciting game of bingo during the conference alongside the previous SC
- Assisted pharmacist interns with the community service placement swapping process
- Launched the 2023 Mentorship Programme with 10 mentorship pairs
- Launched an Instagram page that has attracted over 750 young pharmacists to the Society
- Delivered presentations at the Western Cape Province pharmacist intern and community service inductions
- Ran an exciting competition at the SAAHIP conference
- Designed social media material for the SAPHEX symposium, assisted with the stand, and chaired one of the sessions
- Direct involvement with the FIP's Early Career Pharmaceutical Group
- Health awareness campaigns, including outbreaks and product recalls
- Attended and contributed to various high level meetings of the SAAHIP, SAACP and PSSA

Closing Words

Good-byes are usually given with a heavy heart, however as the Steering Committee of 2022/23, we bid farewell to you with joyous hearts, proud of all that we accomplished throughout our term. Just as the previous Steering Committee handed us a weighty baton, we encourage the incoming team to work together towards a weighty and impactful term that will continue to support the goals of the PSSA for the benefit of all pharmacists nationwide!

"Don't disappear" – Lorraine Osman

Feel free to reach out to us at
Email: ypg@pssa.org.za
Facebook: Young Pharmacists' Group of PSSA
Instagram: @pssaypg
Young pharmacists – connected, engaged, empowered and inspired!

Taking another look at the management of obesity

L Brown
B Square Synergy Consultants, South Africa

Corresponding author, email: liesl_brown@yahoo.com

Abstract

Obesity is a common health condition that is increasing worldwide. Obesity is also a multifactorial condition that affects many physiological systems in the human body. Some include the following: central nervous system (CNS) effects, metabolic effects such as type 2 diabetes (T2D), various effects on the cardiovascular system (CVS), haematological effects and infertility in females. Treatment is suggested to be initiated by first making lifestyle changes such as increasing physical activity, decreasing caloric intake of foods, inclusion and accessibility to healthy foods (e.g. fruits, fibre, vegetables) and consuming foods of a lower glycaemic content. In addition to these interventions, pharmacological management strategies can also be considered adjuncts to managing obesity. These medicines (monotherapies/combined products) include amfepramone, cathine (syn D-norpseudoepherine), phendimetrazine, phentermine, orlistat, liraglutide, semaglutide, bupropion and the bupropion-naltrexone combination, and phentermine-topiramate combination. The pharmacist plays an essential role in identifying obese individuals, making suggestions for losing excess weight, suggesting lifestyle modifications, providing information about anti-obesity medicines and dispensing these medicines.

Keywords: causes, consequences, diagnosis, management, obesity, risk factors

S Afr Pharm J 2023;90(4):14-22

Introduction

The World Health Organization (WHO) defines obesity as an 'abnormal or excessive fat accumulation that may impair health' and further classifying that 'the fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended'.[1]

Obesity is a major public health condition worldwide and accounts for the fifth most common health condition leading to death worldwide. Obesity is also linked to many other health conditions, of which some form part of the cardiovascular, renal and metabolism (CVRM) diseases. Lifestyle changes and medication(s) can effectively manage this health condition. It is important to always take note of the fact that obesity is a lifestyle disease.[2]

Research conducted estimated that the number of 641 million obese adults identified in 2014 was a significant increase when compared to the 105 million identified in 1975.[3] Nwosu et al. (2022)[4] conducted a study where they collectively analysed nationally representative surveys covering nearly two decades to investigate trends in the prevalence of adolescent obesity in South Africa. Their findings showed that by 2016, the prevalence of adolescent obesity was high in South Africa – more than one in five adolescents. These figures are similar to those in Europe; however South African girls appear be at higher risk of overweight and obesity in contrast to Europe, as well as adolescents from high-earning families.

Contributing factors to obesity are the ratio of increased intake of unhealthy foods (e.g. fast foods) to lower levels of physical activity. The lower this ratio, the more likely the individual will have CVRM – diseases also known as cardiometabolic diseases, hypertension, dyslipidaemia and type 2 diabetes (T2D). The following systems are also noteworthy links to obesity: respiratory (obstructive sleep apnoea [OSA]), gastrointestinal (GI) (non-alcoholic fatty liver disease), muscular adverse effects, physiological problems (depression) and social (stigmatisation) effects. It is thus imperative to test for these conditions and effects, screen for comorbidities, and determine their management.[5-8]

Considering the potential consequences of obesity, pharmacists need to identify overweight and obese adults and adolescents. This article focuses on adult obesity.

Causes

Potential factors that influence and/or cause obesity

Obesity is a complex health issue stemming from a combination of factors, including:[2,6,9]

- Individual factors (e.g. genetics, epigenetic environments, learned behaviours)
- Substantial causes (e.g. unhealthy societal/cultural eating habits, food, desserts, etc.)
- Acquired conditions (e.g. those that depend on low rates of physical exercise, chronic overeating despite genetic and epigenetic factors, longer screen time and a sedentary lifestyle)
- Geographic regions (e.g. those that signal social, economic and environmental factors in an 'obesogenic' environment)

Comorbidities

The different forms of obesity, including abdominal obesity, have the potential to lead to an increased risk of several conditions and

diseases, e.g. asthma, cancer, diabetes, hypercholesterolaemia, and cardiovascular diseases (CVDs).[10] Other studies also indicated that obesity can affect multiple organ systems, such as the cardiovascular, endocrine, central nervous and GI systems, and cause coronary heart disease (CHD), atrial fibrillation (AF) and heart failure (HF).[11]

Neurodegenerative diseases

Evidence indicates that there are correlations between adult obesity and the development of Alzheimer's disease and Parkinson's disease. This is due to the correlation factor of T2D.[12] Dementia has also been linked to these factors.

Cardiovascular disease

Obesity worsens several risk factors, particularly hypertension, CVD, AF and HF. These are all exacerbated by obesity as a pre-existing condition.[13] CVDs, such as high systolic and diastolic blood pressure, are major presentations of obesity, with endpoint diseases such as ischaemic heart disease and stroke.[8] Dyslipidaemia (raised low-density lipoprotein cholesterol [LDL], increased triglycerides and low high-density lipoprotein cholesterol [HDL-C]) is one of the most common CV abnormalities in obesity.[7,8]

Prostate diseases

Parikesit et al. found that obesity is a risk factor for different prostate diseases, including benign prostate hyperplasia and prostate cancer.[14]

Respiratory diseases

Respiratory systems/diseases are also affected by obesity. Respiratory problems such as asthma and OSA are more prevalent in obese children compared to their peers with healthy weights.[15]

Autoimmunity

The relationship between obesity and autoimmune disorders has been shown. Autoimmune conditions include rheumatoid arthritis, systemic lupus erythematosus, inflammatory bowel disease, multiple sclerosis, type 1 diabetes and thyroid autoimmunity – especially Hashimoto thyroiditis.[16]

Diabetes

T2D has been shown to be implicated in obese individuals.[17] The twin epidemics of obesity and diabetes have combined to form part of major health crises. Several studies have shown that diabetes is one of the most considered comorbidities of obesity.[18-20] Obesity is also associated with the development of insulin resistance.

Diagnosis

Direct measures

Although Body Mass Index (BMI) is the most frequently indirect method used to measure obesity, there are alternative direct measures that can also be used. These direct measures include measurement of body fat directly by using dual energy x-ray absorptiometry. In recent years, abdominal obesity was defined by using waist circumference while waist-hip ratio was used in earlier years.[21]

Indirect measures (Body Mass Index)

BMI is a simple way to determine different kinds of obesity. Body Mass Index (BMI) is calculated as follows:

$$\text{BMI} = \frac{\text{weight (kg)}}{\text{height (m}^2\text{)}}$$

The BMI is used to classify adults into the following categories:[22]

a. Underweight

b. Overweight

c. Obese

Table I gives a BMI classification of adult weights based on the WHO schema.

Obesity and its collateral damage

The following are potential consequences that may impact the patient, and are important for the holistic management of the patient:

Haematological consequences of obesity

Since obesity is considered a chronic inflammatory condition, it also has theoretical and established downstream effects. This state of low-grade systemic inflammation is characterised by an acute adipose tissue phase response with interleukin (IL), IL-6, IL-1 and IL-8 and tumour necrosis factor (TNF)-α playing the largest role, which results in subsequent elevation of acute-phase proteins such as c-reactive protein (CRP).[23] This implies a subsequent/relative state of leucocytosis and an increased risk for venous thromboembolism (VTE).

Table I: WHO BMI adult classification[2]

Classification	BMI (kg/m²)	Risk of comorbidities
Underweight (B2.5)	< 18.5	Low, but the risk of other clinical problems increased
Normal weight	18.5–24.9	Average
Overweight	25.0–29.9	Mildly increased
Obese	≥ 30	
Obese I	30.0–34.9	Moderate
Obese II	35.0–39.9	Severe
Obese III	> 40	Very severe

This article briefly discusses only a few haematological consequences of obesity. Other haematological conditions include obesity and platelet count, obesity and thrombosis, obesity and elevated levels of coagulation factors and von Willebrand factors,[24] obesity impairment in fibrinolysis,[25] obesity's role in promoting platelet hyperactivity[26] and obesity's role in promoting endothelial dysfunction.[27]

Obesity and iron deficiency

A study published in 1962 first reported lower serum iron levels in obese adults vs. non-obese adolescents.[28] Although it appears counterintuitive to expect an iron deficiency (ID) in a setting of calorie and nutrient excess, lower concentrations of serum iron have been observed in relation to an increased BMI for decades.[23] The link between obesity and anaemia remains less certain and more studies should be conducted regarding this matter.

Obesity in red blood cell count

It is noteworthy to consider that ID is expected to have an increased rate that can progress to iron deficiency anaemia (IDA).[39] Studies have indicated that obese adults have lower levels of haemoglobin than non-obese adults,[29,30] but some studies have shown no correlation[31] of a protective effect.

Obesity and thrombosis

Evidence that obesity, as a proinflammatory condition, promotes an environment that promotes a prothrombotic state, supporting arterial and venous thrombosis. Studies have also indicated associations between abdominal obesity and VTE.[32-34] Other studies undertaken indicated that the risk for VTE is higher in women compared to men, with women having a higher risk for stroke, compared to men affected by CVD.[35,36]

The role of leptin in obesity

Leptin is a peptide hormone that is part of the product of the obese (*ob*) gene that regulates food intake, body mass, and reproductive function and plays a role in foetal growth, proinflammatory immune responses, angiogenesis and lipolysis. Hyperleptinaemia and resistance to a reduction of body mass are two common characteristics of obesity.[37]

Studies have shown that the concentration of circulating leptin decreases during fasting or energy restriction but increases during refeeding, overfeeding, and surgical stress.[38-41] These effects provide an overview of the various pathways that regulate leptin signalling system to maintain body mass, e.g. an increase of fat cells leads to a leptin level, which in turn binds to the leptin receptors (LEP-R) in the brain signalling the inhabitation of food intake and an increase in energy expenditure.[42]

The leptin receptor

Leptin acts by binding to the LEP-R that exhibits structural similarity to the class I family of cytokine receptors, which include receptors for interleukins (ILs), leukaemia inhibitory factor (LIF), colony-stimulating factor 3 (CSF-3), growth hormone (GH), prolactin and erythropoietin.[43]

Regulation of energy balance

Energy balance is maintained when energy from food intake is equal to energy expenditure.

Leptin regulates appetite and metabolism by inhibiting the synthesis and release of neuropeptide Y (NPY) in the arcuate nucleus (ARC). Subsequently, it was discovered that the LEP-R isoform b (LEP-Rb) in the ventromedial hypothalamic nucleus (VMH), ARC, lateral hypothalamic nuclei (LH), and the dorsomedial hypothalamic nucleus (DMH), which play a crucial role in the regulation of energy balance and body mass, was driven by leptin.[6]

Later studies demonstrated that leptin can inhibit neural pathways activated by appetite stimulants (orexigenic) to reduce energy intake and activate pathways targeted by anorexigenic agents to suppress appetite.[44] Examples of orexigenic neuropeptides include NPY and the agouti-related protein (AgRP). The product of proopiomelanocortin (POMC), alpha-melanocyte-stimulating hormone (a-MSH), is an anorexigenic.[45]

In brief, leptin regulates energy balance by modulating the activity of NPY/AgRP and POMC neurons in the ARC nucleus.[45]

Regulation of leptin's secretion

Leptin is primarily produced in white adipose tissue, although smaller amounts have been detected in other body tissues, including the brown adipose tissue (BAT), placenta, foetal tissue, stomach, muscles, bone marrow, teeth, and brain. Leptin circulates in the blood in both free and protein-bound forms, where the free form of leptin is the biologically active form. The equilibrium between free and bound leptin regulates leptin bioavailability.[46]

Leptin can enter the CNS by receptor-mediated transport. The LEP-R isoform plays a particularly significant role in transporting leptin through the blood–brain barrier (BBB).[47]

A complex array of endocrine, neuroendocrine, and paracrine signals governs leptin synthesis and secretion.[48] The secretion of leptin is proportional to body mass and nutritional status. The serum leptin levels decrease during starvation, associated with an adaptive physiological response to the state of starvation.[48]

Food intake, total body fat, as well as several hormones regulate leptin secretion.[48] Insulin and, to a lesser extent, other pancreatic peptide hormones, including amylin, glucagon, and pancreatic polypeptides, reduce food intake and affect leptin secretion.[49] Insulin is the primary regulator of leptin production; hence prolonged hyperinsulinaemia leads to an increase in the plasma concentration of leptin, while short-term hyperinsulinaemia does not cause such a change.

Expression in obesity

Severe early obesity develops from rare genetic mutations that affect leptin signalling. Such mutations often lead to congenital

leptin deficiency or high, but ineffective, leptin and leptin resistance.[50] Hyperleptinaemia and resistance to reducing body mass are two characteristics of typical obesity.[51] Leptin is overexpressed at the gene level in the adipose tissue of individuals with obesity.[52] Furthermore, strong positive associations exist between plasma leptin levels and body fat percentage.[53] Other studies point towards leptin resistance.

Resistance in obesity

Leptin resistance is characterised by reduced satiety, over-consumption of nutrients, and increased total body mass. This often leads to obesity, which reduces the effectiveness of using exogenous leptin as a therapeutic agent.[54] Leptin resistance occurs due to the leptin's inability to reach the target cells, reduced LEP-R expression, or disturbed LEP-R signalling.[55]

Obesity and female infertility

Obesity affects women of reproductive age with some of the following presentations: menstrual irregularities, endometrial pathology and infertility. Obese women also have increased pregnancy complication rates, e.g. hypertensive disorders, gestational diabetes, preterm birth, and caesarean delivery rates.[56]

Clinical effects

Obesity has a negative effect on female reproduction function, primarily through functional abnormalities of the hypothalamic-pituitary-ovarian (HPO) axis. Higher than normal levels of insulin have been associated with increased ovarian androgen production. The increased circulation of androgens is aromatased to oestrogen, ultimately leading to negative feedback on the HPO axis, thus affecting gonadotrophin production,[57] which, in turn, manifests as menstrual irregularities and ovulatory dysfunction.

The increase in insulin leads to the implicated manifestation of polycystic ovarian syndrome (PCOS), which is characterised by oligomenorrhoea and hyperandrogenism.[58] In PCOS, the deposition of visceral fat leads to insulin resistance and hyperinsulinaemia (due to increased androgen levels), which further leads to the stimulation of adrenal and androgen production in the perpetual cycle.[58]

It is noteworthy to mention that obese women remain sub-fertile even in the absence of ovulatory dysfunction. Obese women also seem to struggle with getting pregnant through assisted reproductive technology (ART), which provides more evidence than just having an ovulatory disorder. Obese women also have smaller oocytes that are less likely to be fertilised.[59]

Other studies conducted reported a negative impact on live birth rates (LBRs), which corresponds with increased BMI.[60-62]

Management

The management of obesity needs to be individualised, taking a holistic view of the individual concerned. One should start with lifestyle changes and modifications: increase of physical exercise and lower caloric intake, and only after that, opt for pharmacological interventions.

Nonpharmacological management

Obesity is traditionally seen as an imbalance between caloric food intake and energy output. However, the current standpoint involves a complex interplay of biological and psychosocial factors. It is noteworthy to mention that current research has shown that a weight loss between 5% and 10% is enough to induce clinically relevant improvements in health risk factors such as hyperglycaemia and other biomarkers related to the augmented risk of CVD.[63]

To achieve successful weight loss maintenance over time, the WHO, European Union (EU)[64] and the US Academy of Nutrition and Dietetics[65] recommend lifestyle changes, including a diet that reduces excessive energy intake and improves dietary quality. However, successful treatment of obesity may, in several cases, require adjuvant pharmacotherapy.

A critical factor for success in managing obesity includes, among others, motivation, i.e. the use of motivational interviewing techniques. This includes the following four primary skills, which can be remembered by the acronym **AIAL**:

- **A**sking
- **I**nforming
- **A**dvising
- **L**istening

Other interventions should include the creation of a healthier environment by providing easy access to food, increased pleasurable physical activities (avoiding sedentary activities), social support systems and compliance and positive thinking with goals set on self-motivation, reinforcements, rewards and peer monitoring.[5,66]

Pharmacotherapy should be considered for hypertension > 99th percentile, LDL-C > 4.9 mmol/l and diabetes not responding to lifestyle changes.[67] Current recommended dietary approaches to obtain weight loss are classified into two main groups:[68]

1. **Energy restriction-based diets,** e.g. low-fat, low-carbohydrate and the Mediterranean diet.
2. **Restriction of specific foods** (the Paleo concept) or intermittent calorie restriction (the intermittent fasting concept).[5]

Pharmacological management

As stated above, interventions for weight loss are initially started with lifestyle modifications. Pharmacological treatments are added as adjunct benefits.

Prescribing guidelines for the obese patient[69]

Dosage regimens for obese individuals need to be adjusted and can be done in various ways.

Different weights can be considered to calculate the medication dosing for the obese patient. Dose prediction is more mechanically based by separating fat-free mass (FFM) from fat mass.

The following equations are used:

1. **Total body weight (TBW)** is simply the reading obtained from the scale.
2. **Fat-free mass (FFM)** is similar to lean body weight **(LBW)** but excludes fat in cell membranes. The clinical difference between FFM and LBW is insignificant.

FFM measurements have been used to construct a predictive formula using TBW, length and gender.

$$\textbf{FFM (males)} = \frac{42.92 \times \text{height}\ (m^2) \times \text{TBW}\ (kg)}{30.93 \times \text{height}\ (m^2) + \text{TBW}\ (kg)}$$

$$\textbf{FFM (females)} = \frac{37.99 \times \text{height}\ (m^2) \times \text{TBW}\ (kg)}{35.93 \times \text{height}\ (m^2) + \text{TBW}\ (kg)}$$

Fat mass (FM) = TBW minus (-) FFM

Obesity is a health concern that is associated with many complex physiological changes that influence the pharmacokinetics of medicines. The extent of this variability depends on patient characteristics (e.g. the degree of obesity, underlying organ dysfunction) as well as the physicochemical properties of the medicine.[69]

The following pharmacokinetics are noteworthy:[69]

The volume of distribution (*Vd*) determines the loading dose.

Clearance (*CL*) is the primary determinant of the maintenance dose.

Both *Vd* and the *CL* influence the ***half-life*** and, therefore, the time to reach steady state.

Distribution: Obese individuals have a higher content of body fat which implies that the *Vd* of highly lipophilic medicines may be increased (e.g. diazepam), while in contrast, the *Vd* of hydrophilic medicines may relate better to FFM, although fat mass still contributes (e.g. gentamycin).

Hepatic *CL*: Clearance of some drugs relates better to TBW in the obese (e.g. propofol) whereas for others, FFM appears better (e.g. remifentanil).

Pathophysiological changes associated with obesity, e.g. non-alcoholic fatty liver disease/liver fat, may impair hepatic blood flow, thus impairing **drug metabolism**.

Renal *CL*: In non-obese individuals, both FFM and FM contribute to the predication of glomerular filtration rate (GFR). For every kg of FFM, there is a 21% contribution/kg of FM to the effective body size determining the GFR. This FFM and FM can be used to predict renal function relative to GFR in a 70 kg TBW non-obese individual.[69]

Renal function is determined by the below equation:[69]

$$\textbf{Renal function} = \frac{\text{FFM} \times 0.21 \times (\text{TBW} - \text{FFM})}{70}$$

Anti-obesity preparations

Anti-obesity preparations can be divided into two groups, namely:[70]

1. **Centrally-acting** anti-obesity products, e.g. amfepramone, phentermine and phendimetrazine, cathine (syn D-norpseudoephedrine).

Table II: A summary of centrally- and peripherally-acting anti-obesity products[69,70]

	Dose	Dosage forms	Schedule	Trade names
Centrally-acting				
Amfepramone*	75 mg daily, mid-morning; maximum duration eight weeks	Slow-release tablets, 75 mg	6	Tenuate Dospan®
Cathine (syn D-norpseudoepherine)†	1–2 tablets with breakfast followed by 1 tablet after lunch	Tablets, 20 mg	6	Relislim®
Phendimetrazine*	Adult dose: 105 mg before breakfast Adult dose: 35–70 mg an hour before breakfast and lunch	Long-acting tablets, 105 mg Tablets, 35 mg	6	Obex-LA® Obesan X®
Phentermine*	Adults and children > 12 years dose: 10–30 mg capsules, taken at 07h00am; patients require medical review after a defined course of treatment, which ideally should not exceed three months; can be initiated when BMI < 30 kg/m² in an individual with other risk factors	Capsules, 15 mg, 30 mg	5	Duromine®
Peripherally-acting				
Orlistat‡	Adult dose: 120 mg during or up to 1 hour after each main meal; if a meal is missed/contains no fat, the dose should be omitted; doses above 120 mg 3 x per day do not provide additional benefits; discontinue after 12 weeks only if the patient was unable to lose at least 5% of weight as measured at the start of the treatment	Capsules, 120 mg	3	Xenical®

* Sympathomimetics with CNS stimulant effects; has significant abuse potential. †Sympathomimetic with CNS stimulant effects similar to phenylethylamines; used as an adjunct to lifestyle modification; has significant abuse potential.
‡Management of obesity in conjunction with a hypocaloric diet in individuals with a BMI ≥ 30 kg/m² or BMI ≥ 27 kg/m² with comorbidities, only if 2.5 kg has been lost on diet alone over a four-week period.

CURB APPETITE AND CRAVINGS*[1,2]

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36 % reduction in cravings in 12 weeks*[2]

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*Studies were conducted on the HCl formulation. Duromine is available as sustained action ion exchange resinate granules in capsules containing phentermine 15 mg or 30 mg. Duromine should be used in conjunction with an exercise, diet and behaviour modification program. Patients require medical review after a defined course of treatment, which ideally should not exceed 3 months.

References: 1. Duromine® approved professional information, October 2020. **2.** Moldovan CP, Weldon AJ, Daher NS, Schneider LE, Bellinger DL, Berk LS, et al. Effects of a Meal Replacement System Alone or in Combination with Phentermine on Weight Loss and Food Cravings. Obesity 2016; 24:2344-2350. **3.** Munro JF, Maccuish A. C, Wilson EM, Duncan LJP. Comparison of Continuous and Intermittent Anorectic Therapy in Obesity.

Scheduling status: S5 **Proprietary name (and dosage form):** Duromine 15 mg and 30 mg Capsules. **Composition:** Sustained action ion-exchange resinate granules, available as capsules containing phentermine 15 mg and 30 mg. **Reference number:** 15 mg: B657; 30 mg: B658 [Act 101/1965]. **Name and business address of applicant:** iNova Pharmaceuticals (Pty) Limited. **Co. Reg. No.** 1952/001640/07, 15e Riley Road, Bedfordview. **Tel. No**. 011 087 0000. www.inovapharma.co.za. For full prescribing information, refer to the professional information as approved by the SAHPRA (South African Health Products Regulatory Authority) available at www.inovapharma.co.za. Further information is available on request from iNova Pharmaceuticals. 21855L. IN4912/23.

inova pharmaceuticals

Table III: A brief summary and an example of a centrally-acting anti-obesity product: phentermine (Duromine®). Indications, dosage form, dose and method of administration, adverse effects, and some pharmacokinetic properties[71]

Indications	• Used as a short-term adjunct in a medically monitored comprehensive regimen of weight reduction (e.g., promotion of exercise, diet [caloric/kilojoule restriction] and behavioural modification in obese patients [BMI† of 30 ≥ kg/m²] who has not achieved a positive clinical response to an appropriate weight-reducing regimen alone) • Can be also be initiated with patients with a lower BMI with other risk factors • Secondary organic causes of obesity should be excluded by diagnosis before prescribing this agent
Dosage form	• Capsules that contain 15 mg of phentermine (opaque green cap with opaque light grey body with marking DUROMINE 15/ DUROMINE 15 printed in black ink on both the body and the cap • Capsules that contain 30 mg of phentermine (opaque light grey body with marking of DUROMINE 30/DUROMINE 30 printed in white ink on the body and cap • Capsules are packed into blister formats/strips with 15 capsules spaced per blister form/strip. Two strips are included per commercially available pack
Dose and method of administration	• Doses are taken orally as indicated • Avoid evening dosing as this may cause insomnia • Use only as directed under supervision of a medical practitioner • Do not exceed daily dose • Do not take concomitantly with other appetite suppressants • Patients require medical review after a defined course of treatment, which ideally should not exceed three months
Pharmacokinetic properties	• Absorption: readily absorbed from the GIT (almost complete) • Metabolism (via liver); excretion (urine); half-life: 25 hours

*Note that for more detailed information look at the phentermine (Duromine®) pamphlet. Not all information is tabulated here.

2. Peripherally-acting anti-obesity products, e.g. orlistat.

Table II summarises the two groups of anti-obesity products available in South Africa.

Table III, below, provides a brief summary of an example of a centrally-acting anti-obesity drug, phetermine; its indications, dosage form, dose and method of administration, adverse effects and some pharmacokinetic properties.

Recent advancements with the use of a glucagon-like peptide-1 agonist[70]

Recently the following GLP-1 agonist, liraglutide (Saxenda®), has been used to assist with weight loss in individuals with concurrent T2D.

Table IV, provides some tips of advice that a pharmacist can communicate with patients taking phentermine.

Other pharmacological product combinations

Liraglutide and semaglutide

Liraglutide is a GLP-1 agonist initially approved in 2010 for treating T2D at doses of 1.8 mg subcutaneously (SC) daily. Presumably via effects on the CNS, it has been observed that liraglutide decreases appetite and enhances satiety.[72] Early studies indicated that liraglutide mimics the effects of natural GLP-1 via its interaction with the arcuate nucleus in the hypothalamus,[73] and led to the development of its use in the treatment of obesity. One trial study of 20 weeks demonstrated that liraglutide treatment led to a dose-dependent weight loss of up to 4.4 kg vs. 3 kg for the placebo.[74] It was also observed that prediabetic individuals showed greater weight loss compared to the placebo[75] group. Liraglutide is currently indicated for the treatment of T2D and not as an anti-obesity product.

Table IV: Some tips of advice that pharmacists can communicate with patients taking phentermine[71]

Ask the patient if he/she is taking any **other medications** (e.g., MAO† inhibitors [do not take within 14 days following their administration], insulin/ oral hypoglycaemic agents [responses may vary due to alterations in dietary regimes], psychotropic medicines [including sedatives and agents with sympathomimetic activity], sympathomimetic agents [antagonises adrenergic neuron blocking agents], SSRI‡ [may be associated with CVD§]; thyroid hormones [increase CNS‖ stimulation]
Ask the patient if he/she has **preexisting medical conditions** (e.g., cardiac diseases, hyperthyroidism, agitated states/history of psychiatric conditions including anorexia nervosa and depression, glaucoma, history of drug/alcohol abuse/dependence, poorly controlled epilepsy, mild hypertension/kidney impairment, diabetes)
Ask the patient if she is **pregnant** or **lactating** (safety has not been stablished)
Ask patients if he/she has **hereditary problems of galactose** intolerance (lactose monohydrate contained in phentermine, may have an effect on the glycaemic control of diabetic patients)
Inform the patients that he/she should **gradually loose** and **control weight**
Inform the patient that phentermine may **impair** the ability to perform activities such as mental alertness (e.g., driving/operating machinery)
Avoid use in the elderly and children; concomitant alcohol use (increased CNS side effects)

*Note that for more detailed information look at the phentermine (Duromine®) pamphlet, †MAO inhibitors = Monoamine Oxidase Inhibitors, ‡Selective Serotonin Reuptake Inhibitors, §CVD = Cardiovascular Disease, ‖CNS = Central Nervous System

Table V: A brief summary of liraglutide's indications, dosage form, dosing regimen and schedule[70]

Indications	Adjunct to diet and exercise for medically supervised chronic weight management in adults with a BMI ≥ 30 kg/m^2 (obese) or a BMI ≥ 27 kg/m^2 to ≤ 30 kg/m^2 (overweight) in the presence of at least one weight-related comorbidity such as dysglycaemia (an abnormality in blood glucose stability)/hypertension/dyslipidaemia/OSA
Dosage form	Solution for injection 6 mg/ml, 5 x pens
Dosage regimen	• For SC use only • Administer one daily dose at any time of the day independent of meals but preferably at the same time of the day • Starting dose: 0.6 mg once a day; increase the dose to 3 mg once daily in 0.6 mg increments with at least one-week intervals to improve GI tolerability • If dose is escalated to the next step and is not tolerated for two consecutive weeks, consider discontinuation • A daily dose of higher than 3 mg is not recommended • Discontinue use after 12 weeks on 3 mg/ml if weight loss of at least 5% of initial body weight is not achieved • Re-evaluate treatment annually
Schedule	4

OSA – obstructive sleep apnoea, SC – subcutaneous, GI – gastrointestinal

A drawback of liraglutide is its daily SC injections. Semaglutide, another GLP-1 agonist, can be administered by weekly injections, which makes this more favourable for the patient.[76] In a recent 68-week placebo-controlled trial with obese individuals, it was found that semaglutide treatment (2.8 mg weekly) led to a weight loss of 14.9% compared to 2.4% with the placebo.[77] Another study with a similar design and follow-up period found a weight loss of 16% with semaglutide and 5.7% with the placebo.[78]

Bupropion and the bupropion-naltrexone combination

Bupropion is a norepinephrine and dopamine reuptake inhibitor used to treat depression.[79] Via POMC activation, it appears to decrease appetite via hypothalamic functions. This leads to the effects on food intake.[68] Bupropion has been shown to clinically assist with weight loss in obese individuals.[80] Upon combination with the opioid antagonist, naltrexone, it has been shown to alleviate addictive over-eating.[81]

Naltrexone inhibits the appetite-enhancing effects of beta-endorphin caused by cannabinoid-1 receptor activation, and it has been shown to decrease food cravings in obese and binge-eating individuals.[82]

The combined use of bupropion and naltrexone has a synergistic effect on appetite suppression.[83] The combination of bupropion with a low dose of naltrexone resulted in more pronounced weight loss when compared to bupropion monotherapy in a 24-week trial.[84] In a phase-3 study, bupropion (360 mg/day) combined with naltrexone (32 mg/day) resulted in a weight loss of about 6%, compared with about 1% for the placebo.[84]

Phentermine-topiramate combination

The combination of low-dose phentermine (15 mg/day) with low-dose topiramate (100 mg/day) has been investigated for the treatment of obesity, with most of the studies being done in the United States of America (USA). The studies indicated that this combination led to reduced energy intake and substantial weight loss when compared to the placebo.[80] Some adverse effects have been reported when using this combination[68] and although not available in South Africa, will be considered an off label prescription when the combination is prescribed.

Conclusion

Obesity is a common condition that affects many different systems in the body. Some include CVS effects, endocrine disorders, haematological disorders, infertility, and T2D. Lifestyle modification interventions should be the starting point in managing obesity, whereafter pharmacological interventions might be needed. The pharmacist plays an important role in the identification of obese individuals (BMI calculations), making suggestions for lifestyle modifications (e.g. increase physical activity that overshadows increased caloric intake), providing individuals with information about the rationale behind the combination of nonpharmacological and pharmacological management and the dispensing of anti-obesity products.

Conflict of interest

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ORCID

L Brown https://orcid.org/0000-0002-8007-723X

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The knowledge and perceptions of pharmacy students regarding tetanus and its prevention at a South African university in Tshwane

M Malinga,[1] CB Mthabeni,[1] NM Mabaso,[1] E Teague,[1] KJ Mahlaba,[1,2] M Sibanda,[1,2] D Engler[1,3]

[1] School of Pharmacy, Sefako Makgatho Health Sciences University, South Africa

[2] South African Vaccination and Immunisation Centre, Sefako Makgatho Health Sciences University, South Africa

[3] Ras al-Khaimah Medical & Health Sciences University, UAE

Corresponding author, email: engler.deirdre@gmail.com

Abstract

Background: Tetanus is a medical emergency, caused by spores of the bacterium *Clostridium tetani*, which cannot be eradicated. Infection with *C. tetani* does not provide immunity and vaccination-acquired immunity wanes with age and should be maintained with booster doses. This study aimed to establish pharmacy students' knowledge and perception of tetanus as a vaccine-preventable disease (VPD).

Methods: A quantitative descriptive study was conducted prospectively amongst 256 Bachelor of Pharmacy (BPharm) students at a South African university in the Tshwane District, Gauteng, using a Google Forms® questionnaire. Data was exported to Microsoft Excel®, followed by statistical analysis using BlueSky Statistics version 10.2.0 for Windows, version 26.

Results: The majority (80.77%; n = 156) of participants knew about tetanus and its causative agent (70.97%; n = 155). Only 52.90% (n = 155) knew that *C. tetani* can be found in the soil. The incorrect Expanded Programme on Immunisation (EPI) vaccination schedule was selected by 65.54% (n = 148) while only 23.13% (n = 147) knew that tetanus vaccination requires a booster dose. Of the participants, 49.35% (n = 154) incorrectly believed that a completed tetanus vaccination schedule ensures lifelong protection. Most (60.39%; n = 154) were unsure whether the tetanus toxoid (TT) vaccine could trigger the disease. Moreover, 47.40% (n = 154) did not know if the vaccine can be administered to pregnant women, and 25.97% (n = 154) said the vaccine is teratogenic. Of the participants, 36.77% (n = 155) have received all the tetanus vaccinations as per the EPI schedule. Only 10.32% (n = 155) had received a booster dose within the previous ten years.

Conclusion: Even though tetanus disease is taught in BPharm-1 and BPharm-3, this study found a noticeable knowledge gap regarding the disease and its management across all year groups. This is worrisome as pharmacists are often a trusted source of health information and health services. The inconsistencies in knowledge about the disease could potentially increase the risk of tetanus in the population.

Keywords: knowledge, perception, tetanus, vaccination

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Cholera outbreak – an overview of management and prevention

S Vambe, W Zulu, S Rwizi, E Hough, MJ Luvhimbi, E Bronkhorst
School of Pharmacy, Sefako Makgatho Health Sciences University

Corresponding author, email: elmien.bronkhorst@smu.ac.za

Abstract

Cholera is a water-borne disease, caused by the bacteria *Vibrio cholerae*, and it is spread by contaminated food and water. Transmission happens through the oral-faecal route, by ingestion of contaminated food or water and poor sanitation. The risk factors include limited access to safe water and sanitation facilities. The symptoms include severe watery diarrhoea and dehydration. Management is based on proper and timeous rehydration as well as preventative measures to stop the transmission of the bacteria. Antibiotics such as doxycycline or ciprofloxacin are effective treatment options. Hand hygiene and proper sanitation are of the utmost importance to reduce the spread of the disease. This review will focus on assessing the aetiology, pathophysiology, modes of transmission, treatment, and prevention methods available for cholera, with an aim to raise public awareness on the cholera outbreak currently affecting the country.

The review conducted searches on Pub-Med and Google Scholar databases to find literature covering different aspects of cholera, such as its causes, pathophysiology, transmission, treatment, and prevention. Articles on cholera in the current year of 2023 up to a limit of 2012 and written in English language were used in this review. In addition, this review made use of the standard treatment guideline for cholera treatment options provided by the South African National Department of Health.

Keywords: cholera, prevention measures, treatment options

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Background

Cholera is a water-borne disease, caused by the bacteria *Vibrio cholerae*, and it is spread by contaminated food and water. The bacteria is transmitted through the oral-faecal route, by the ingestion of contaminated water, uncooked or contaminated raw food and poor sanitation.[1]

A recent outbreak of cholera has been reported in the north of Gauteng Province, with the first patient identified in February, and the first death reported in March. Several patients have since died.[1]

The World Health Organization (WHO) estimates 1.3 to 4.0 million incidents of cholera each year with 21 000 to 143 000 deaths worldwide.[2] The disease dates back to the 5th century on the Indian subcontinent, where it originated and later spread followed by a prevalence of six global cholera pandemics between 1817 and 1923. The seventh ongoing cholera pandemic identified in 1961 in Indonesia continues to spread through Asia, Africa, Europe, and Latin America.[3]

The risk factors for cholera outbreaks include limited access to safe water and sanitation facilities, extreme climate change such as rainy seasons that cause damage to water infrastructure, travelling to cholera endemic regions, and poverty leading to poor access to sanitation, thus increasing susceptibility to becoming infected.[4] Presently, water, sanitation, and hygiene, also known as the WASH measures, together with the new generation oral cholera vaccines are considered interventions and beneficial preventative tools in cholera-endemic countries and in areas prone to risk for outbreaks.[5]

Despite improved knowledge of how cholera spreads and preventive measures and measures to control outbreaks, the disease remains a major health problem in many African, Asian, and South American countries.[2] There have been continuous and recurrent episodes of cholera outbreaks in Africa, which have led to a rise in morbidity and mortality in several countries.[5] Based on the global patterns of trends in cholera mortality between 1990 and 2019, there has been an increase in the number of cholera-related deaths worldwide, which doubled in 2010 as a result of a vast increase in cholera epidemics in many countries including Haiti, Nigeria, Cameroon, Chad, and the Democratic Republic of Congo. This is due to poverty in these countries, which limits access to basic services such as clean running water.[6] Nigeria recorded the highest mortality rates at 4.5% over the period from 1990 to 2019.[6]

In 1974, South Africa recorded its first case of cholera, however, most outbreaks that followed were a result of importation from the neighbouring countries, Zimbabwe and Mozambique.[7] This includes the 12 706 cases reported during the 2008 outbreak from November 2008 to April 2009, five cases from 2010–2014, and 102 *V. cholerae* isolates identified from February 2018 to January 2020.[7] The National Institute for Communicable Diseases (NICD) in South Africa, is notified of all suspected cholera cases, they receive all human and environmental isolates, then make a definitive diagnosis if *V. cholerae* O1 or O139 is isolated.[7]

Different studies have been done covering aspects such as the aetiology, pathophysiology and transmission of cholera, as well as previous reports across many countries. It is important to assess

the current information on cholera and to better understand the disease so that appropriate preventative measures can be implemented to avoid future outbreaks. This review aims to provide information to the public about cholera and to aid healthcare workers, including pharmacists, to be aware of symptoms like diarrhoea, especially during an epidemic and the relevant treatment options available to them.

Methods

Search strategy

The review conducted searches on Pub-Med and Google Scholar databases to find literature covering different aspects of cholera, such as its causes, pathophysiology, transmission, treatment, and prevention. Literature searches were done using the following keywords in different combinations on the online search; cholera, prevention measures and treatment options.

Article selection

All the selected articles were independently reviewed by the five authors for eligibility to be used in this review. All the disagreements were resolved by consensus. Articles on cholera in the current year of 2023 up to a limit of 2012 and written in English language were used in this review. In addition, this review made use of the standard treatment guideline for cholera treatment options provided by the South African National Department of Health.

Aetiology

Cholera infection is caused by toxins produced by the comma-shaped, Gram-negative bacteria *V. cholerae*, namely O1 and O139 serogroups of the bacterium that take residence in the small intestine.[7,8,9] The onset of symptoms of cholera can occur within 12 hours and up to five days after ingesting the bacterium.[2] Symptoms are often mild, and some infected people can be asymptomatic. Even if people are asymptomatic, they can still spread the infection through their faeces for up to 10 days. The key symptoms of cholera are diarrhoea and dehydration due to the rapid loss of fluids and electrolytes.[10] Some people may experience vomiting, shock, seizures, leg cramps, abdominal pain, and kidney failure. In addition to diarrhoea and dehydration, drowsiness, fever, and convulsions are some of the symptoms noted in children with cholera.[11]

Pathophysiology

Entering the human body, *V. cholera* avoids the low pH environment of the stomach where the acidity will destroy the bacteria, which reduces the infectious dose significantly.[12] The cells, which withstand the acidic environment of the stomach, eventually reside in the intestinal tract. Their residence is aided by the toxin co-regulated pilus, which can eradicate other bacteria.[12]

Cholera toxin (CT) is a toxin released by *V. cholera,* which elicits its effect intracellularly once the toxin enzyme has activated the adenylate cyclase regulatory proteins.[13] The CT and other proteins block the normal ion transport through the gut epithelium[12] by increasing the efflux of chloride from the plasma to the lumen and decreasing the absorption of sodium from the lumen into the plasma.[14] Additionally, CT also causes an increase in adenyl cyclase activity, which causes cyclic adenosine monophosphate (cAMP) to rise, ultimately reducing the intestinal villus cells' ability to actively absorb sodium, potassium, and bicarbonate. This increase in electrolytes in the gut results in massive water loss that presents as severe diarrhoea and vomiting. The diarrhoea is severe, and if not treated timeously, it can be fatal.[10,12,14,15]

Transmission

The main routes of transmission for cholera include the oral-faecal route, human-to-human transmission, and the consumption of contaminated food or water.[16] Table I depicts the different routes of transmission for the bacteria.

Prevention

Authorities in charge of public health face several demands on their limited resources during a cholera outbreak. Thousands of lives can be saved by ensuring that the front-line healthcare workers have the tools and training necessary to address the acute dehydration and other symptoms caused by cholera. The burden of cholera can be reduced by advising households to treat diarrhoea with oral rehydration solution, disinfect drinking water with an effective disinfectant, such as chlorine, which can be found at non-governmental organisations (NGOs), and washing their hands with soap under running water.[17]

The Centers for Disease Control and Prevention (CDC) recommend five basic steps to prevent the disease. These steps are depicted in Figure 1.

Firstly, people can ensure that they use uncontaminated water by using bottled water with unbroken seals. Alternatively, methods such as boiling water before use, using bleach, filters or treating water with chloride products can be used to ensure that water is not contaminated. The method of boiling water is a reliable method of sanitising water when access to chlorine products is not available. Households that cannot boil water can use household bleach (two drops for every one litre of water) as an alternative to sanitise water, but this method requires waiting 30 minutes before using the water. One can also use filters of 0.3 microns or less to filter water together with the use of chemicals

Table I: Routes of transmission of *V. cholerae.*

Not using latrine
Not washing hands after touching faeces
Flies on food
Not washing food before preparing
Not washing hands before preparing food
Unsafe drinking water
Not washing hands before eating

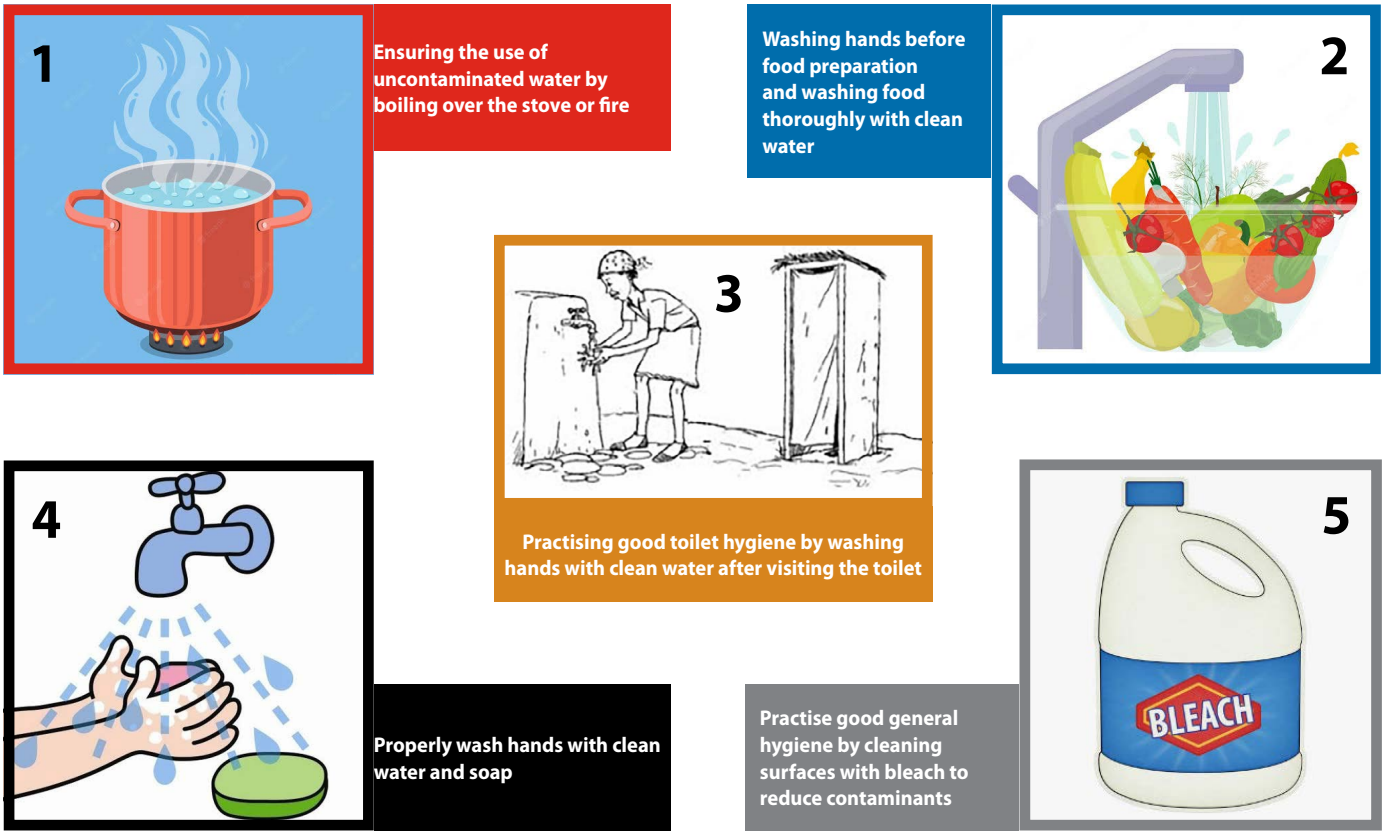

Figure 1: Five basic steps to reduce cholera transmission[18,19,20,21,22]

like chlorine, chlorine dioxide, or iodine to disinfect the water before use. Additionally, the purified water should be stored in clean and covered containers.[23]

Regular washing of hands with soap and clean water should be done before, during and following food preparation as well as when feeding children or yourself. Hands should be washed after every visit to the bathroom and immediately after wiping the bottoms of babies. Caregivers should wash their hands after caring for a person suffering from diarrhoea. In situations where there is no access to soap and water, alcohol-based hand sanitisers that contain at least 60% alcohol can be used.[23]

Good toilet hygiene such as getting rid of waste in toilets and not in open spaces and using properly maintained sanitary facilities to dispose of child waste, must be practised minimising the spread of cholera. Additionally, proper hand washing with clean water and soap should be practised, following a visit to the bathroom.[23]

Good food preparation is important to ensure that fruits and vegetables are cleaned and peeled correctly. All surfaces and items, which will be used to prepare food, should be adequately cleaned with soap and water. When cooking, ensure that meals are cooked thoroughly, and store leftover food in sealed or covered containers. All food should be consumed while warm. Lastly, bathing and washing of dirty clothes or diapers should be performed at least 30 meters away from sources of drinking water. Toilets and other faeces- contaminated surfaces should first be washed down with soapy water and then disinfected with a solution of 1:9 parts household bleach and water. Once cleaning is done, the water and dirty rags should be disposed of properly, and hands should be washed with soap and clean water.[23]

Management

In an endemic or epidemic condition, anyone over two years of age with clinical presentation of acute watery diarrhoea (three or more watery stools in the last 24 hours) of short duration (24–48 hours), with or without vomiting, accompanied with dehydration, should be treated as cholera.[24]

Early rehydration is the cornerstone of care (regardless of the causative organism), and time should not be wasted thinking about investigations or the best antibiotic to utilise.[24]

Cholera is easily curable. Most patients can be successfully treated with timely oral rehydration solution (ORS) delivery. One litre (L) of clean water is used to dissolve the WHO/United Nations International Children's Emergency Fund (UNICEF), ORS standard sachet. For the first day's treatment of moderate dehydration in adult patients, up to 6L of ORS can be administered. Patients with severe dehydration need to receive intravenous fluids quickly, because they run the danger of developing shock.[2] Additionally, the appropriate antibiotic therapy such as ciprofloxacin or doxycycline, are administered to these patients to minimise the duration of diarrhoea, to lessen the amount of rehydration fluids they require, and to reduce the amount and duration of *V. cholerae* excretion in their stool.[2]

Table II: Treatment options for cholera according to the CDC[23] and STG[26]	
According to the Centers for Disease Control and Prevention (CDC)	
Rehydration	Fluid and electrolyte replacement
First-line treatment for adults, pregnant women and children.	Doxycycline 300 mg single dose. Adverse effects: Previously doxycycline was not recommended for children due to teeth discolouration, and in pregnant women due to teratogenic effects; however a recent systemic review showed no correlation between the use of doxycycline and teeth discolouration or teratogenic effects.
Other alternatives:	Furazolidone, chloramphenicol or sulfaguanidine can lower cholera morbidity. Norfloxacin, trimethoprim-sulfamethoxazole (TMP-SMX), erythromycin.
According to Standard Treatment Guideline (STG)	
Treat dehydration	Oral rehydration solution (up to 6L)
Antibiotic treatment	Children: Ciprofloxacin, oral, 15 mg/kg/dose 12 hourly for 3 days Plus Nutritional supplementation: Zinc, oral for 14 days (if < 10 kg give 10 mg/kg or if > 10 kg give 20 mg/kg). Adults: Ciprofloxacin, oral, 500 mg 12 hourly for 3 days.

The WHO further states that for children under the age of five, zinc can be crucial supplementary therapy that also shortens the duration of diarrhoea, and it may help avoid recurrences of other types of acute watery diarrhoea. Breastfeeding in babies should be encouraged.[2] Treatment options for cholera according to the South African Standard Treatment Guidelines and the CDC are depicted in Table II.

Erythromycin is an excellent alternative treatment for cholera that is safe for use in both children and adults, including those who are pregnant. While doxycycline has benefits relating to simplicity of administration and equivalent or greater effectiveness, norfloxacin, trimethoprim-sulfamethoxazole (TMP-SMX), and ciprofloxacin are also effective antibiotics. Recently, it was discovered that azithromycin was more effective than erythromycin and ciprofloxacin. In areas where cholera is endemic and epidemic,

V.cholerae isolates which are resistant to tetracyclines and other antimicrobial agents have been identified.[25]

The volume of fluid required to rehydrate patients is dependent on the severity of dehydration.[21] IV Sodium chloride 0.9% or homemade sugar and salt solution (½ level medicine measure of table salt plus 8 level medicine measures of sugar dissolved in 1 litre of boiled (if possible) then cooled water). Rehydration together with ciprofloxacin antibiotic treatment is recommended in both children and adults. The management of cholera relies heavily on replacing fluids and electrolytes as soon as possible,[24] in combination with antibiotics.[25]

Conclusion

The findings indicate that cholera remains a major health concern in many regions, particularly in African, Asian, and South American countries, despite significant efforts to control its spread. The cholera incidence in Hammanskraal, Gauteng, South Africa, serves as a poignant example of the consequences that can arise when prevention and management strategies are not adequately implemented. The outbreak may have led to avoidable deaths and illnesses, putting a strain on the local healthcare system, and causing social and economic disruptions in the affected area. Although cholera poses a significant health problem, it can be effectively managed with appropriate oral rehydration fluids and antibiotic medications like ciprofloxacin and doxycycline. Healthcare workers should be aware of current outbreaks and treat all watery diarrhoea as cholera. Healthcare workers, including pharmacists, play a role in educating the population on proper hand hygiene, effective handwashing and food preparation.

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Premenstrual dysphoric disorder (PMDD) – an overview

RM Battey
Department of Pharmaceutical Sciences, Faculty of Science, Tshwane University of Technology, Pretoria

Corresponding author, email: batteyrm@tut.ac.za

Abstract

Premenstrual dysphoric disorder (PMDD) is a disabling condition that affects women of reproductive age. It is not frequently conversed, is often mistaken for Premenstrual Syndrome (PMS) or can be misdiagnosed due to its array of symptoms and periodicity. Women experience severe and distressing symptoms which can lead to dysfunction. PMDD symptoms usually begin around the luteal phase of the menstrual cycle and reduce upon menstrual bleeding.

Treatment options include diet and lifestyle modification, medication and psychological interventions. This article aims to review the condition and treatments options that are available.

Keywords: menstruation, premenstrual dysphoric disorder (PMDD), luteal phase, reproduction

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Introduction

Premenstrual dysphoric disorder (PMDD) is a condition distinguished by mood and physical symptoms in the week prior to menstruation. Approximately 5% of women are affected and often go undiagnosed.[1] Assigned in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), it is distinguished by cognitive–affective symptoms that are distinctive from those of other mood disorders.[2]

Cognisance of the synchronised variation in mood with menstrual cycle phases has amplified noticeably over the past two decades. Traditionally the term premenstrual syndrome (PMS) has been more familiar. PMS has a number of symptoms such as which occur in the late luteal phase and subside at the commencement of menstruation:[3]

- irritability
- tension
- fatigue
- dysphoria
- distractibility
- impaired motor coordination
- changes in eating and sleeping, and
- libido changes

Distinction between PMDD and PMS is the severity of PMDD symptoms and the ability to affect functioning.

Clinical phenomenology

The DSM-5 diagnosis is established upon a pre- and perimenstrual repetition of at least five physical, affective, and/or behavioural symptoms (Table I).

As per DSM-5 criteria, these symptoms must have occurred during at least two menstrual cycles in the past year to meet criteria for PMDD diagnosis. The greatest severity of symptoms is noted from three to four days prior to onset of menstruation to up to three days postmenstruation onset. There must be an absence of symptoms in the postmenstrual week.[5]

Pathophysiology

PMDD symptoms occur due to hormonal actions following ovulation. The hormones progesterone and oestrogen control certain neurotransmitters that impact mood and behaviour e.g. serotonin, Gamma-aminobutyric acid (GABA), dopamine, norepinephrine.[6] When serotonin levels are decreased, sleep, appetite and moods are affected. It has been postulated that women with PMDD have lower levels of serotonin in the last 10 days of the menstrual cycle.[6] Allopregnanolone (ALLO), which is a metabolite of progesterone, has also been shown to play a role

Table I: Physical, affective, and behavioural symptoms of PMDD[4]

Physical	Affective	Behavioural
Breast tenderness breast swelling or bloating.	Affective lability (mood swings, tearfulness, sensitivity to rejection). Irritability or anger that is often characterised by increased interpersonal conflicts. Marked depressed mood, hopelessness, or self-deprecating thoughts; or anxiety, tension or feeling on edge. The woman may also experience difficulty concentrating or a sense of feeling overwhelmed.	Loss of interest in usual activities. Lack of energy. Changes in appetite or food cravings. Changes in sleep.

Table II: Pharmacological treatment options for PMDD[2,7,8,9]

Agents	Dosage	Use recommendation	Comments
Serotoninergic agents			
Citalopram	10 to 30 mg per day	Full cycle or luteal phase only	Benefits physical, cognitive, and emotional symptoms. Administration during luteal phase. Luteal-phase use is superior to continuous treatment. Common side-effects include headache, nausea and insomnia.
Fluoxetine	20 mg per day	Full cycle or luteal phase only	Significant reduction of all symptoms. Decreased libido or delayed orgasm is most common side-effect in long-term, continuous use.
Paroxetine	10 to 30 mg per day	Full cycle	Benefits all symptoms. Transient gastrointestinal and sexual side-effects.
Sertraline	50 to 150 mg per day	Full cycle or luteal phase only	Benefits all symptoms. Transient gastrointestinal and sexual side-effects.
Venlafaxine	75 to 150mg per day	Full cycle	Improvement in mood. Adverse events include nausea and insomnia.

on GABA-A receptors in the pathophysiology of PMDD.[6,7] ALLO has anxiolytic effects comparable to benzodiazepines.[7] Genetics, stress and psychosocial factors are other contributors.[7] Risk factors include anxiety, depression, PMS, family history of PMDD or mood disorders, personal history of trauma, abuse or other highly stressful events.[7]

PMDD can worsen during the years of perimenopause. The symptoms may be more severe, and as periods become increasingly irregular, symptoms can be more frequent and much less predictable, making PMDD harder to manage.[2]

Treatments

The goals of the treatment of PMDD are:

1. Reduction of symptoms
2. Enhanced social and occupational functioning
3. Improved quality of life

Pharmacological interventions

The first-line treatment for PMDD are selective serotonin re-uptake inhibitors (SSRIS) (Table II).

Hormonal interventions are indicated in Table III.

Lifestyle changes and non-pharmacological treatment options include:[2,8,9]

- Dietary modifications
- Restricted salt –1200 mg/day in divided doses
- Restricted caffeine
- Restricted alcohol – 6 g/day from ovulation to menses

Table III: Hormonal therapies for PMDD[2,7,8,9]

Drug	Dosage	Use recommendation	Comments
Leuprolide depot	3.75 mg IM per month	Up to six cycles	Pregnancy category X.
			Significant relief from symptoms but can induce menopausal syndrome.
Leuprolide depot with ovarian hormone supplements	3.75 mg IM per month with oestrogen and progesterone	Can exceed six cycles	Less likely to induce menopause; PMDD symptoms may return, making this combination less effective.
Goserelin with oestrogen supplementation	3.6 mg SC every 28 days with oestrogen	Can exceed six cycles	Less likely to induce menopause; PMDD symptoms may return, making this combination less effective.
			Pregnancy category X.
			Use non-hormonal contraception during therapy and for 12 weeks after discontinuation of drug or until menses resume.
Danazol	100 mg twice a day	Up to six cycles	May cause masculinisation from weak androgenic properties.
			Pregnancy category X.
OCPs	OCPs with varying amounts of oestrogen and progesterone, once a day	Full cycle	Variable response; may not benefit patients with significant mood symptoms; in some patients, may make mood symptoms worse.
Progesterone	Vaginal suppositories, 200 to 400 mg per day	Not recommended for this use	Questionable efficacy.

IM = intramuscularly; SC = subcutaneously; OCPs = oral contraceptive pills

- Moderate regular exercise
- Cognitive behavioural therapy
- Stress management
- Supportive therapy
- Patient education about the condition

Nutritional supplements include:[2,8,9]

- Vitamin B6, up to 100 mg per day
- Vitamin E, up to 600 IU per day
- Calcium carbonate, 1,200 to 1,600 mg per day
- Magnesium, up to 500 mg per day
- Tryptophan, up to 6 g per day

Complementary medicines include:[9,10]

- Vitex agnus-castus (chasteberry)
- St John wort
- Gingko biloba
- Evening primrose oil

Management

Figure 1 provides an outline for the management of PMDD.

Novel pharmacotherapies

The appearance of evidence associating allopregnanolone in the aetiology of PMDD has led to new drug advances. A phase II study was conducted in a sample of women with PMDD with sepranolone, an allopregnanolone antagonist.[13] It was demonstrated that patients receiving the active ingredient had a decrease in symptoms compared to placebo over the menstrual cycle.[14,15] It is an injection that inhibits the effects of the GABA steroid allopregnanolone on a GABA-A receptor in the brain.[16] This prevents PMDD symptoms from developing.[16]

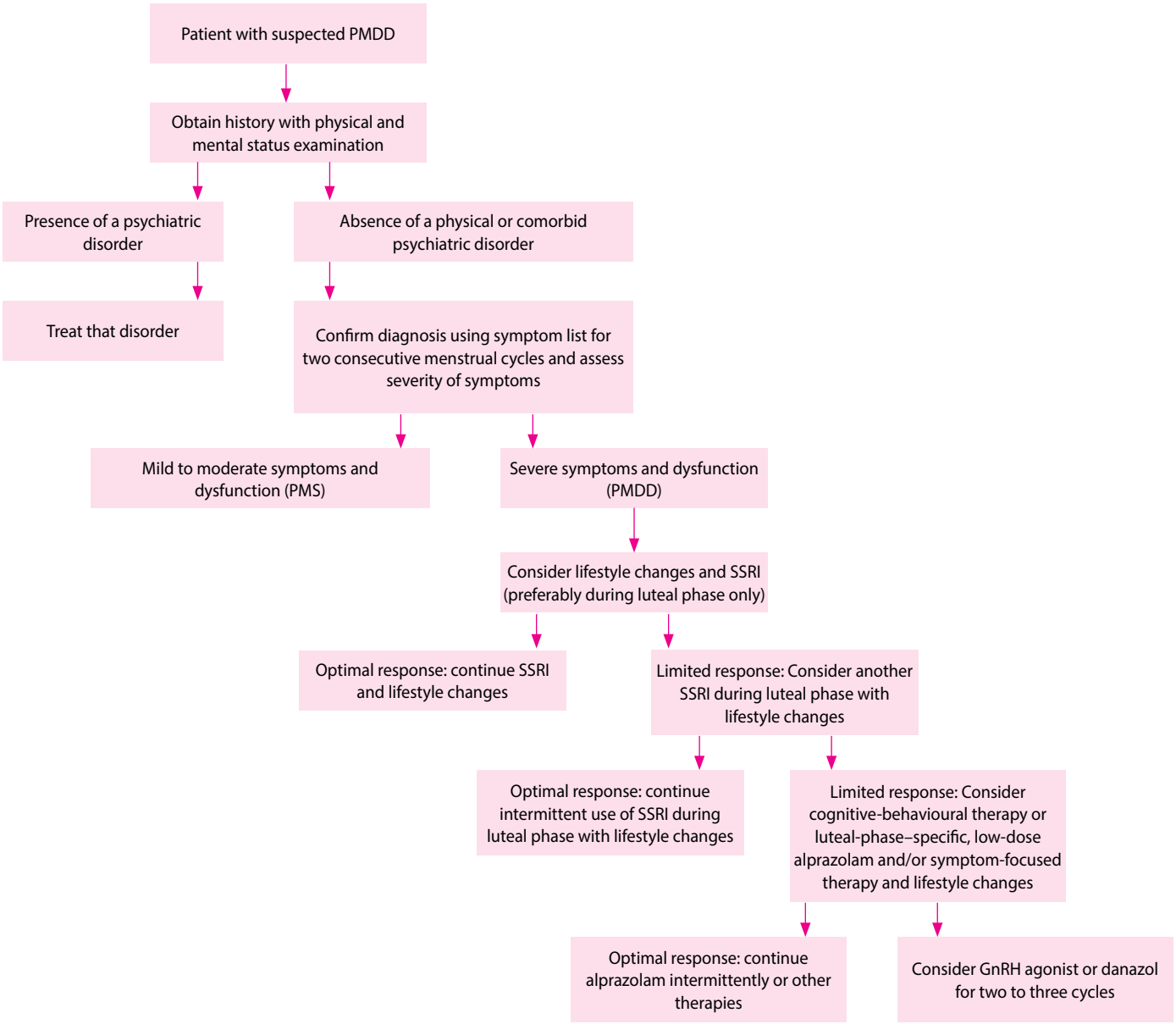

Figure 1: Algorithm for the management of PMDD[10,11,12]

Conclusion

It is imperative that pharmacists and healthcare professionals have the ability to distinguish between PMS, PMDD and psychiatric disorders in order for women to be correctly diagnosed and treated. Future outlooks may include training healthcare professionals for the assessment of PMDD and how to offer support to patients. Women who suspect they have the condition should aim to track their symptoms using journals or apps. PMDD is a cyclical mood disorder distressing a subset of women with a disease burden analogous to other depressive disorders. Additional investigation is required to both continue to clarify the pathophysiology of this disorder and to establish its most effective treatments.

ORCID

RM Battey https://orcid.org/0000-0002-1953-143X

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Doping in sport: an overview

N Schoeman
Zuid-Afrikaans Hospital, South Africa

Corresponding author, email: nicolene@zah.co.za

Abstract

Doping, the illegal use of performance-enhancing drugs or techniques in sport, continues to be a significant issue that threatens the integrity and fairness of athletic competition. This article explores the motivations behind athletes' decision to dope, emphasises the pharmacist's pivotal role in combating it by staying informed on the World Anti-Doping Agency (WADA) Code, ensuring legitimate medication use, and educating athletes about doping and nutritional supplements. Furthermore, the role of the WADA in combating doping, the impact of doping on sports performance, and the substances and methods prohibited in sports are then discussed. The findings highlight the need for stringent anti-doping measures to preserve the principles of fair play and protect the health and well-being of athletes.

Keywords: doping, sports, performance-enchancing drugs, WADA, athletes, substance abuse, sports medicine, pharmacist

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Introduction

Doping, which involves the illegal use of banned performance-enhancing drugs (PEDs) or techniques to enhance athletic performance, has been a practice dating back to the creation of sport itself.[1] From the ancient use of substances in chariot racing to recent doping scandals at the Olympic Games, drug abuse in sport has become a growing concern.[2]

Doping poses a significant threat to the integrity and reputation of sport, as it grants an unfair advantage to those who partake in such practices. By doing so, it undermines the fundamental principles of fair competition and sportsmanship.[3] The ban on PEDs serves not only as an ethical measure but also to safeguard the well-being of athletes.[3] PEDs can have severe health implications, potentially causing long-term damage.[4]

Numerous international sports organsations, including the International Olympic Committee (IOC), actively enforce stringent anti-doping policies to uphold the principles of fair play.[4] Pharmacists, as the custodians of medicine, also play a crucial role in this effort by upholding anti-doping regulations and supporting athletes. They can ensure that athletes adhere to anti-doping rules, verify medication compliance with the Prohibited List, and educate athletes about the risks associated with doping.[5]

Why do athletes dope?

Drug abuse is a prevalent issue that affects athletes across various sports, age groups, and skill levels.[1] While gaining a competitive edge is often a motive for doping, athletes are not immune to the challenges and struggles faced by society.[6] Factors such as mental health disorders, injuries, and pain contribute to their decision to engage in doping.[7]

A common reason for doping is the desire to enhance cognitive abilities, stamina, strength, and power, ultimately improving athletic performance.[6] However, athletes may turn to doping as a form of self-medication to alleviate stress and anxiety from the pressure to perform and succeed or when suffering from a mental health disorder.[6] Moreover, athletes may resort to using doping substances to self-treat injuries and manage physical pain to continue participating in their sport.[7]

The pharmacist's role in combating doping in sports

Sport and exercise participation, from amateur to elite international levels, is witnessing a global surge, demanding a greater need for guidance and support from well-informed healthcare professionals.[8] Pharmacists, with their extensive pharmacological knowledge, role in patient counselling,[5,10] and unique position within the community, can play a crucial role in the fight against doping in sports.[5,10] By providing athletes with expert knowledge on medicine use in sports, including prohibited substances and anti-doping regulations, pharmacists can significantly support athletes.[5,10] Moreover, they can contribute to the anti-doping movement by helping prevent inadvertent use of prohibited substances and promoting awareness and education (Table I).[10]

By adhering to these responsibilities, pharmacists contribute significantly to the fight against doping in sport and play an integral part in promoting fair, clean, and safe sports environments for athletes worldwide.[5,9,10,11]

The World Anti-Doping Agency

In response to a cycling doping scandal in 1998, the IOC organised the First World Conference on Doping in Sport in 1999, leading to the establishment of the World Anti-Doping Agency (WADA).[3] WADA aims to ensure doping-free sport, promoting health, fairness, and equality. The agency implements anti-doping programmes globally, setting rules, conducting research, providing education, and monitoring compliance through collaborating with sporting bodies, governments, and stakeholders.[3]

Table I: Responsibilities of pharmacists in doping control and anti-doping support for athletes[5,9,10,11]

Classification	Responsibilities and actions
Staying informed and documenting	Stay abreast of the latest WADA prohibited list and regulations to ensure full compliance with anti-doping regulations in sport.
	Document an individual's participation in competitive sport in their medication record to facilitate appropriate treatment and adherence to anti-doping guidelines.
Dispensing medications and monitoring TUEs	Ensure that any medications dispensed to athletes are compliant with the anti-doping rules and do not contain prohibited substances.
	Verify the validity and necessity of Therapeutic Use Exemptions (TUEs) that allow athletes to use prohibited substances for legitimate medical reasons. Ensure proper documentation of TUEs.
Educating athletes and providing support	Educate athletes about the risks of doping, the consequences of using prohibited substances, and the importance of adhering to anti-doping regulations for the integrity of sports and athlete health.
	Educate athletes about the benefits and risks associated with nutritional supplements to promote safe and effective supplementation practices.
	Support athletes in maintaining their health and well-being through legitimate means, helping them navigate medications that are allowed within the anti-doping framework.
Being vigilant and reporting suspected violations	Exercise vigilance in distinguishing between legitimate medical use of medications and potential misuse for performance enhancement. Consider refusing to supply medications if there is clear intent for illegitimate performance enhancement.
	Report any suspicious or questionable practices related to doping to relevant anti-doping authorities or sports organisations to maintain the integrity of sport competitions.

Figure 1: Exploring the components of sports performance and doping

Adapted from Handelsman[8]

Sports performance and doping

Sports performance encompasses four key components: skill, strength, endurance, and recovery (Figure 1).[8,12] Each sport requires a unique combination of these elements. Skill-focused sports like target shooting or chess rely heavily on concentration and may benefit from drugs that reduce anxiety or fatigue and increase concentration.[7,8,12] Sports emphasising explosive, anaerobic power, like sprinting or boxing, favour a muscular build and are susceptible to PEDs that increase muscle mass and strength.[7,8,12] Endurance-based sports, such as cycling, triathlons or long-distance running, benefit from doping methods that boost aerobic capacity, like blood transfusions or erythropoietin (EPO).[7,8,12] Additionally, contact sports rely on injury recovery and may benefit from growth hormones and other factors that aid tissue regeneration.[7,8,12]

Top sports with the highest number of ADRVs committed by athletes

Athletics, cycling, and weightlifting were the sports with the highest number of Anti-Doping Rule Violations (ADRVs) committed by athletes (Figure 2).[13]

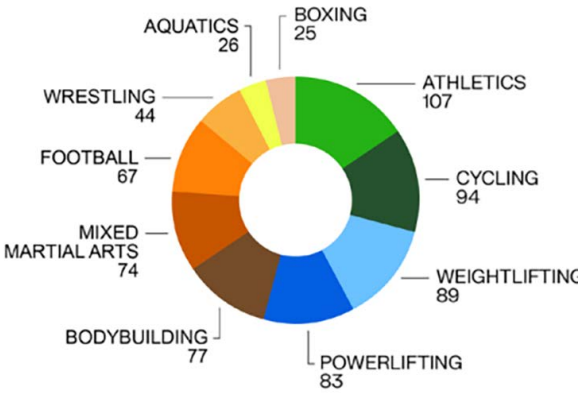

Figure 2: Top 10 sports with the highest number of ADRVs[13]

(WADA Anti-doping rule violations report 2023)

Nationalities of athletes with the highest number of ADRVs

The top three nationalities with the highest number of ADRVs are Russia, with 135 cases; India, with 59 cases; and the United States, with 57 cases (Figure 3).

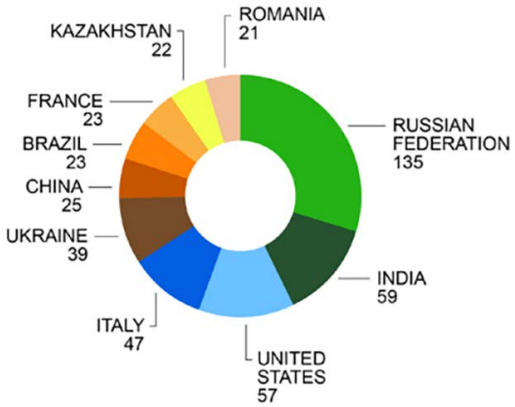

Figure 3: Top nationalities with the highest number of ADRVs[13]
(WADA Anti-doping rule violations report 2023)

Prohibited substance list 2023

The prohibited list is a crucial part of the World Anti-Doping Programme, updated annually through a consultation process by WADA (Table II).[14] The list plays a crucial role in ensuring fair play, safeguarding athlete health, and upholding the core values of sport. It encompasses more than 300 drugs and metabolites, which are classified into various groups.[14]

Prohibited substances

Non-approved substances (S0)

This category includes drugs that are not approved by any regulatory health authority for human use and are always prohibited.[14] It covers substances in various stages of development, discontinued drugs, designer drugs, and those approved only for veterinary use.[14] An example mentioned is BPC-157, a peptide known for its potential therapeutic effects in healing and tissue repair.[13]

Anabolic agents (S1)

Anabolic agents stand out as the most abused substances in sport.[12,13] According to the 2020 anti-doping testing figures

Box 1: Glossary of terms used in the prohibited substance list 2023[14]

Term	Explanation
Prohibited in competition	Substances or methods that are banned only during the period when an athlete is participating in a sports competition. Athletes must avoid using these substances or methods during the competition period, which typically begins at midnight (11:59 pm) before the competition and ends at the conclusion of the event and the sample collection process related to such competition.
Prohibited at all times	Substances or methods that are banned both in and out of competition. Athletes are not allowed to use these substances or methods at any time, whether during competition or in their everyday life.
Specified	Substances that are more likely to be used for legitimate medical purposes, but they still have the potential to enhance performance or mask the presence of other prohibited substances. If an athlete tests positive for a specified substance, they may receive a reduced sanction if they can demonstrate that the use was not intended to enhance performance.
Non-specified	Not all substances and methods may be explicitly listed on the prohibited list. However, they can still be considered prohibited if they lack approval from any governmental regulatory health authority for human therapeutic use, such as drugs in pre-clinical or clinical development, designer drugs, or substances approved solely for veterinary use. Additionally, substances with similar chemical structures or biological effects may also be deemed prohibited.
Substances of abuse	Substances that are identified as such because they are frequently abused in society outside of the context of sport, e.g. recreational drugs like cocaine, heroin, MDMA/"ecstasy",THC.
S0-9	Specified and non-specified prohibited substances.
M1-3	Prohibited methods.
P1	Specified substances prohibited in particular sports.

MDMA/"ecstasy" Methylenedioxymethamphetamine, THC = Tetrahydrocannabinol.

Table II: The prohibited list[14]

Prohibited substances in sports		Prohibited methods in sport		Substances prohibited in specific sports	
S0	Non-approved substances	**M1**	Manipulation of blood and blood components	**P1**	Beta-blocker
S1	Anabolic agents	**M2**	Chemical and physical manipulation		
S2	Peptide hormones, growth factors, related substances, and mimetics	**M3**	Gene and cell doping		
S3	Beta-2 agonists				
S4	Hormone and metabolic modulators				
S5	Diuretics and other masking agents				
S6	Stimulants				
S7	Narcotics				
S8	Cannabinoids				
S9	Glucocorticoids				

report, stanozolol was the most frequently abused anabolic agent, followed by dehydrochloromethyl-testosterone and drostanolone ranking third.[12,13]

Among selective androgen receptor modulators (SARMS), enobosarm emerged as the most abused substance. Clenbuterol occupied the second position, and ligandrol LGD-4033 third.[13]

Although anabolic agents have legitimate medical uses, athletes misuse them to enhance performance, seeking increased muscle mass, strength, and improved athletic performance.[12,13]

Peptide hormones, growth factors, related substances, and mimetics (S2)

Athletes commonly misuse peptide hormones, growth factors, related substances, and mimetics to enhance performance, increase muscle mass, improve energy and exercise capacity, and reduce risk of heart disease.[12,13]

The 2020 report highlighted that EPO and substances affecting erythropoiesis were the most misused within this category. Although these substances have therapeutic uses, such as treating anaemia, athletes misuse them to elevate red blood cell count, which in turn enhances oxygen transport and endurance capabilities.[13]

Beta-2 agonists (S3)

Beta-2 agonists are substances that have been prohibited in sport since the 1990s. However, there have been changes in the regulations to allow for the inhalation of specific beta-2 agonists, including salbutamol, formoterol, and salmeterol, aimed to strike a balance between allowing athletes with legitimate medical needs to use certain inhalers for respiratory conditions while preventing the misuse of beta-2 agonists for performance enhancement.[12]

According to the 2020 report, the most frequently reported beta-2 agonists in this category were terbutaline and higenamine. These findings highlight the continued monitoring and regulation of beta-2 agonist usage in sport to maintain fair competition and prevent abuse.[13]

Hormone and metabolic modulators (S4)

Athletes often use aromatase inhibitors and anti-oestrogenic substances, including anti-oestrogens and selective oestrogen receptor modulators (SERMS), not to directly enhance performance but to counteract the adverse effects of anabolic steroid abuse.[12,13]

Aromatase inhibitors block the conversion of androgens to oestrogens, leading to artificially elevated levels of androgens in the body. Androgens possess various performance-enhancing effects.[12,13]

The most frequently reported occurrences within this category included tamoxifen, meldonium and clomifene.[13]

Diuretics and other masking agents (S5)

Furosemide and hydrochlorothiazide were the most reported Adverse Analytical Findings (AAFs) for diuretics and other masking agents.[11]

Diuretics are therapeutically used to treat conditions such as oedema or volume overload in patients with heart failure, cirrhosis, kidney disease, or pulmonary oedema. In sports they are used to manipulate or falsify the results of doping controls and to conceal the use of prohibited substances.[12]

Stimulants (S6)

Stimulants are used to enhance sports performance by increasing alertness, concentration, metabolic rate, power, strength, and reducing fatigue.[12]

Methylphenidate had the highest occurrence, followed by cocaine and amphetamine.[13]

Cocaine and methylenedioxymethamphetamine (MDMA or "ecstasy") are classified as substances of abuse within this category due to their societal misuse, extending beyond performance enhancement in sport.[13]

Drugs used for cough and cold treatment, like ephedrines, fall into the threshold category, where their concentration must exceed a specific level for sanctions to be imposed. Exceptions to the ban on stimulants include clonidine and imidazoline derivatives used for dermatological, nasal, ophthalmic, or otic purposes.[13]

Narcotics (S7)

Narcotics are powerful painkillers, typically used in post-surgical treatments. However, athletes may misuse these drugs to mask pain and enable them to compete for longer periods. Narcotics such as morphine, heroin, and pethidine can be highly addictive.[12] The highest occurrence was oxycodone, followed by morphine.[13] Proper pain management and seeking appropriate medical advice and alternatives are crucial to ensure both the athlete's well-being and compliance with anti-doping rules.[10]

The cannabinoids (S8) and Carboxy-THC 91 99%

While there may be claims about the positive effects of cannabis in sport, like muscle relaxation and decreased anxiety, it is important to note that WADA prohibits the use of cannabinoids in competition. This includes natural and synthetic cannabinoids, such as tetrahydrocannabinol (THC) and cannabidiol (CBD).[13]

Glucocorticoids (S9)

Glucocorticoids have several effects on the body that may be perceived as beneficial for athletes. These effects include increased effort and energy due to higher glucose levels during exercise, reduced muscle swelling and pain due to their anti-inflammatory properties, decreased sense of fatigue, increased euphoria, and quicker replenishment of glycogen stores.[12]

While some routes of administration, such as oral, intravenous, intramuscular, or rectal, are always prohibited, other routes, including inhaled, topical, dental-intracanal, dermal, intranasal, ophthalmological, otic, and perianal, are not prohibited when used within the manufacturer's licensed doses and therapeutic indications.[13] The most used drugs in this class are triamcinolone acetonide, prednisolone, and betamethasone.[13]

Prohibited methods

Manipulation of blood and blood components (M1)

Prohibited activities include the administration or reintroduction of any blood or blood products into the circulatory system. Artificially enhancing the uptake, transport, or delivery of oxygen, including the use of substances like perfluorochemicals, efaproxiral (RSR13), voxelotor, and modified haemoglobin products. Intravascular manipulation of blood or blood components through physical or chemical means is also prohibited.[12,13]

Chemical and physical manipulation (M2)

Tampering with or attempting to tamper with the integrity and validity of collected samples during doping control is prohibited. This includes sample substitution or adulteration.

Intravenous infusions and/or injections of more than a total of 100 ml per 12-hour period are prohibited, except for legitimate medical purposes.[12,13]

Gene and cell doping (M3)

The use of nucleic acids or nucleic acid analogues that may alter genome sequences and/or gene expression, including gene editing, gene silencing, and gene transfer technologies, is prohibited. The use of normal or genetically modified cells with the potential to enhance sports performance is also prohibited.[12,13]

Substances prohibited in specific sports

Beta-blockers (P1)

Beta-blockers are prohibited during competition and, in some cases, also out-of-competition. The sports in which beta-blockers are prohibited include archery, automobile racing, billiards, darts, golf, mini golf, shooting, skiing/snowboarding (specific disciplines), and underwater sports.[12,13]

Examples of prohibited beta-blockers include acebutolol, atenolol, propranolol, and sotalol.[6]

Propranolol had the highest occurrence under AAFs in this class.[13]

Conclusion

Doping threatens fair competition and athlete health in sports. Reasons for doping include performance enhancement, pressure to succeed, and managing challenges. The global rise in sport and exercise participation requires support from informed healthcare professionals. Pharmacists, with their pharmacological knowledge and patient counselling role, play a crucial role in combating doping in sport by providing expert knowledge on medicine use and contributing to anti-doping efforts. WADA enforces global anti-doping policies with the prohibited list, which bans substances. The 2020 anti-doping rule violation report shows anabolic agents as the most abused substances. To protect sports integrity and athletes, a comprehensive approach is needed, including education, awareness, and strict enforcement. Efforts must create fairness and sustainability in clean sports.

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Adverse reactions to food: Navigating the maze in primary health care

J Staats,[1] **I Van Zyl**[2]

[1] Department of Family Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

[2] Department of Nutrition, Faculty of Health Sciences, North-West University, Potchefstroom, South Africa

Corresponding author, email: drjstaats@gmail.com

Abstract

Primary health care providers are often confronted with patients describing adverse reactions to food. With a multiplex of differential diagnoses, it is essential to have a structured approach to these complaints. Just as allergies can have a negative impact on quality of life, inappropriate food allergy labelling can cause unnecessary distress and hardship for patients. Understanding the diagnostic approaches to adverse food reactions, alongside an appreciation of multidisciplinary collaboration, can assist the clinician in making appropriate decisions in the management of these patients.

Keywords: food allergy; food hypersensitivity; food intolerance; allergy-focused history; allergy diagnosis.

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Introduction

An adverse food reaction is defined as an abnormal response linked to the ingestion of food and can be broadly classified into immune-modulated reactions and non-immune-modulated reactions (food intolerances) as demonstrated in Figure 1.[1] It is a common complaint, affecting 15%–20% of the global population, with multisystem involvement, ranging from gut to mucocutaneous, respiratory, cardiovascular and central nervous system symptoms.[2] In addition, patients and caregivers may suffer from anxiety and reduced quality of life related to attending or being excluded from social events, bullying at school, the affordability of special or 'free-from' products and the extra time spent in-store to read food product labels. Fear of recurrence after events such as anaphylaxis may also lead to conditions such as post-traumatic stress reactions.[3]

Whilst the majority of adverse reactions to food can be attributed to non-allergic processes,[4] patients may label their reactions as food allergy (FA). This self-reported diagnosis may lead to an overestimation as much as four times higher than the true prevalence,[5] which may lead to self-imposed food avoidance[6] and a risk of nutritional deficiencies.[7]

Food allergy is an adverse food reaction associated with a reproducible hypersensitive immune response.[6] Despite beliefs that FAs are rare in Africa, evidence suggests that it is a growing problem[8] and that it remains underdiagnosed.[5] Studies have found that the true prevalence of immunoglobulin E (IgE)-mediated FA in children in South Africa varies from 0.5% in rural populations to 2.5% in urban populations,[9] whilst the prevalence of IgE sensitisation to common foods is estimated at 11.6%.[10] At present, non-IgE-mediated FAs (non-IgE FA) are less well studied than other food allergies.[11] There is currently no prevalence data available for non-IgE FA in South Africa.

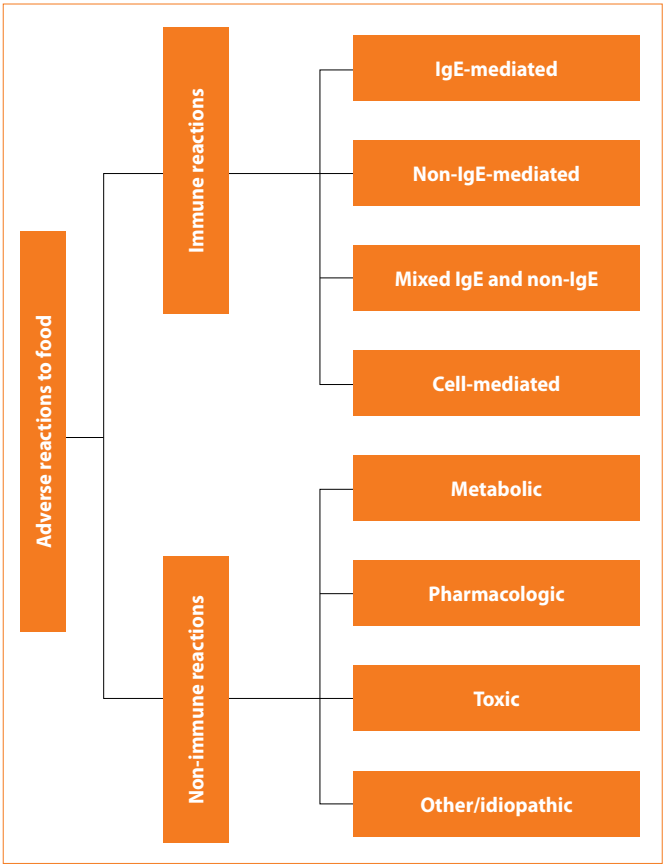

Figure 1: Classification of adverse food reactions.

Source: Adapted from Cox AL, Sicherer SH. Classification of adverse food reactions. J Food Allergy. 2020;2(1):3–6. https://doi.org/10.2500/jfa.2020.2.200022 IgE, immunoglobulin E.

It is the dichotomy of the increasing incidence of FA against the backdrop of self-reported overestimation that creates a diagnostic conundrum for primary health care providers. Considering that there are no validated tests for non-IgE-mediated allergies yet, clinicians may find themselves stuck in a maze of uncertainty.

The clinician should be able to discern a true FA from food intolerance and therefore provide relevant counselling or make an appropriate referral. Truly allergic individuals are at risk of developing life-threatening anaphylaxis and should therefore receive education on avoidance measures as well as the need for an allergy action plan and adrenaline autoinjector. Conversely, those without concrete evidence of harmful effects because of food ingestion should be discouraged from practising unnecessary avoidance.

It is therefore essential to have a structured approach to the diagnosis of an FA.

Diagnostic approach to food allergies

The diagnosis of FA may be seen as a process of triangulation involving sequential steps. One such model recommended by the European Academy of Allergy and Clinical Immunology supports a five-step approach that can be followed to confirm or exclude an FA:[7]

- Food allergy-focused history
- Selecting appropriate investigations to determine the presence of sensitisation
- Short-term elimination of suspected foods for diagnostic purposes
- Performing oral food challenges
- Evaluating for non-IgE-mediated FA.

Step 1: Food allergy-focused history taking

An allergy-focused clinical history remains the cornerstone of any investigative process. Ignoring this step in favour of other uninformed investigations will likely create further diagnostic confusion. The EATERS (exposure, allergen, timing, environment, reproducible, symptoms) mnemonic[2] provides a method for clinicians to interpret each case and makes sense of test results (Table I).

Some caveats may not fit in with the classical history of FA. For instance, food-dependent, exercise-induced anaphylaxis occurs when food and exercise are tolerated independently, but reactions occur when physical exertion follows ingestion of a food allergen.[15] Secondly, a condition called alpha-gal syndrome presents a true IgE-mediated allergy to red meat, but the timing of symptoms is delayed by 2–6 hours,[16] resulting in the phrase 'midnight anaphylaxis'.[17] These examples provide the potential limitations of an allergy-focused history and further demonstrate the fact that diagnosis in allergic conditions is a process rather than a single investigation.

Step 2: Investigations to confirm sensitisation

Immunoglobulin E (IgE) sensitisation can be determined via skin prick testing (SPT) or specific IgE levels. It is important to remember that sensitisation may be used as a proxy for confirming FA in the context of a positive history.[4] Food-specific SPT and IgE have a sensitivity of 70%–100%, but a specificity of 40%–70%. Therefore,

Table I: EATERS mnemonic.

Focus	IgE-mediated allergies	Non-IgE-mediated allergies
Exposure	Proximity to allergens is not deemed adequate to suggest exposure, the suspect food must be ingested. Other occasional methods for exposure could include handling raw food, being kissed by someone who has just eaten or inhalation of aerosolised pan-fried foods.	Ingestion of allergens via infant formula, food consumption or exposure through allergens excreted in breastmilk.[12]
Allergen	The most common allergens include milk, egg, nuts, soy, wheat and fish. The allergen is often determined by host immune responses.	Any food can cause a reaction. Cow's milk, soy and egg are often implicated. More common foods include corn, wheat, rice, oat, barley, sweet potato, white potato, chicken, vegetables, fruit, peanuts, nuts, fish and shellfish.[7,12]
Timing	Most reactions occur immediately on exposure.	Symptoms are often delayed and typically occur within 72 hours after ingestion.
Environment	Weaning is the most common scenario as new foods are introduced to the diet. Food allergy also tends to occur when eating away from home – nurseries, restaurants, parties and holidays.	More commonly seen in young infants and children. May occur during breastfeeding, formula feeding or during the introduction of solid foods.
Reproducible	Strictly reproducible and occur at all subsequent exposures to the food.	Strictly reproducible, and symptoms may occur with small volumes of the implicated food.
Symptoms	*Skin*: hives, swelling, redness, itching	*Skin*: pruritus, erythema, atopic eczema
	GIT: vomiting, abdominal pain, diarrhoea	*GIT*: acute or chronic diarrhoea,[13] gastroesophageal reflux, loose or frequent stools, constipation, food aversion or refusal, abdominal pain, severe or recurrent vomiting, intermittent bloody stools[11] or mucous in stools, dysphagia, oesophageal food impaction, erythema around the anus, malabsorption
	Respiratory tract: chough, wheeze, stridor, hoarseness, hypoxaemia *Cardiovascular*: shock, hypotension, syncope, collapse	*Others*: failure to thrive, changed behaviour because of discomfort and pain, persistent clear rhinorrhoea, lethargy, possible cyanosis, repetitive emesis may be associated with progressive lethargy, shock, dehydration and acidosis, hypotonia and hypotension.[14]

Source: Adapted from Erlewyn-Lajeunesse M, Weir T, Brown L, et al. Fifteen-minute consultation: The EATERS method for the diagnosis of food allergies. Arch Dis Child Educ Pract. 2019;104(6):286–291. https://doi.org/10.1136/archdischild-2018-316397

Box 1: Characteristics of disease-specific conditions.

- FPIAP symptoms are induced by localised inflammation of the distal colon, causing blood/mucus-streaked stools, together with mild diarrhoea in otherwise well-appearing infants.
- FPE mainly affects the small intestine, resulting in symptoms including intermittent vomiting, diarrhoea and malabsorption with failure to thrive.
- FPIES can affect the entire gastrointestinal tract, presenting with intractable vomiting, often followed by diarrhoea, which can result in metabolic disturbances and hypovolemic shock. FPIES can further be classified according to the timing of symptoms (acute vs. chronic FPIES), the severity of clinical manifestations (mild, moderate and severe), age of onset (early-onset, late-onset, adult FPIES), type of food triggers (cow's milk/soy vs. solid foods) and the presence of food-specific IgE (sIgE) (atypical FPIES).[28]

Source: Labrosse R, Graham F, Caubet J-C. Non-IgE-mediated gastrointestinal food allergies in children: An update. Nutrients. 2020;12(7):2086. https://doi.org/10.3390/nu12072086

FPIAP, food protein-induced allergic proctocolitis; FPE, food protein-induced enteropathy; FPIES, food food protein-induced enterocolitis syndrome.

in isolation has limited clinical value as it is possible for patients to be 'sensitised', but not clinically allergic to certain foods.[18] For some allergens, certain threshold levels have been determined to provide a 95% positive predictive value decision point. Notably, the size of the SPT reaction or the level of IgE correlates only to diagnostic probability and not the severity of reactions.[19]

Food-specific immunoglobulin G (IgG) testing is increasingly used by primary health care providers to identify and diagnose food sensitivities. This practice has no evidence basis. Conversely, the development of IgG or IgG4 is used as a marker of desensitisation and/or tolerance to that specific food allergen. Similarly, other tests such as the antigen leukocyte antibody test, provocation–neutralisation testing, hair analysis, electrodermal testing and applied kinesiology are frequently used to detect FA but have not been validated. These testing methodologies require further research for validation, regulation and standardisation before they can be endorsed for clinical practice.[20]

Step 3: Short-term elimination for diagnostic purposes

Short-term elimination or exclusion diets may be considered in situations where patients suffer from chronic symptoms or when a high index of suspicion exists for a specific food. If the patient improves following the period of elimination, a rechallenge with the suspected foods is done one by one to confirm the presence of a true FA. Low-dose re-introduction is usually done after 2–6 weeks of strict elimination. In instances where no improvement is observed, the eliminated food is unlikely to be the cause of the symptoms, and the value of excluding it from the diet is limited.[21]

Step 4: Oral food challenges

An oral food challenge is the gold standard for the diagnosis of FA. However, it is mostly reserved for scenarios where further clarification is required (e.g. in the setting of a suggestive history but equivocal SPT or IgE results),[21] as it is time-consuming and carries a risk of inducing a severe allergic reaction. It should therefore be done under the supervision of a trained clinician.[22]

Step 5: Evaluation for non-IgE food allergy

Overview of non-IgE-mediated food allergy

Non-IgE FAs are characterised by gastrointestinal reactions, including food protein-induced allergic proctocolitis (FPIAP), food protein-induced enterocolitis syndrome (FPIES) and food protein-induced enteropathy (FPE) (see Box 1 for disease specific characteristics); cutaneous reactions (such as atopic dermatitis, contact dermatitis and dermatitis herpetiformis) and respiratory reactions (such as Heiner syndrome) are often reported. Eosinophilic gastrointestinal disorders (EGIDs), including eosinophilic esophagitis (EoE), allergic eosinophilic gastroenteritis (AEG) and eosinophilic colitis (EC), are also classified as non-IgE FAs. Eosinophilic gastrointestinal disorders often present with non-specific symptoms such as repeated regurgitation, vomiting, and watery, mucoid or haemorrhagic diarrhoea, combined with other features such as poor growth and crying crises (colic). Food allergy itself can also cause gastroesophageal reflux disease.[23,24]

Non-IgE-mediated food allergic gastrointestinal disorders, including gastroesophageal reflux, abdominal pain, constipation and frequent vomiting, can adversely affect a child's feeding ability and skills, depending on the associated symptoms, disease severity, age at which the child is affected, social circumstances and the degree of dietary restriction recommended. Early diagnosis and management of these feeding difficulties are of utmost importance, as they can result in nutritional deficiencies or growth faltering.[25] Growth faltering is a commonly described symptom, with low weight and in particular low height found in approximately 10% of children with non-IgE FA.[26] Cow's milk is a predominant FA in children, of which non-IgE gastrointestinal FA accounts for up to 50% of reactions. Similarly, cow's milk is responsible for the majority of reactions in FPIES, FPE and FPIAP.[28]

Diagnostic approach to non-IgE-mediated food allergy

With the lack of laboratory tests to support the diagnosis of non-IgE FAs, the diagnosis remains challenging, as it relies on clinical evaluation and sound history taking (refer to Table I). The onset of non-IgE FA symptoms is delayed and may have a chronic presentation, making their association with the food allergen less evident.[27] The diagnosis of non-IgE FAs is based on the occurrence of symptoms after the culprit allergen is consumed, followed by their resolution once the suspected food has been eliminated and reappearing when it is re-introduced.[28]

Multidisciplinary collaboration: The role of the registered dietitian

A targeted, individualised approach to each allergic patient remains essential for the effective management of FA. As part of a thorough nutritional assessment, an experienced dietitian will conduct an allergy-focused clinical history and a comprehensive dietary assessment, including the evaluation of the food and symptom diary, as well as monitor growth. Dietary management includes advice regarding allergen avoidance, food label ingredients and terminology, hidden allergens in foods, suitable replacement foods and ensuring dietary adequacy. Ideally, no food should be

removed from an individual's diet without the involvement of a dietitian.[29,30] A dietitian can help with the identification of possible allergen–symptom associations and offer the necessary support to improve the allergic individual's quality of life.

Summary

Adverse reactions to food are commonly seen in primary health care providers. In addition to the obvious physical effects, it also has negative psychological and social consequences. Given the variety of causes and presentations, clinicians may easily be confused, resulting in haphazard testing and counselling.

Central to the accurate diagnosis of an FA is a sound allergy-focused clinical history. Specific information regarding the presenting symptoms should include the following:[12,29] the age of symptom onset; the timing of onset following food contact; the duration, severity and frequency of symptoms; and the quantity of food required to induce a reaction, as is the reproducibility of symptoms on re-exposure. Other pertinent information includes personal history of atopic disease (other FA, asthma, eczema or allergic rhinitis); family history of atopic disease in parents or siblings; cultural and religious factors that affect food preferences; comprehensive dietary assessment, including the age of weaning and food preferences; and whether breastfed, mixed or formula-fed. If the patient is breastfed, enquire about maternal dietary intake; details of any previous treatment, including medication such as antihistamines; and details on food elimination and reintroduction which may guide further investigation and management. A '14-day food and symptom diary' is a valuable diagnostic aide.

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J.S. and I.v.Z. contributed equally to the design and the writing of the article.

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ORCID

J Staats https://orcid.org/0000-0003-1314-0961
I Van Zyl https://orcid.org/0000-0002-4506-0547

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Safeguarding South Africa: newly available nonavalent HPV vaccine targets 9 HPV types and helps protect against cervical cancer risks

Cervical cancer ranks as the fourth most common cancer among women worldwide.[1]

In South Africa, cervical cancer is the second most common cancer among women between 15 and 44 years of age.[2] More than 95% of cases of cervical cancer are caused by human papillomavirus (HPV).[1] HPV is the most common viral infection of the reproductive tract.[1] Cervical cancer is the leading cause of cancer death in females between the ages of 15 and 44.[2] While most HPV infections (more than 90%) naturally clear up without causing harm, there remains a real risk of HPV infection leading to cancer.[1]

It's quite alarming to learn that nearly 6 000 women in South Africa lose their lives to cervical cancer each year.[2] Men aren't immune either and are also at risk of developing penile, throat, and anal cancer due to HPV.[2]

South Africa's new weapon in its arsenal

HPV vaccines target HPV types 16 and 18, responsible for a whopping 70% of cervical cancers![1] There is a 9-valent vaccine that offers even wider protection, and now available right here in South Africa. It is important to note that cervical cancer is not only caused by 16 and 18, but other HPV types are also culprits.[3] 16 and 18, together with a majority of these other cervical cancer-causing HPV types are included in the 9-valent vaccine.[1]

Zweli Bashman, Managing Director, MSD SA & SSA

"Our mission with the introduction of the 9-valent HPV vaccine to the South African market re-affirms our commitment to the elimination of HPV. We live in a region with the highest HPV prevalence, highest cervical cancer incidence and accounting for the highest mortality rates in the world.[1h] This makes it our mission as an innovative medicines company to ensure that we bring the best available vaccines to our market. We are actively and continuously working with all key stakeholders to find ways of expanding access and enhance the protection of individuals, empowering them to lead healthier lives free from the risks of HPV-related diseases."

The HPV vaccine, preventing 9 HPV types

The 9-valent HPV vaccine offers comprehensive protection against nine types of HPV, including the types most associated with cervical cancer, types 16 and 18 and two low-risk types - 6 and 11. In comparison to the quadrivalent vaccine, this vaccine goes the extra mile, safeguarding against five other high-risk to cause cancer HPV types (31, 33, 45, 52, and 58).[3] With the 9-valent vaccine, you can feel confident not only in preventing cervical cancer but also other HPV-related diseases, including vaginal, vulvar, and anal cancers, as well as genital warts.[3] Take charge of your health and ensure protection for yourself, your loved ones, and your family. With the 9-valent HPV vaccine, you're making a smart choice for your health. Speak to your local pharmacist, clinic nursing sister or doctor about HPV vaccination and safeguard your future.

Choosing the right protection

The 9-valent HPV vaccine targets nine types of HPV.

- High-risk types 16 and 18[4]
- Low-risk types 6 and 11, causing genital warts[4]
- Five other high-risk types (31, 33, 45, 52, and 58)[4]

The Quadrivalent HPV vaccine 4a targets four types of HPV.

- High-risk types 16 and 18[4]
- Low risk types 6 and 11, causing genital warts[4]

People living with HIV are 6 times more likely to get cervical cancer[1]

An astonishing 85% of women diagnosed with cervical cancer and HIV live in sub-Saharan Africa.[5] This statistic highlights the significant impact of HIV on the prevalence of cervical cancer within our country. People living with HIV are six times more likely to get cervical cancer,[1] emphasising the importance of HPV vaccination. HIV has an indirect role in oncogenesis, mainly via immune suppression, enhancing the effects of high-risk HPV.[5] When it comes to countries like South Africa, where we deal with the dual challenge of high cervical cancer rates and HIV prevalence, prioritising HPV vaccination becomes paramount.[5] HPV vaccines can make a huge difference in preventing cervical cancer and reducing the burden of disease in the long run.[5]

HPV vaccination made easy

Accessing the HPV vaccines is convenient and hassle-free. The HPV vaccine does not require a prescription, making it easily

obtainable. Healthcare providers across South Africa offer vaccination services, allowing you to schedule an appointment and receive the vaccine during routine healthcare visits. Speak to your doctor, clinic nursing sister or local pharmacist to learn more. Taking proactive steps towards your health has never been simpler.

Don't wait, vaccinate

Getting vaccinated before being exposed to HPV is highly recommended before being exposed to the virus.[1] The optimal time would be usually between the ages of 9 and 14 years.[1] The good news is that the 9-valent vaccine is approved for both males and females up to the age of 45 years old.[3] By vaccinating everyone, we can further reduce the overall burden of HPV-related cancers and safeguard the health of our communities.[1] Protect your family against HPV.

Dr. Trudy Smith is a Gynaecological oncologist at Wits Donald Gordon Medical Centre

"Cervical cancer is the most common cancer in women aged 15 to 44 years in South Africa and it is second leading cause of female cancer in South Africa.[2] The HPV vaccine is cancer preventing. Therefore, we must as a country make it our mission to ensure that women get vaccinated and protected against cervical cancer" [1]

Scientific backing of HPV vaccination

Extensive research and clinical trials over 15 years has shown that all HPV vaccines are safe.[6] The protection provided by HPV vaccines is durable, lasting at least about 12 years.[6] The 9-valent vaccine has received endorsement from Health Care Professions in the field due to its proven efficacy.[4]

Speak to your doctor, clinic nursing sister or local pharmacist about the HPV vaccine. You can also visit https://medinformer.co.za/health_subjects/human-papillomavirus-hpv/ for additional insights on HPV. Don't wait, prioritize your health, your families' health, and take the necessary steps towards prevention.

Some key facts about the newly available 9-valent HPV vaccine

- **Comprehensive protection:** the 9-valent vaccine provides protection against nine types of HPV, including those associated with cervical cancer and other HPV-related diseases.[3]
- **Preventive Benefits:** The 9-valent vaccine is highly effective in preventing cervical cancer, as well as other HPV-related diseases such as vaginal, vulvar, anal cancers, and genital warts.[3]
- **Convenience and Accessibility:** The 9-valent vaccine does not require a prescription, making it easily obtainable during your routine healthcare visits.
- **Gender-Neutral Vaccine:** Approved for both males and females, the nonavalent vaccine recognizes the impact of HPV on both sexes, reducing the overall burden of HPV-related diseases.[3]
- **Early Vaccination is Key:** Vaccinating preteens and young adults between the ages of 9 and 14 years old provides optimal protection and the best defense against HPV-related diseases.[1] Vaccination starts from 9 years onwards for both men and women.
- **Safety Profile:** Extensively tested in clinical trials, the nonavalent vaccine has been proven safe and well-tolerated.[6]
- **Long-Lasting Protection:** The nonavalent vaccine offers durable immunity for at least 12 years, providing long-term protection against HPV-related diseases.[6]
- **Strong Scientific Support:** The nonavalent vaccine is supported by extensive research, approved by regulatory authorities worldwide, and recommended by major health organizations for the prevention of HPV-related diseases.[6]

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FameLab South Africa Final 2023

South Africa's most talented young science communicators will gather in Pretoria later in September, hoping to be crowned this year's national FameLab champion.

The winner will have the chance to follow in the footsteps of last year's champion, phytochemist Nehemiah Latolla of Nelson Mandela University, who went on to win the international FameLab final in the UK.

Throughout 2023, young scientists around the country have been competing with peers at their research institutions in FameLab heats. The competition challenges participants to communicate their work to a mainstream audience in less than three minutes – and the programme organisers, Jive Media Africa, train them how to do just that.

Talks must be fun, engaging, accessible and free of jargon. Entrants are judged on content, clarity and charisma, and the aim is to give the next generation of scientists and researchers invaluable communication skills so they can clearly and imaginatively explain their work to the general public.

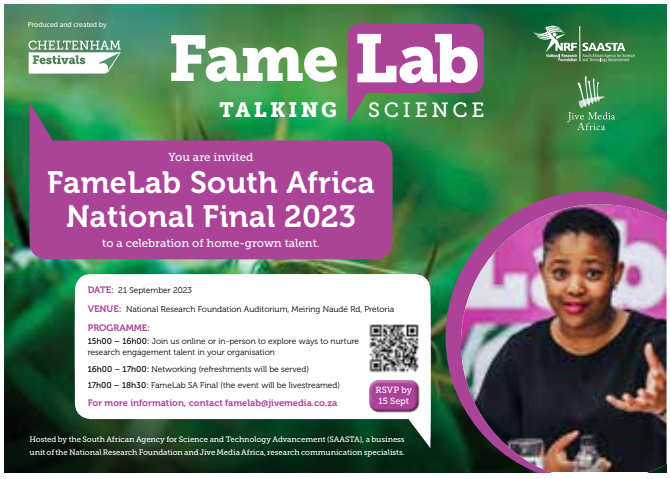
To round off its 11th year in South Africa, 16 winners from FameLab heats will gather shortly for the semi-final. The top 10 will meet once more at the National Research Foundation on September 21, when they will entertain judges and guests as they compete for the national title, the chance to represent South Africa in the international final, and a R5,000 prize.

About FameLab

Cheltenham Festivals held the first FameLab in 2005. Since then it has grown globally and so far more than 40,000 scientists and engineers have taken part.

In South Africa, FameLab is delivered by the South African Agency for Science and Technology Advancement (https://www.saasta.ac.za), a business unit of the National Research Foundation, and research communication specialists Jive Media Africa (https://jivemedia.co.za).

FameLab entrants must be aged 21 to 35 and registered, studying or working in science, technology, engineering or mathematics. Science and research organisations can host a local heat as part of the FameLab competition.



The next level

Nhlanhla G Mafarafara
President, SAAHIP

"We cannot solve problems with the same level of thinking we used when we created them." Albert Einstein.

Nhlanhla G Mafarafara

What does it take to lift any institution to the next level? This is the question that keeps on being asked in different ways, for generations. Its answers keep on evolving with time and people. The healthcare system of South Africa also ought to go through a transformation, one that will be built on the next level thinking. Every industry experiences an upward or downward disruption every once in a while, and pharmacy is no exception. Every disruption is first perceived, conceived, incubated and then birthed within a particular generation who takes it upon themselves to not leave systems the way they found them.

In 1913, Henry Ford and his team introduced an innovative value add method to the automobile manufacturing industry. He offered a new large scale vehicle manufacturing method using a moving assembly line which allowed work to be taken to workers as opposed to the workers moving around the vehicle to install parts, thus building vehicles faster without assembly technicians moving. The assembly line is used in many industries as a way to make work easy and fast. The realisation of this is a product of leadership that continues to seek solutions not only for the immediate environment, but for the broader community in which they serve.

Pharmacists in hospitals continue to use the same methods that have been in existence for many years to serve the patients. The public health problems keep on increasing, sister industries have been adding on new, faster, safe and efficient ways to serve the patients, including using artificial intelligence to manage and monitor patients. However, there is some degree of drag when it comes to transforming hospital pharmacy practice. Primary Healthcare Clinics (PHC) remain with plans written in beautifully worded and printed documents, but implementation of such things as reengineering of PHC remains but a dream to a certain extent. Systems of pharmacy practice exist with extreme differences between one area to another, largely due to disparities in human resources, geographical complexities and other technical and system challenges. The big question is how do we transform this industry to still deliver pharmaceutical care, but better, faster and safer? And how do we make it satisfying to the one delivering the service?

The essence of this writing is not to offer a one size fits all answer, but a call to action for all pharmacists to think hub, first in your isolated pharmacies, then as collective. Let me offer my first value proposition ideation challenge to you. Do not underestimate the question and therefore miss an opportunity for a new value add. Furthermore, do not underestimate yourself as a leader. Change does not happen by remissness; it happens by taking positive action away from what is preventing it. Failure to participate in the design gallery of your industry is acceptance that you will abide by and in whatever is handed to you. Instead of watching, seek solutions and answers to: what is the value of your practice where you are, collectively as distinct sectors and as a profession and how is it maximised? While engaging on this question, I also invite you to think about the answer in a broad way using the following thinking process for redefining value:

- Maintenance thinking: What have you been doing best that you need to keep doing?
- Elimination thinking: What do you need to stop doing that is no longer serving us or our clients?
- Up scaling: What actions, systems, processes need to be improved or scaled up?
- Introductions: What industry best practices have we observed that we can introduce within our sector?

South Africa still has a two-tiered health care system, with extreme healthcare service inequalities. Solutions to improve the quality of healthcare are fast becoming an emergency. There is a need for pharmacists to champion the way forward and serve the society.

Instead of taking the cinematic view of what is unfolding, take up the director role and lead the change towards what is ideal. The challenges that exist requires a new approach, the above model is a fraction of our perceived intervention which could be even better with wider collaborative contribution with tested solutions.

Monitoring of medicine availability during the COVID-19 pandemic at the National Department of Health

R Lancaster,[1] A Brewer,[2] K Jamaloodien[1]

[1] Affordable Medicines Directorate, National Department of Health

[2] USAID Global Health Supply Chain Technical Assistance Programme

This paper is based on the Life Healthcare Best Podium presentation at the SAAHIP Conference 2023.

Introduction

The COVID-19 pandemic, caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) virus, spread rapidly throughout the world in early 2020. The World Health Organization (WHO) declared the outbreak of COVID-19 a Public Health Emergency of International Concern on 30 January 2020, and a pandemic on 11 March 2020.[1] The South African Government declared a National State of Disaster from 15 March 2020 to 4 April 2022.[2]

Initially there was no evidence-based prevention and treatment for COVID-19 , although this was rapidly evolving. Worldwide, the closure of borders, limited transport routes and a reduction in economic and production activity posed a significant risk to the integrity of the global medicines supply chain. In addition, an unpredictable higher demand for medicines expected to prevent and treat COVID-19 was experienced. The South African population is approximately 61 million people,[3] the majority (82%) of whom are dependent on the public sector[4] with a healthcare budget of R259 billion.[5] A national co-ordinated response was needed to avoid stock-outs and to ensure the availability of essential medicines so that patients continued to receive life-saving medicines to prevent and treat disease. Furthermore, the National Department of Health (NDoH) had to plan for potential increases in medicine demand, in an area of which there was a paucity in evidence-based literature, ensuring that adjusted quantification plans could be used to prevent future stock-outs.

Medicines selection and the medicines supply chain

The Affordable Medicines Directorate (AMD) within the NDoH is responsible for developing systems to facilitate access to essential medicines and ongoing oversight and monitoring of access to medicines. The Directorate is also responsible for the licensing of persons and premises that deliver pharmaceutical services. Refer to Figure 1 below for the supply chain framework of the AMD.

Economies of scale, through the use of national tenders, are used to reduce medicine costs. Furthermore, equitable access and promotion of the rational use of medicines is ensured through the development and implementation of the Standard Treatment Guidelines (STGs) and Essential Medicines List (EML). The Essential Drugs Programme of the AMD oversees development and implementation of the STGs and EML through National Essential Medicines List Committee (NEMLC). The NEMLC is a non-statutory, advisory committee constituted in terms of the National Drug Policy (1996) and appointed by the Minister of Health. Its objective is to develop and review a list of essential medicines for use in the public sector, supported by Expert Review Committees.

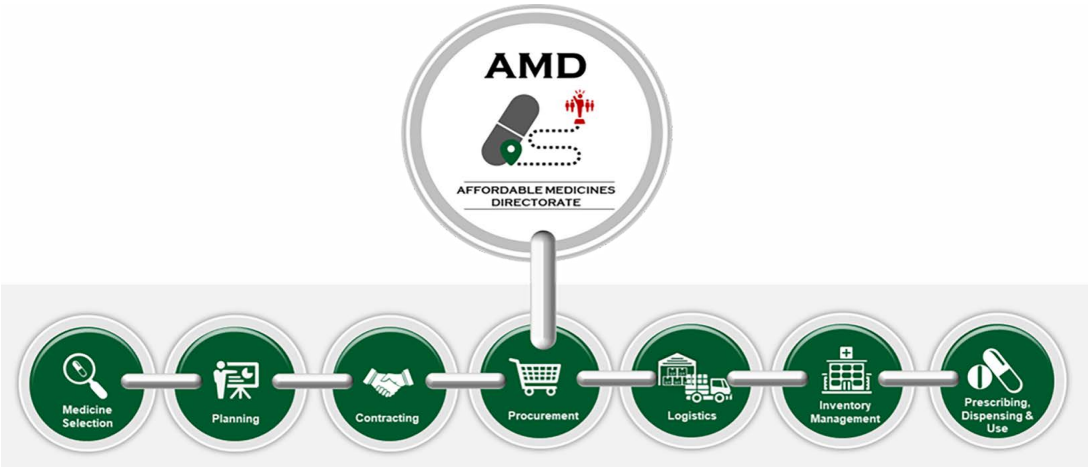


Figure 1: Supply chain framework of AMD

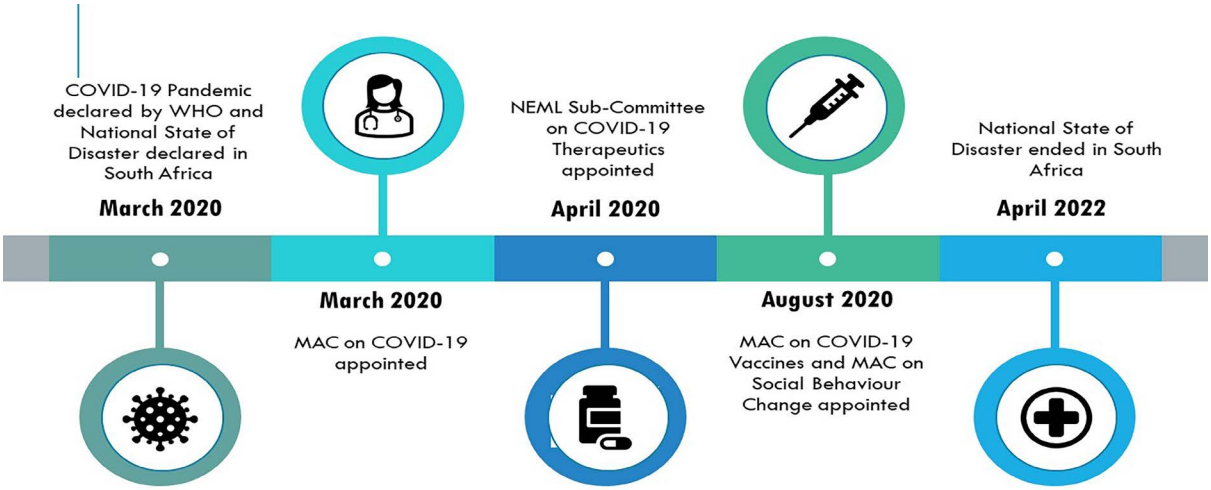


Figure 2: Timeline of COVID-19 MAC pandemic in South Africa

Medicines selection during the COVID-19 pandemic

To implement effective interventions to manage the potentially increased medicine needs due to the COVID-19 pandemic, the Minister of Health appointed non-statutory advisory committees, as enabled by the National Health Act, 2003 (Act No. 61 of 2003). This included the Ministerial Advisory Committee (MAC) on COVID-19. The National Essential Medicines List (NEML) Sub-Committee on COVID-19 Therapeutics was also convened, to provide input on medicines for the treatment and prevention of COVID-19, using rapid reviews adapted from the NEMLC evidence review process with the aim to expedite decision-making for the selection of medicines for COVID-19. Existing medicines supply chain systems had to resiliently assist the already strained health care sector to mitigate the challenges and ensure medicine availability in South Africa. Refer to Figure 2 above for the COVID-19 MAC pandemic timeline.

Monitoring of medicine availability - the COVID-19 priority list

Strong, responsive leadership was needed to respond to the dynamic nature of the COVID-19 pandemic. The AMD provided this leadership in initiating the development of a priority list of medicines to prioritise forecasting needs and monitoring of availability of priority medicines and inform strategic interventions necessary to avoid medicine stock-outs. The initial list was identified from various chapters in the STGs that were expected to be important, such as respiratory diseases. This list was refined with frequent updates as treatment of COVID-19 evolved, in line with changes to the guidelines and supply chain challenges or improvements.

Medicines that were monitored closely in the supply chain included the following:

1. Medicines used in the management of COVID-19. These included medicines used for the prevention of disease and treatment of symptoms, and secondary infections and complications as recommended by the NEMLC and as stated in the STGs and EML. Two drugs that have undergone this afore mentioned rigorous process were enoxaparin and corticosteroids.
2. Medicines essential for continuation of essential service delivery at health establishments. This included chronic medicines for which multi-month dispensing were provided, for example antihypertensives.
3. Medicines with current or potential supply chain challenges. Supply chain challenges can come from shortages in the active pharmaceutical ingredient (API), or lack of finished medicine products. Shortages could also be experienced by supply chain centres that were affected by limited operation of distribution during this pandemic. Medicines that could be used as alternatives were also included in the priority list, for example, heparin as an alternative to enoxaparin.

The National Surveillance Centre (NSC) is a web-based performance monitoring and evaluation tool that uses dashboards to represent medicine availability in health facilities, depots and medicine suppliers. From this, the medicine availability throughout the public health chain can be monitored. Data obtained from the monitoring of the priority list of medicines was presented on the NSC, giving AMD visibility into the integrity of the supply chain. The NSC was used to monitor the stock levels of these medicines to inform activities and act as an early warning system for future supply chain challenges, as well as to assist key personnel to respond quickly to address challenges throughout the supply chain.

Prior, historic order quantities were used as the baseline for consumption. COVID-19 patient modelling and various statistical methods were used to forecast potential demand for these medicines. Actual usage during the pandemic against these modelled quantities was frequently monitored, so that any adjustments to models, could be made and pharmaceutical suppliers be notified of changes to quantities needed. Data was monitored at all levels of the supply chain, including at pharmaceutical suppliers, provincial pharmaceutical depots, hospitals, community health centres and primary health care clinics in all provinces.

A guideline for monitoring of priority medicines for the pandemic was developed, together with the priority list and data fields to be reported to the NSC. Data on these medicines was monitored at all levels of the supply chain, informing demand and supply planning, and discussed at weekly COVID-19 Emergency Supply Chain meetings between the National and Provincial Departments of Health.

Examples of medicines monitored

1. Enoxaparin was recommended for use in hospitalised COVID-19 patients.[6] Figure 3 shows the forecasted quantities anticipated by the demand planners that were assumed would be needed (line graph), compared to previous, actual procurement quantities for four months prior to COVID-19 (which was used as a baseline for consumption, bar graph). Of all the heparins, it was assumed that enoxaparin 40 mg would have the highest demand during the COVID-19 pandemic and as such the forecast was adjusted for this (*assumptions on medicine usage by NDoH were necessary at this stage of the process as the treatment of COVID-19 was still in its infancy)*. There were no stock-outs noted on the NSC during the COVID-19 pandemic for this item. Increased forecasted quantities for heparin 5 000 IU and 25 000 IU were also used to ensure availability as a secondary option in the case that enoxaparin could not be procured.

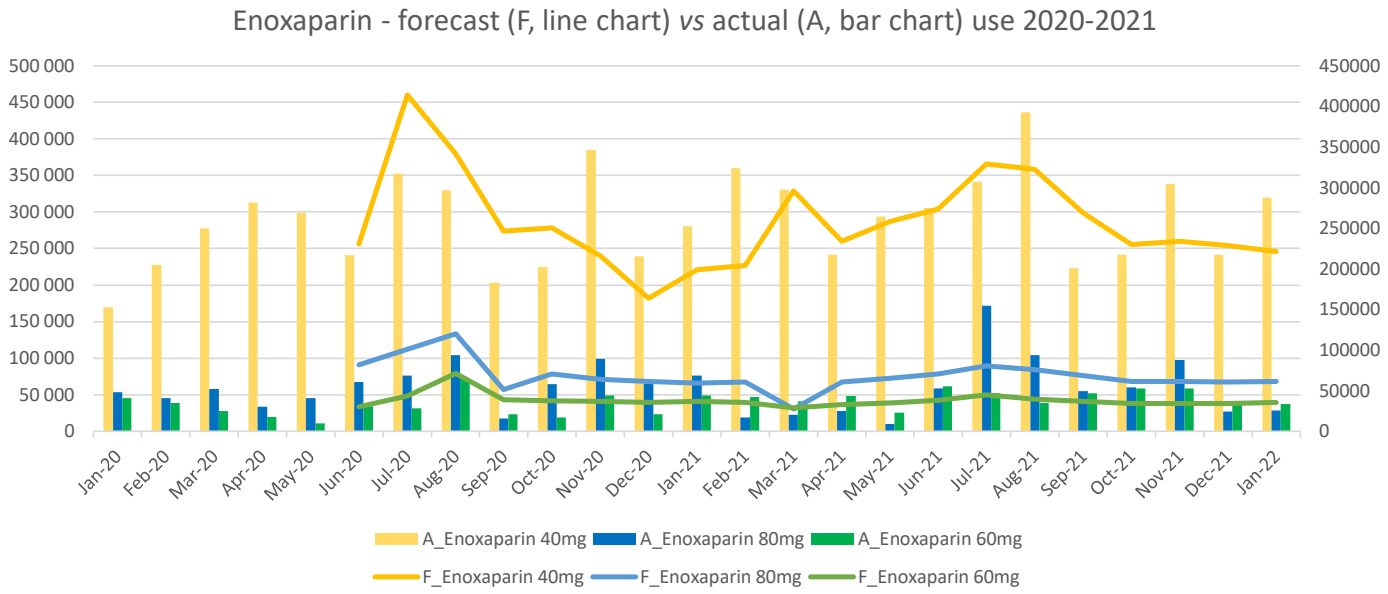


Figure 3: Forecasted and actual quantities of enoxaparin used during the COVID-19 pandemic

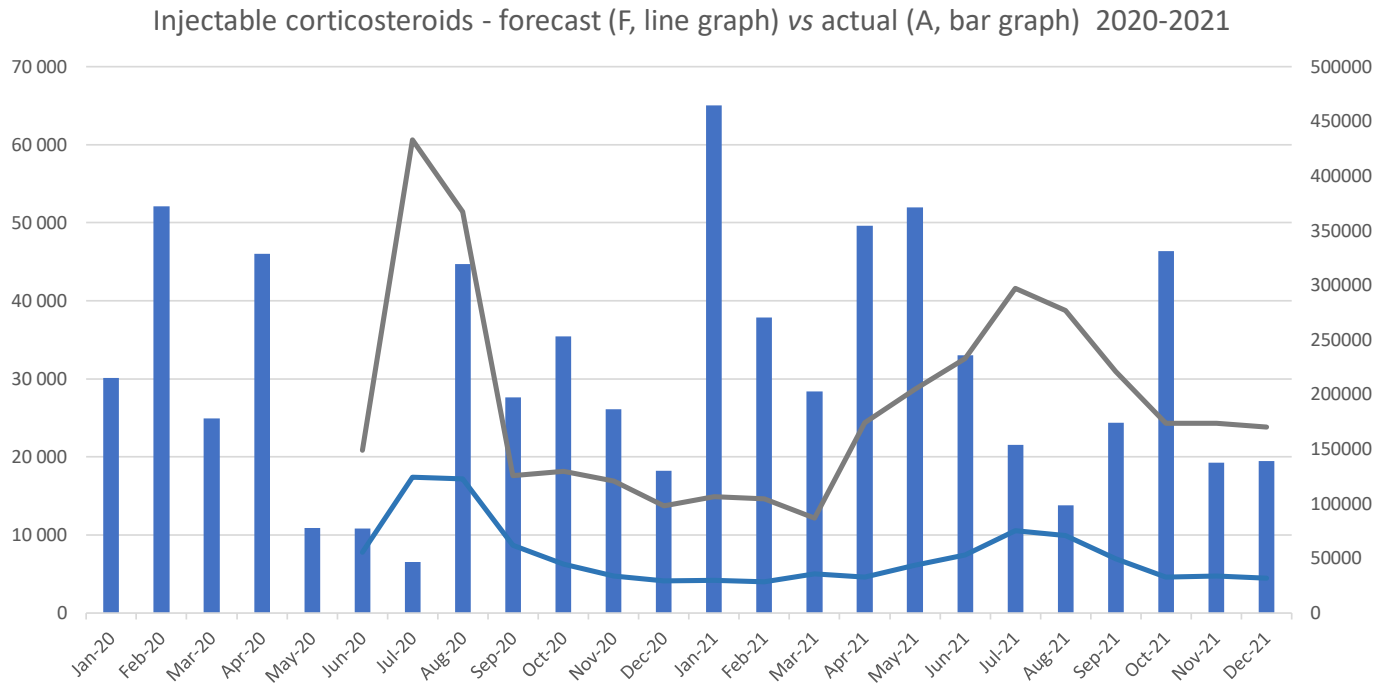


Figure 4: Forecasted and actual quantities of injectable corticosteroids betamethasone and dexamethasone used during the COVID-19 pandemic

2. Intravenous corticosteroids (dexamethasone and betamethasone) were also indicated for the treatment of hospitalised COVID-19 patients.[6] The projected patient infection rate and number of hospitalisations was used to increase the initially forecasted quantities of injectable corticosteroids in preparation for the expected increased demand during the COVID-19 pandemic. Figure 4 shows the forecasted quantities represented by the line graph, and actual procurement data (as the baseline) by the bar graph. The high availability of these agents was maintained during the pandemic. Increased forecasts of all available oral corticosteroids (*graphs not shown*) were also used to ensure availability as a secondary option in the case the intravenous agents were not available, as well as for their own indication in the treatment of COVID-19.

Conclusion

The effective monitoring of the COVID-19 priority list together with mitigation of risks, enabled through constant communication between the AMD and its key stakeholders, ensured the maintenance of high medicine availability during the pandemic. Transparency of medicine availability through the visibility of data on the NSC promoted accountability and enabled early warning systems to detect potential supply chain issues, allowing the priority list team time to consider and plan for alternative medicine availability. This enabled high medicine availability, in line with the requirements from the WHO.

The monitoring of medicine availability involved a successful national coordinated response through the centralisation of the medicines supply chain, together with constant communication and stakeholder management. A rapid response was initiated to strengthen AMD's medicine supply chain to ensure availability during the pandemic, through which gaps were observed and managed. The system will continue to be strengthened and used for other emergencies that may affect the medicines supply chain in the future.

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News

Yes! We can end TB, but it starts with YOUth

Brenda Knipe,[1] Renier Coetzee,[2] Duran Thomas,[1] Eliz Human[1]

[1] School of Pharmacy, University of the Western Cape

[2] School of Public Health, University of the Western Cape

South Africa (SA) is among the top ten countries worldwide with the highest burden of tuberculosis (TB), which accounts for two-thirds of all TB infections globally.[1] In 2021, approximately 304 000 people had TB, which means that every two minutes a person gets infected.[2] TB is still the leading cause of death in SA, accounting for 56 000 deaths in 2021.[1]

Are we truly making progress in the fight against tuberculosis?

According to the Global Tuberculosis Report (2022), the progress achieved in the years leading up to 2019 has been impeded, halted or reversed, causing global tuberculosis (TB) targets to fall behind schedule. A call for more vigorous efforts, supported by increased funding, are urgently needed to counter and reverse the negative impacts of the COVID-19 pandemic on TB. According to the report, the necessity for action has become even more pressing due to the war in Ukraine, ongoing conflicts, a worldwide energy crisis, and the associated risks to food security, all of which are expected to exacerbate some of the underlying factors contributing to TB.[1]

The current generation of young people is the largest in history, with over one-third of the world's population aged between 10 and 24 years. As future leaders and contributors to growth, productivity, and innovation, investing in their health and wellbeing by harnessing their potential as catalysts for change is crucial in ending deadly epidemics such as TB. Young people are disproportionately affected by TB and play a significant role in a country's social and economic capital, especially in developing countries. To fully harness the youth's potential in TB eradication efforts, the World Health Organisation (WHO) launched a youth initiative called 1+1 in 2019 to mobilise young people to fight TB. This initiative culminated in a Global Youth Townhall that resulted in a Youth Declaration to End TB.[3]

"Yes! We can end TB, but it starts with YOUth". By engaging young people in the fight against TB, we can harness their energy, creativity, and passion to create a world where TB is a thing of the past. On March the 24th 2023, several organisations such as TB Proof, Western Cape Government, University of the Western Cape, TB-HIV Care, and the City of Cape Town all came together to empower our country's youth by hosting a public health campaign in honour of World TB Day.

Mandela famously said in 2000, at the inaugural Laureus World Sports Awards: *"Sport has the power to change the world. It has the power to inspire. It has the power to unite people in a way that little else does. It speaks to youth in a language they understand. Sport can create hope where once there was only despair. It is more powerful than governments in breaking down racial barriers. It laughs in the face of all types of discrimination."*

What better way can be used to unite the youth to End TB than a game of soccer. The soccer event was hosted at Nkazimlo Primary School in Khayelitsha, Western Cape. Approximately 200 grade seven pupils gathered after school to enjoy a day of sports and arts, along with discussions about TB. Various TB survivors shared their stories of how they overcame TB and the stigma that is associated with the disease. Community doctors and nurses educated the youth on how to identify and prevent TB and provided them with a local person to contact or go to if they suspect that they themselves or family members have TB. A "myth buster" session was held, and the children could answer questions and actively engage in conversations about TB. The fun did not stop there! Two intense soccer matches were played. The final match ensured for great watching pleasure. All the team players received medals, while the winning team received a TB Proof trophy that will be kept in the principal's office.

"It was so nice to hear real stories about people who have survived TB. I could see on the children's faces that it had an immense impact on them because it becomes real. TB is not just a disease you learn about from your textbook; it affects real people, and it shouldn't be stigmatised. We all breathe. By teaching them from a young age we can help end the stigma around TB—which will ultimately help eradicate TB as people will seek treatment earlier and not fear judgement.

Children may not always remember what you said, but they will always remember how you made them feel, which was the point of this event. They need to feel safe to speak up and seek help. Although we only played a small part in this day by helping hand out food parcels and cheering them on, it was nice to feel a part of something bigger and as important as ending TB." – Brenda Knipe, TB Proof Core Group Member, School of Pharmacy, University of the Western Cape (UWC).

"Pharmacists play an important role in informing all ages about the signs and symptoms of TB, as well as precautionary measures to minimize the spread of the disease. The event gave us an insight of what education about TB in the younger population looks like and how we can impact the prevention and spread among them. It was inspiring to see the children participate in the activities, join in on conversations and ask questions. They are our future and a crucial part in making South Africa TB Proof!" – Elize Human, School of Pharmacy, UWC.

"I felt that the awareness was targeted strictly to the youth - which was great to see. It was informative, concise, fun, and kept the children engaged the entire day. I was impressed by how well the children answered the questions. Educating our youth about TB is one of the most important driving forces to ending TB. The world already has the artillery to win the war against TB however, it is the education about the disease that is lacking." – Duran Thomas, School of Pharmacy, UWC.

The African proverb "Ubuntu", meaning "I am because we are" was in the air that day as the children cheered their friends on. The smiles on their faces said it all when the winning team held the cup in the air. Maybe we should learn from the children and have a more "Ubuntu" approach to ending TB.

The clock is ticking if we want to achieve the World Health Organization's (WHO) End TB Strategy to eradicate TB by 2030.

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LOCUMS … some practical suggestions

Gary Black
(Dip.Pharm) FPS

Introduction

Due to a number of factors, there has been an increased need to use locum pharmacists in both the public and private sectors. This article has been written as a general guideline on the employment of locums with reference to professional and legal responsibilities of both locum and employer and suggested practical steps to be taken.

While this article may have a bias towards pharmacies providing patient care directly, many of the principles espoused are applicable to all other categories of pharmacies.

What is the right thing to do?

In the best interest of the patient, it is important to ensure access to good pharmaceutical care from a pharmacy that is adequately staffed, open and accessible. Adequate arrangements must also be in place for emergency service after hours.[1] When employing a locum pharmacist, it is important that you find the right person, suitably qualified and experienced in the services which the pharmacy offers and motivated and prepared to provide the same level of care which the patients expect.

Providing good pharmaceutical care is a team effort with the pharmacist as the leader. Respect must be shown for the contributions made by each of the support personnel in the team. This should be taken into account when appointing a locum. Select a locum with the right personality, positive attitude and ability to motivate and lead the team.[2]

What does the law say?

The Responsible Pharmacist (RP) must ensure that the pharmacy is adequately staffed with suitably qualified and appropriately experienced and trained professional staff. If short-staffed, he should appoint a locum in accordance with: *Good Pharmacy Practice (GPP) Rule 3.6 Minimum Standard for Locum Tenens Pharmacists and Pharmacy Support Personnel.*[3] When a locum is appointed, the RP must ensure that the locum pharmacist is fully informed as to his responsibilities, has access to the necessary Standard Operating Procedures (SOPs) for the smooth running of the pharmacy, and basically has clear instructions to be able to fulfill his professional responsibilities.

If the RP himself is absent from the pharmacy, he must ensure that there is a suitable locum in place. Note, in particular, GPP reference: *2.1.1 Circumstances and Conditions under which a Responsible Pharmacist may be absent from his Pharmacy.*[4]

The position of RP is defined in law and the individual is registered as such with the SA Pharmacy Council (SAPC). The RP still carries the responsibility of the pharmacy although he may not be physically present. See GPP *2.1.1.2 Conditions (c) The responsible pharmacist will remain responsible to Council for any act performed by or on behalf of the responsible pharmacist, including any omission to perform an act required to be performed by or on behalf of the responsible pharmacist which may involve disciplinary action by Council.*

Every healthcare professional must take personal responsibility for their own actions. However, a locum left in charge of a pharmacy in the absence of the RP is responsible for compliance with legal requirements, GPP standards and day-to-day running of the pharmacy while he is in charge. However, the level of responsibility that the locum as being the "pharmacist on duty" cannot be equated to the full, extensive responsibilities of the RP which include additional responsibilities such as human resource management, signing of legal agreements, setting up management structures, etc. Thus, the RP, whilst transferring many duties to the locum, still carries the ultimate legal responsibility, even in his absence.

What to do about it!

Getting the right person for the job!

1. Insist on an up-to-date Curriculum Vitae (CV). Any such CV should contain at least the following information:
   - Personal details including proof of registration status, PSSA membership, and personal professional indemnity insurance.[5]
   - Professional qualifications including date of first qualifying and institute at which primary pharmacy qualification was obtained.
   - Professional development, including any additional business or pharmacy qualifications, continuing education courses attended in the last three years, computer literacy and languages spoken, written and understood.
   - Work experience and contactable references.
   - The areas and/or types of pharmacy that the locum is prepared to work in.

Note: an example of a short-form CV is available from our office, on request.

2. Use the information provided on the CV to select the correct person for the job. The basic information from the CV could be used as primary selection criteria.

However, other practical issues to consider include:

- Age or physical ability may limit the person to only working a certain number of hours per day or preclude them from certain categories of work. Is the person capable of handling the volume of work anticipated?
- Agree on rest breaks (teas and lunches) and delegation of duties to another pharmacist at these times. Single parents may need breaks at specific times of the day to attend to family matters.
- Security concerns – people may not feel comfortable working after hours, alone or travelling through certain areas. Check on the mode of transport used to get to and from work, is it reliable, is secure parking needed?
- Personality type – some people just do not have the required patience to deal with elderly patients or tolerate noisy children!
- Communication skills – most pharmacists have certain basic communication skills in dealing with patients but not all have the same confidence, knowledge or experience in dealing with other healthcare professionals.
- Is the locum qualified and capable of performing additional professional services e.g. immunisation, health screening tests, etc.

Getting the commitment right!

1. Request a written contract of employment. Any such contract should include at least the following:
   - A mutual agreement by the employer and the locum which includes dates, times, hours of work, period of contract, job title, job description, and place of work.
   - Engagement conditions including salary and method of calculation, rate for overtime work (if applicable), other payments (cash or kind).
   - Frequency of payment, all deductions to be made, leave or time off, travel and or accommodation allowances, out of pocket expenses, conditions and cost of purchases from the pharmacy, protective clothing, etc.
   - Conditions of cancellation of the contract and settlement of disputes.
2. Practical issues include:
   - A clear understanding that the contract is mutually binding.
   - An agreement on the role, level of responsibility and authority of the locum and relationship of the locum with other staff.
   - Does the locum have a list of duties (professional and administrative) he is expected to perform?
   - Procedures regarding purchases, other spending (even petty cash) or payment of accounts.
   - Commitment to ethical practice is a personal responsibility not to be interfered with by either party or the staff.
   - Dealing with special needs of patients (e.g. sight impaired) including complaints and referrals.
   - Detail of owner's travelling arrangements and contacts and conditions under which he should be contacted.

Note: A template of a contract is available. This should also be verified with our labour lawyer (contact details available to PSSA members on request).

Keeping the pharmacy operating smoothly!

Locum pharmacists must have the necessary information to ensure the smooth running of the pharmacy. Basic operational information must be available, preferably in writing. This information should include the following:

1. Staffing
   - Names, addresses and telephone numbers of key staff
   - An organisational chart indicating staff responsibilities
   - Access to information regarding staff leave especially days off or leave due during the locum period
   - Any special needs of staff or concessions made e.g. times of work
   - Staff purchases
   - There must be a record of which registered persons were on duty at any particular time and day
2. The dispensary
   - Copies of all SOPs
   - Computer instructions (as applicable)
   - List of medical practitioners with telephone numbers
   - Referral procedures
   - List of outstanding work
   - Ordering systems and wholesalers/suppliers used
   - Contracted medical aids
   - Payment policies and systems used for calculation of fees
   - Special services e.g., domiciliary services
   - Keys to dispensary and Schedule 6 cupboard
   - Access control and after hour call outs, who is responsible?
3. The pharmacy
   - Plan of the pharmacy
   - Standard Operating Procedures
   - Cash register instructions and cashing up procedure
   - Emergency contact numbers
   - List of service suppliers e.g. electricians, computer vendors, etc.
   - Instruction for use of lights, alarm systems, computers, emergency back-up systems
   - Collection and delivery service details
   - Local map
   - Smoking policy
   - Buying policy, contact list of wholesalers and suppliers

What you, the locum, should do![6]

1. Before your first day as the locum you should,
   - Re-confirm the dates and times of your bookings
   - Clarify any questions you may have, especially regarding your role and responsibilities

- If possible visit the pharmacy, familiarise yourself with the systems and nature of the work, services offered, resources available, how busy the pharmacy is, transport route to and time taken to reach the pharmacy, and meet the staff
- If possible, familiarise yourself with the SOPs of the pharmacy beforehand

2. Be personally prepared
   Be professionally dressed with your own white coat and name badge
   Have the necessary ID documents available including proof of SAPC registration, PSSA membership and professional indemnity
   Have your own resources including pens, cell phone, and reference resources, if necessary
3. On arrival at the pharmacy… arrive early enough to get orientated
   - Introduce yourself to the pharmacy team and find out about their roles, qualifications and when they work
   - Locate and familiarise yourself with the company policies and standard operating procedures (SOPs)
   - Receive passwords and logins for computer systems, or the till to process transactions, if needed
   - Check where you can store your personal belongings
   - Confirm your lunch break time, if there's no second pharmacist, check if cover will be provided from another pharmacy
   - If anyone in the pharmacy team is absent, confirm if there's a contingency plan in place for lunch cover, etc.
   - Check the pharmacy end-of-day procedure, and who is responsible for locking the pharmacy
   - Check the procedure for recording your worked hours and invoicing (if relevant)
4. Priorities for your day once you arrive
   Familiarise yourself with the layout of the pharmacy, clinic, private consultation area, S1&S2 medicines, etc.
   Familiarise yourself with the location of the S6 cabinet and register, near miss error log, fridge(s), complaint / incident report forms, referral forms, dispensed medication for collection, stock arrangement, and first aid kit, clinic layout, medicines needed in an emergency e.g. adrenaline for flu or services etc.
   Check if there are any people who will be collecting chronic medicine instalment prescriptions, and whether these have already been prepared for collection
   Check details of collection and delivery schemes, including times when prescriptions should be collected from the surgeries and when they should be ready for collection or delivery
   Check the medicine ordering procedure, cut-off times for placing orders, and expected delivery times from wholesalers
   Check the procedure for checking and recording fridge temperatures, follow the SOP if it's out of range
   Check if there is a list of any outstanding problems/queries that have occurred from previous days and any follow up required (a separate communications book may be useful for this). We would also recommend you keep your own personal activity log for recording any issues that arise.
5. At the end of the day
   - Make sure all appropriate records have been completed including, for example, those that need to be made in the S6 register
   - Check that orders have been sent to wholesalers and manufacturers as necessary
   - If you're not in the next day, leave a handover briefing for the next pharmacist, highlighting any outstanding issues / interventions that took place
   - Leave your contact telephone number in case the pharmacist or employer needs to contact you
   - Make sure the S6 cabinet is secure and keys are stored securely overnight
   - Leave the dispensary clean and tidy
   - Wait until the pharmacy has been locked and secured, whether you're the key-holder or not
   - Follow up the next day with the RP to check whether everything was satisfactory

Conclusion

If properly organised, the use of locum pharmacists should not be disruptive to the pharmacy service provided. It requires the employer, RP and the locum to make the effort to consider and implement the suggestions made above.

Disclaimer: This document is a guideline and does not necessarily reflect official policy of the Pharmaceutical Society of SA. Any member wishing to implement proposals made in this document, must do so in accordance with the requirements of the Pharmacy Act, Medicines & Related Substances Act and all other relevant legislation, and, if necessary, should seek legal advice to ensure compliance.

Additional information and copies of references are available on request from gary@pssacwp.co.za.

References

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FIP President Dominique Jordan tribute

1960-2023 – The loss of a giant to international pharmacy

On 19 August 2023, we were saddened by the news of the passing of the FIP President, Mr Dominique Jordan, after a period of illness. Mr Jordan was serving his fifth year as President, due to be concluded in September 2023 after the FIP Congress in Brisbane, Australia.

"Dominique was an exceptional advocate for our pharmacy profession and dedicated to advancing pharmacy in every country. He was convinced that FIP was the platform by which this could be achieved. During his presidency, he led our federation through the global crisis of COVID-19 and introduced the vision of 'One FIP', which resulted in greater collaboration between the many constituencies within our organisation and increased engagement with our members," said FIP CEO Catherine Duggan.

PSSA shared their condolences with the FIP CEO and staff in a letter on 21 August 2023, stating, *"South Africa was privileged to host Mr Jordan on several occasions, of which the last was in March 2023 in Johannesburg during the SAPHEX event. During this event, many South African pharmacists had the opportunity to meet Mr Jordan and learn more about FIP. Colleagues who had the chance to host Mr Jordan for dinner at the time left inspired, re-energised and recommitted to the pharmacy profession. Mr Jordan was a visionary leader in implementing One FIP, which resulted in greater collaboration between the many constituencies within our organisation and increased engagement with members throughout a global pandemic,"* said PSSA President Mr Tshifhiwa Rabali.

FIP President Dominique Jordan (center) with SAACP President Johannes Ravele (left) and SAACP Vice-President (at the time) Simbongile Pambuka (right) during the SAPHEX show at the Sandton Convention Center in March 2023.

The following tributes were received from PSSA members:

"With great sadness, we note the FIP President, Mr Dominique Jordan's passing on 19 August 2023. Mr Jordan was the FIP President from 2018 to 2023. As members of the SAACP, we met with Mr Jordan at the SAPHEX and TPS show in Sandton, Johannesburg, in March 2023. During our brief meetings with Mr Jordan, we were struck by his dedication to the pharmacy profession, his understanding of the challenges facing pharmacy, and his enthusiastic passion for community pharmacy. As a member of FIP, it was an incredible experience for me to meet with Mr Dominique Jordan. We wish his family and the FIP fraternity strength in this challenging time" – Jameel Kariem, vice-president, SAACP.

"This is a significant loss to the profession worldwide. A man who, even though I spent little time with him, has inspired me to join the FIP ECPG committee when the next opportunity arises. We also discussed the importance of having the FIP Congress in South Africa next year and how great it would be if I could make it as an ECPG EXCO member representing South Africa at this 2024 congress. His death is a sudden and painful one. I wish the family and close friends/

FIP President Dominique Jordan (right) with ICPA Vice-Chair Sham Moodley (left) at the 80th FIP World Congress in Seville, Spain, during September 2022.

colleagues peace and comfort during this trying time" – Byron Chukwu, Young Pharmacist.

"I was privileged to work with President Jordan these past few years. We had the advantage of having him in South Africa at the ICPA conference as the Vice President and at the time as part of the Swiss Pharmacy Association. This determination, vision and drive contributed to the One FIP concept – a real uniting force is what he will be remembered for. Personally, I enjoyed a close relationship, especially over the past two years with Dominique. I will always be grateful for his support and guidance. The dinner evening in March 2023 with the ICPA Board was undoubtedly a highlight for us this year. Rest in peace, dear friend" – Sham Moodley, ICPA Vice-Chair, FIP Community Pharmacy Section exco member.

In this time of mourning, let us also find comfort in the knowledge that our lives were enriched by the privilege of knowing and working alongside such an extraordinary individual. May his memory serve as a reminder to us all that a life well-lived is not measured by the years we spend, but by the impact we leave on the hearts and minds of those we leave behind.

Farewell, dear colleague.

Dr M Eksteen

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031 463 3319
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Reference: 1. Lokkegaard E *et al. Eur Heart J* 2008;29:2660-8. **2.** Renoux *C et al.* BMJ 2012;340:c2519. **3.** de Lauzon-Guillain, Fournier A, *et al.* Diabetologia 2009;52:2092-100. **4.** L'Hermite M *et al. Maturitas* 60;2008:185-201. **5.** Mueck A.O. *CLIMACTERIC* 2012:15(Suppl 1):11–7.

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