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An assessment of Western Cape metro public dental clinics' compliance with the Primary Healthcare Package for South Africa: A set of norms and standards

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ABSTRACT

Introduction

This study explores the compliance of public dental clinics in the Western Cape Metro (WCM), South Africa with the Primary Healthcare Package for South Africa.

Aims and objectives

The study evaluates the availability of prescribed dental consumables, instruments and equipment in primary oral health clinics. Additionally, it seeks to determine the number of clinics providing the basic package of oral health services.

Design

A cross-sectional study.

Methods

This study conducted an audit of 28 public dental clinics in the Western Cape metro. Full-time clinic staff were surveyed using a questionnaire. Equipment and materials were assessed using a checklist. Data analysis was performed using SPSS version 28, summarising quantitative variables with proportions, frequencies, means and standard deviations.

Results

A total of 15 clinics responded out of the 28 invited with a response rate of 53.6%. Only two clinics offered all services in the basic package of care. Eleven clinics had 80% or more of the required equipment. Ten clinics had 80% or more of the required instruments used to treat pain and sepsis. All the clinics had at least 80% of the required consumables.

Conclusion

None of the clinics was compliant with national norms and standards.

Keywords

Instruments, equipment, consumables, dental, Western Cape, public health

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INTRODUCTION

Oral diseases, such as dental caries, periodontal disease, tooth loss and oral cancers, are widespread globally, imposing significant health and economic burdens and diminishing the quality of life for those affected. Despite being largely preventable, oral diseases persist due to prevalent social and economic inequalities, coupled with insufficient funding for prevention and treatment, especially in low-income and middle-income countries (LMICs).[1]

In South Africa there exist gross disparities between public and private dental services, a factor which contributes to unequal access to care. While the private sector often provides more comprehensive services, a significant portion of the population relies on the public sector, where resource limitations can result in gaps in care.[2] This is despite the World Health Organisation's (WHO) initiative for universal access to care.[3]

While the United Nations (UN) adopted a universal political agenda to achieve peace, prosperity and wellbeing for all by the year 2030 through the implementation of the 17 Sustainable Development Goals (SDGs),[4] South Africa still falls short despite the SDG 3 which is aimed at achieving healthy lives and promoting wellbeing for all. Despite having several policies on improving oral health services in South Africa,[5] there has been limited evidence indicating the burden of oral disease has been adequately addressed.[6]

In response to the oral disease burden, public dental clinics were mandated to provide a basic package of care as described in the Primary Healthcare Package for South Africa: A Set of Norms and Standards.[7]

This package of care includes the promotion of oral health through education, prevention of oral disease (fissure sealant and toothbrushing programmes), basic restorations (fillings) and treatment of pain and sepsis (including extractions, bitewing radiographs and scale and polish treatments).[7] The minimum expected outcome of these services includes "exposing at least 50% of primary schools to organised school preventive programmes" and that "everybody in the catchment area is covered by basic treatment services".[7] Each

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dental clinic should have a complete dental unit, dental hand instruments, sterilisation equipment, dental radiographic equipment and the necessary medicines and supplies required to perform various dental clinical procedures. Service delivery standards are derived from the National Oral Health Policy,[8] National Norms, Standards and Practice guidelines for Primary Healthcare, Provincial Operational Health Policy and oral health educational materials.[7]

Dental equipment, instruments and consumables are an essential component in the prevention, diagnosis and treatment of oral diseases[9] and a responsive health system ensures the availability and appropriateness of the required resources to render quality dental services.[10] A lack of resources and nonfunctioning equipment negatively impacts on the clinician's ability to provide effective treatment services and limits access to care.[9]

A study by Rajcoomar[11] conducted in the uMgungundlovu district in KwaZulu-Natal measured public dental clinics compliance with national norms and standards and found that deficient resources led to inadequate service delivery. Dental treatments offered were based on available resources rather than what is clinically appropriate.[11]

Primary Health Care (PHC) facility audits, which include public dental clinics, were conducted in 2011 by the National Department of Health (NDoH) in preparation for the National Health Insurance (NHI) which aims to provide universal health coverage to the South African population. The audits revealed poor infrastructure, excessive waiting times, medicine shortages and overall patient dissatisfaction resulted in poor usage of services.[12] To address these challenges, the Office of Health Standards Compliance (OHSC) was established under the National Health Amendment Act of 2013 to oversee the Ideal Clinic Realisation and Maintenance (ICRM) programme. Public dental clinics in the Western Cape Metro (WCM) have been included in the ICRM facility audits since its implementation but very little has been done to address areas that are not "ideal", specifically in terms of essential equipment. Audits reflect necessary resources are available; however, the services provided to the public does not reflect this. A facility with ideal status has "*good infrastructure (ie physical conditions and spaces, essential equipment and information and communication tools), adequate staff, adequate medicines and supplies, good administrative processes and adequate bulk supplies*.[12]

A study by Smit and Osman revealed less than a third (31.5%) of public dental clinics in the Western Cape offered the basic treatment package and less than two-thirds (65%) were only offering treatment for pain and sepsis in the form of tooth extractions.[5]

In light of the above-mentioned challenges, the aim of the study was to conduct an assessment of available instruments, equipment and materials in public dental clinics in the WCM and evaluate their compliance with the Primary Healthcare Package for South Africa.

METHODOLOGY

Ethical approval was obtained from the Research Ethics Committee of the Faculty of Health Sciences, University of Pretoria (Ref: 57/2023). Access to public dental clinics was applied for via the National Health Research Database (NHRD). Approval letters were issued via the Western Cape Department of Health and Wellness Health Support directorate. The researcher was unable to contact potential participants directly. No personal details of the participants were disclosed and all information was strictly confidential and anonymous.

A quantitative, cross-sectional study auditing public dental clinics in the Western Cape metro area was conducted. All 28 public dental clinics in the Western Cape metro area were invited to complete a survey to achieve the objectives of the study. Participants were in full-time employment at the dental clinic.

Each participant received an information leaflet and consent form to read and sign if they agreed to participate in the study. A self-administered questionnaire drawn up with Microsoft Word was used to collect data. The questions were taken from the Primary Healthcare Package for South Africa: A Set of Norms and Standards.[7] The questionnaire was distributed to a dental clinic staff member and included closed-ended questions about the presence of key staff members such as dentists, dental therapists, dental assistants, oral hygienists and receptionists. Additionally, it inquired about the availability of various dental services, requesting information on the hours dedicated to each service and barriers preventing their delivery.

The oral health checklist in the Ideal Community Health Centre Definitions, Components and Checklists document was adapted to suit the requirements of the study**.** The study checked and recorded the available dental equipment, instruments and consumables in the dental clinic. Additionally, the relevant staff member verified whether each item was actively in use. In cases where an item was not yet available but had been ordered, an anticipated delivery date was provided.

DATA ANALYSIS

Data analysis was done with SPSS version 28. Quantitative variables were summarised as proportions, frequencies and means with their standard deviations, ranges and percentages. A Chi-square test was used to evaluate the association between variables – the level of significance was set at $p \leq 0.05$. The missing data was omitted during the data analysis.

RESULTS

A total of 15 clinics responded out of the 28 invited with a response rate of 53.6%.

Table 1. Services offered in the PHC facilities n=15

Service	n(%)	Service	n(%)
Oral hygiene education	15(100)	Scaling & Polishing	9(60)
Treatment of pain & sepsis	15(100)	Intra-oral x-rays	3(20)
Fissure sealants	10(66.7)	1-3 surface fillings incl ART	11(73.3)
Topical fluoride	14(93.3)	Outreach services eg schools	14(93.3)

Only two clinics offered all of the services outlined in the basic package of care.

www.sada.co.za / SADJ Vol. 79 No.10
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Table 2. Equipment in PHC facilities n=15

Equipment	n (%)	Equipment	n (%)	Equipment	n (%)
Amalgam separator	0(0)	Dental scaler	14(93.3)	X-ray: wall mounted	8(53.3)
Amalgamator	12(80)	Headband light	7(46.7)	X-ray: digital oral imaging plate with computer and cabling	0(0)
Autoclave	15(100)	Paediatric booster seats	0(0)	3-in-one syringe incl. dental delivery system	15(100)
Compressor	13(86.7)	Plastic dental instrument trays	14(93.3)	Air motor (high speed turbine)	15(100)
Cuspidor	13(86.7)	Stool: dentist	14(93.3)	Contra-angle handpiece	14(93.3)
Dental chair basic	15(100)	Stool: dental assistant	14(93.3)	Slow handpiece	15(100)
Dental delivery system with handpieces (fixed)	13(86.7)	Suction: central, wet/dry	12(80)	Slow handpiece motor	15(100)
Dental delivery system with handpieces (mobile)	2(13.3)	Suction: mobile	2(13.3)	Straight handpiece	15(100)
Dental LED light	15(100)	Ultrasonic cleaner	4(26.7)		
Dental curing light	15(100)	Water distiller	12(80)		

Oral hygiene education and treatment of pain and sepsis were universally available in all 15 clinics. Outreach services, including those provided in schools, as well as topical fluoride applications, were offered by 93.3% of the clinics. Services like intra-oral X-rays and scaling and polishing were less universally available, offered by 20% and 60% of the clinics, respectively. Fissure sealants and 1-3 surface fillings, including ART, were available in 66.7% and 73.3% of the clinics, respectively. Certain equipment was nearly universal across these clinics, with all 15 clinics having essential items such as autoclaves, basic dental chairs, three-in-one syringe systems, slow handpieces and straight handpieces. Air motors (high-speed turbines), dental LED lights, dental curing lights, plastic dental instrument trays, dental scalers and contra-angle handpieces were observed in 100% of the surveyed clinics. Conversely, items such as amalgam separators, paediatric booster seats and X-ray systems with digital oral imaging plates and associated cabling were notably absent in all clinics. None of the clinics had all of the equipment to offer outreach treatment services. Only two of the clinics had mobile dental delivery units but no central suction systems. One clinic did not have a compressor. Only 11 clinics had 80% or more of the required equipment.

Ten clinics had 80% or more of the 30 required instruments used to treat pain and sepsis.

Table 3. Instruments in PHC facilities n=15

Instrument	n (%)	Instrument	n (%)	Instrument	n (%)
Cryers left	15(100)	Forceps: tooth extracting lower molars	14(93.3)	Forceps: tooth extracting upper roots 29	12(80)
Cryers right	15(100)	Forceps: tooth extracting lower roots and crowded incisors	14(93.3)	Forceps: tooth extracting lower teeth and roots, child	9(60)
Straight large	14(93.3)	Forceps: tooth extracting upper roots 44N	12(80)	Forceps: tooth extracting lower canines, adult	13(86.7)
Straight medium	14(93.3)	Forceps: tooth extracting upper roots 29 S	13(86.7)	Forceps: tooth extracting lower anterior, adult	14(93.3)
Straight small	15(100)	Forceps: tooth extracting upper roots 76	13(86.7)	Forceps: tooth extracting upper incisors and canines, child	10(66.7)
Warwick-James left	15(100)	Forceps: tooth extracting upper roots small	10(66.7)	Forceps: tooth extracting upper molars, child	10(66.7)
Warwick-James right	15(100)	Forceps: tooth extracting lower molars child	11(73.3)	Forceps: tooth extracting upper teeth and roots, molars, child	6(40)
Warwick-James straight	14(93.3)	Forceps: tooth extracting upper anterior and canines	15(100)	Forceps: cheatle	9(60)
Forceps: tooth extracting upper molars left	15(100)	Forceps: cheatle container/ holder	1(6.7)	Forceps: tooth extracting upper molars right 90	14(93.3)
Forceps: tooth extracting lower bicuspids	13(86.7)	Forceps: tooth extracting upper molars right 89	13(86.7)		

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Table 4. Conservative instruments in PHC facilities n=15

Instrument	n (%)	Instrument	n (%)	Instrument	n (%)
Amalgam carrier plastic right angle	8(53.3)	Cotton pellet holder	12(80)	Kidney dishes small	11(73.3)
Amalgam carrier plastic straight	8(53.3)	Cotton wool holder (small bowl)	14(93.3)	Matrix retainer Siqveland Narrow/ Tofflemire	10(66.7)
Amalgam carver	10(66.7)	Dappen dishes	15(100)	Matrix retainer Siqveland Wide/ Tofflemire	9(60)
Amalgam plugger	11(73.3)	Dental Explorers/ Probes Straight	15(100)	Mouth Mirrors to it Handle Mouth Mirror	15(100)
Ball burnisher 2.5-3.0mm	15(100)	Dental syringe Aspirating	15(100)	Mouth models	15(100)
Bib holders	5(33.3)	Excavator 125/126	12(80)	Needle holder	13(86.7)
Bur blocks	15(100)	Excavator 129/130	12(80)	Sickle	6(40)
Bur brushes	12(80)	Excavator 133/134	14(93.3)	Tofflemire holder	13(86.7)
Cement spatula	15(100)	Flat plastic	15(100)	Thymosin	13(86.7)
Chip syringe	9(60)	Handle Mouth Mirror	15(100)	Waste receiver	8(53.3)
Cotton and dressing Tweezers	14(93.3)	Kidney dishes large	12(80)		

Instruments such as ball burnishers (2.5-3.0mm), bur blocks, cement spatulas, handle mouth mirrors, and mouth models were universally present in all clinics. Dental syringes (aspirating) and dental explorers/probes (straight) were also universally available. Some instruments showed varying levels of availability. For instance, amalgam carriers, both in plastic right-angle and straight configurations, were present in approximately 53.3% of clinics. Similarly, bib holders and sickles demonstrated lower levels of prevalence, found in 33.3% and 40% of clinics respectively.

Instruments such as matrix retainers (Siqveland Narrow/ Tofflemire and Siqveland Wide/Tofflemire) and thymosin displayed mid-range prevalence, indicating that they are relatively common but not ubiquitous. On the other hand, instruments such as kidney dishes (both small and large) and waste receivers were found in 73.3% to 80% of clinics.

Table 5. Periodontal instruments in PHC facilities n=15

Instrument	n (%)
Dental probe: periodontal	15(100)
Periodontal hoe SG 5F	10(66.7)
Scaler, dental: H6/7	10(66.7)

The dental probe specialised for periodontal examinations was found to be universally present across all 15 clinics. The periodontal hoe SG 5F and dental scaler H6/7 were available in 66.7% of the clinics.

Table 6. Miscellaneous instruments in PHC facilities n=15

Instrument	n (%)	Instrument	n (%)
Artery forceps	12(80)	Slab: mixing, glass	14(93.3)
Handle scalpel	13(86.7)	Tongue forceps	7(46.7)
Mouth gag	12(80)	Trimmer: gingival margin U3/U4	7(46.7)
Protective glasses	14(93.3)	Trimmer: gingival margin Ui/U2	6(40)
Rongeur: dental No.4	15(100)	Wire ligature forceps	6(40)
Rongeur: dental No. 5S	9(60)	Apron, dental, plastic, adult	14(93.3)
Scissors, ligature	12(80)	Apron, dental, plastic, child	4(26.7)

Dental artery forceps and mouth gags were present in 80% of the clinics. Protective glasses and ligature scissors were available in a majority of clinics, with rates of 93.3% and 80%, respectively. On the other hand, instruments such as tongue forceps, U3/U4 gingival margin trimmers, Ui/U2 gingival margin trimmers and wire ligature forceps showed comparatively lower availability rates, suggesting these instruments may not be as universally utilised across all surveyed clinics. Dental aprons, particularly those designed for adults, were prevalent in 93.3% of the clinics; however, aprons for children were less commonly available, found in only 26.7% of clinics.

www.sada.co.za / SADJ Vol. 79 No.10
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Table 7. Consumables for exodontia and minor oral surgery clinics that responded n=15

Consumable	n (%)	Consumable	n (%)	Consumable	n (%)
Surgical blades No.11 &12	13(86.7)	Haemostat sponge	14(93.3)	Sutures, surgical	14(93.3)
Chlorhexidine oral rinse 0.2%	15(100)	Hydrogen peroxide	4(26.7)	Topical anaesthetic	11(73.3)
Cotton wool balls	15(100)	Hypodermic needles	15(100)	Local anaesthetic (with and without vasoconstrictor)	15(100)
Dry socket alveolar paste	12(80)	Saline solution, 500ml	11(73.3)		
Ethyl chloride	6(40)	Saliva ejectors, disposable	15(100)		

Certain consumables exhibited a remarkably high presence, with items such as chlorhexidine oral rinse (0.2%), cotton wool balls, disposable saliva ejectors, hypodermic needles and local anaesthetics (both with and without vasoconstrictor) universally available in all 15 clinics. Haemostat sponges and surgical sutures were found in 93.3% of clinics. Dry socket alveolar paste was found in 80% of clinics and saline solution (500ml) was available in 73.3% of clinics.

Table 8. Consumables for conservative dentistry clinics that responded n=15

Consumable	n (%)	Consumable	n (%)	Consumable	n (%)
Fissure sealants	14(93.3)	Prophylaxis paste	14(93.3)	Glass ionomers	12(80)
Amalgam capsules	7(46.7)	Cement/Liners (Kalzinol/ Dycal)	13(86.7)	Polishing strips	15(100)
Composite	14(93.3)	Articulating paper	15(100)	Polishing kit	9(60)
Fluoride gel	14(93.3)	Cotton wool pellets	13(86.7)	Dental floss	14(93.3)
Varnish cavity liner	5(33.3)	Polyester strips (composite)	15(100)	Fluoride trays	14(93.3)
Acid etch & bonding agent	14(93.3)	Toothpaste, fluoridated	13(86.7)	Toothbrushes	13(86.7)

Polishing strips, articulating paper and polyester strips (composite) were universally available in all 15 clinics. Fissure sealants, prophylaxis paste, composite, fluoride gel and dental floss also exhibited high availability, present in 93.3% of the surveyed clinics. On the other hand, varnish cavity liner displayed a lower availability rate of 33.3%, indicating it may not be as commonly used in these clinics. Items such as amalgam capsules, cement/liners (Kalzinol/Dycal) and polishing kits showed varying levels of prevalence.

Participants reported that the Covid-19 pandemic guidelines recommended the suspension of elective dental treatment maintaining only emergency dental appointments. Many instruments and equipment were no longer in use and deteriorated due to lack of maintenance. Consumables were not replenished and most items reached their expiration dates. This impacted dental clinics' ability to offer preventative and restorative treatments. All clinics engaged in school outreach services and collaborated with various other institutions to promote oral health.

DISCUSSION

The response rate of this study was 53.6%, which could be due to the high patient volumes seen at PHC clinics which limited the time the respondents had available for research participation. Similar studies that surveyed oral health care professionals reported similar response rates.[13,14] Additionally, concerns about potential exposure of shortcomings may have contributed to the lower response rate.

Services

The number of surveyed clinics offering the basic package of care was much lower than the findings reported in a previous study.[5] This likely stems from the fact that dental clinics lack access to a fundamental set of equipment, instruments and consumables necessary for performing the basic recommended services. While all clinics offered treatment for pain and sepsis, approximately two-thirds provided preventative treatments. The substantial burden of untreated dental caries, coupled with delayed treatment seeking in the Western Cape, amplifies the demand for dental extraction services.[5] All clinics remained actively engaged in school outreach services and collaborated with various institutions to promote oral health, demonstrating a strong commitment to community-based oral healthcare.

Equipment

The study highlights crucial gaps in equipment availability that warrant immediate attention. One noteworthy shortfall is the absence of X-ray systems, which poses a significant constraint on diagnostic capabilities. This limitation has the potential to impede accurate diagnoses and treatment planning, potentially compromising the quality of care provided.[15] Furthermore, the observation that none of the clinics possess all the necessary equipment for outreach services underscores a potential deficiency in community-based dental care provision. This suggests that there may be challenges in delivering comprehensive dental services to communities beyond the clinic premises. Another critical

aspect is the absence of amalgam separators, signifying potential environmental and waste management gaps. These separators are essential for responsible dental practice, as they help prevent the release of harmful substances into the environment.[16]

The presence of only two clinics in the study equipped exclusively with mobile dental delivery units and lacking central suction systems draws attention to a crucial infrastructure issue. These mobile units can be instrumental in expanding the reach of dental care, especially to remote or underserved areas. However, the absence of central suction systems could potentially hinder the standardisation of clinical operations and compromise the overall quality of care provided. To address this challenge, it is imperative to consider further investments in infrastructure within the dental healthcare system.

Consumables

The study reveals a mixed landscape of availability for dental consumables across the surveyed clinics. Items such as fissure sealants, prophylaxis paste, composite, fluoride gel and dental floss exhibited high availability, although services suggest these are not optimally utilised. Participants highlighted that the Covid-19 pandemic brought about significant shifts in dental practice guidelines, emphasising the suspension of elective dental treatments and prioritising emergency appointments. Consumables were not replenished, and a majority of items reached their expiration dates.

Instruments

The study's findings reveal that the majority of clinics were adequately equipped with the necessary dental instruments for a diverse range of clinical procedures. However, it is noteworthy that less than half of the clinics possessed the instruments essential for performing amalgam restorations, potentially suggesting a shift towards a preference for more aesthetic restorative treatments.

This shift aligns with the recommendations of the Minamata Convention on Mercury, which advocates for reducing the use of dental amalgam due to environmental and health concerns.[16] The lower prevalence of periodontal instruments correlates with the low availability of oral hygiene treatment services. This indicates that clinics may be prioritising curative measures over basic oral hygiene care.

CONCLUSION

The assessment of instruments and consumables reveals a generally high level of preparedness in the surveyed clinics. However, none of the clinics was compliant with national norms and standards.[7] There are notable gaps and variations that should be addressed to ensure consistent and comprehensive oral healthcare services across all clinics.

This information provides a valuable foundation for strategic planning, resource allocation and training initiatives to further enhance the capabilities of these primary healthcare facilities.

Limitations

The cross-sectional design of this study imposes limitations on the ability to infer causality. Only 15 of the 28 clinics volunteered to participate in the study. Participants were recruited via the Western Cape Department of Health and Wellness Directorate Health Support and the researcher was not able to follow up with or recruit participants directly.

RECOMMENDATIONS

Clinics can use these findings to prioritise the procurement of missing equipment and instruments, ensuring they have the necessary resources to meet the demands of their patient population.

Understanding the current state of resources and services allows for evidence-based policy-making to improve overall oral health outcomes in the region.

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Conflict of interest

None.

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