



Research Article

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Occupational Exposure and Observance of Standard Precautions Among Bucco-Dental Health Workers in Referral Hospitals (Yaoundé, Cameroon)

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To Cite This Article: Innocent Takougang*, Zita Fojuh Mbognou, Fabrice Zobel Lekeumo Cheuyem, Ariane Nouko and Michèle Lowe. Occupational Exposure and Observance of Standard Precautions Among Bucco-Dental Health Workers in Referral Hospitals (Yaoundé, Cameroon). *Am J Biomed Sci & Res.* 2023 20(5) AJBSR.MS.ID.002762, DOI: [10.34297/AJBSR.2023.20.002762](https://doi.org/10.34297/AJBSR.2023.20.002762)

Received: 📅 December 01, 2023; **Published:** 📅 December 11, 2023

Abstract

Background: The risk of infection during healthcare delivery is omnipresent. Workers within the bucco-dental health services are among the most affected. The most reported infectious agents transmitted through Accidental Exposure to blood and body fluids (AEB) are Human Immunodeficiency Virus, viral hepatitis B and C. Compliance with standard precautions prevents exposure to hospital associated infections that are acquired through needle sticks and splashes. The aim of the present investigation was to assess the level of implementation and constraints to the observance of standard precautions in bucco-dental health services.

Methodology: A cross-sectional study was conducted in five referral hospitals in Yaoundé, from March to April 2021, involving a purposeful selection of 40 Bucco-Dental Health Workers (BDHW). Workers were submitted to a pre-tested self-administered questionnaire covering their knowledge, level of observance of standard precautions and experience of occupational exposure to body fluids. The data collected were analyzed using IBM SPSS software version 26.

Results: Out of the 53 Bucco-Dental Health Workers (BDHW) who were selected for inclusion, 40 provided responses for a participation rate of 75.5%. The mean age of participants was 30.65 years and the M/F sex ratio 0.54. Half of the participants (58.5%) had a good overall level of knowledge of standard precautions. Less than a quarter (12.5%) were compliant with standard precautions. Only 35% of BDHW had received training on hospital infection control, while 60% experienced a needle stick injury in the last three months. Gaps in the observance of standard precautions included the lack of disinfectants (70%) and Personal Protective Equipment (PPE). Less than half of participants (47,5%) were fully vaccinated against hepatitis B.

Conclusion: Most bucco-dental health workers had insufficient knowledge of standard precautions, had experienced needle stick injuries and were at high risk of hospital acquired infections. There is an urgent need to establish and strengthen hospital-based infection control committees to ensure training and implementation of infection prevention measures. A framework for the nationwide scale up of such interventions should be explored.

Keywords: Standard precautions, Bucco-dental health worker, occupational infection, Accidental exposure, Referral hospital

Introduction

The healthcare sector is the fastest-growing sector of the financial system, employing over 18 million workers worldwide. The hospital environment is one of the most hazardous work settings [1,2]. More than facilities employ some 60 million workers worldwide of whom two-thirds of Healthcare Workers (HCW) provide services directly to patients [3]. They are exposed to biological, chemical, physical and psychosocial hazards, resulting in the loss of some 24 million healthy life years [4]. HCWs sustain some 3 million percutaneous exposures annually, more than 90% of which occur in resource-limited countries [5,6]. Exposure to healthcare-related hazards is influenced by the occupational category, work experience and environment [7,8]. They cause work-related stress and sleep disturbances. Such exposures may lead to body fluids or airborne infections. [9,10]. The infectious agents involved include the human acquired immuno-deficiency virus (HIV/AIDS), hepatitis viruses A, B and C, Mycobacterium tuberculosis and a number of blood-borne pathogens, some which cause life-threatening illnesses. Most accidental exposures to blood and body fluids (AEBF) result from medical errors, causing more than 20,000 cases of viral hepatitis B, C (HCV) and HIV/AIDS among HCW [11,12]. They hold a high risk to the health, safety and quality of care delivered [11]. The working environment, availability of health and safety information, compliance with standard precautions (SP) are associated with AEBF [12-14]. Key components of SP include hand hygiene, use of personal protective equipment, development and implementation of preventive health policies [15]. Adherence to SP aims to minimize occupational exposure to body fluids. Compliance with SP is essential to reduce the spread of infectious agents to patients, HCW and visitors of healthcare settings [16]. Oral health practitioners are disproportionately exposed to healthcare associated infections. The accrued risk is related to the use of rotating instrumentation, aerosols produced during bucco-dental care and the closer contact required with the patient cared for [17]. Dental health practitioners have traditionally been among the HCW reporting the most needle stick injuries [12]. Observance of SP and adherence to vaccination are effective interventions to prevent the transmission of healthcare associated infections [18]. Within the Cameroonian healthcare system, referral hospitals are endowed with providing technical support through continued education including issues related to the promotion of infection control in their satellite establishments [10-13]. The present study aimed to determine the level of compliance with infection prevention guidelines among dental health workers in referral hospitals.

Methods

Study Design and Period

The present descriptive cross-sectional study was conducted in five purposefully selected Yaounde-based referral hospitals, from the March to April 2021. Referral hospitals were the University Teaching Hospital (YUTH), the Central (YCH), Jamot (JHY), Gyneco-Obstetric and Pediatric (YGOPH) and General (YGH) hospitals. Each of the hospital has a dental unit with cabinets where bucco-dental health workers operate from Monday to Friday. Dental care units typically bear sterilization rooms, prosthesis laboratory, dental services cabinets with an examination bed and water supply.

Study Participants

The study participants were dental healthcare workers including doctors, nurses, technicians and assistants, all working in the dental cabinets and accessory services.

Data Collection

Data on infection prevention practices were collected using including a self-administered questionnaire and an observation guide. Observations were made on working days (Monday to Friday) and during daily operating cycle. The questionnaire included topics related to hand hygiene, use of personal protective equipment, respiratory hygiene, injection safety, sharps disposal, antisepsis and sterilization.

Data Processing and Analysis

Data collected were entered and analyzed using the SPSS (Statistical Package for the Social Sciences) Version 26. HCWs' knowledge and practices were assessed with relevance to socio-demographic characteristics. HCW knowledge score were classified as poor (less than 50%), insufficient (50-65%), average (65-85%) and good (more than 85%). Infection prevention practices were classified as very bad (less than 50%), bad (50-65%), inadequate (65-85%) and adequate (>85%).

Results

Out of 53 Bucco-Dental Healthcare Workers (BDHW) contacted, 40 completed the questionnaire, for a response rate of 75.5%.

Socio-Professional Characteristics of Bucco-Dental Health Workers

Study BDHW were mostly dentists (70%) or dental technicians (22.5%). They were women (65%). Participants aged 20-30 years were the most represented (Table 1).

Table 1: Socio-professional Characteristics of Bucco-dental Healthcare Workers in Yaoundé Referral Hospitals, April 2021 (n=40).

Characteristic	Count (n)	Frequency (%)
Hospital		
University Teaching	12	30
Central	14	35
General	5	12.5
Gyneco-Obstetric and Pediatric	3	7.5
Jamot	6	15
Sex		
Female	26	65
Male	14	35
Age (in Years)		
20-30	30	75
31-40	6	15
41+	4	10
Professional Status		
Dentist	28	70
Dental technician	9	22.5
Dental assistant	3	7.5
Professional Experience (Years of Practice)		
<5	26	57.5
10-May	11	27.5
20-Nov	3	7.5

Knowledge of Infection Prevention and Control

Almost all participants (97.5%) reported being aware of the risk of infection associated with dental care. Half of the participants

(50%) had heard of standard precautions. Less than half (35%) had received training in infection prevention in the healthcare setting. The overall level of knowledge of standard precautions was good for more than half of the HCW (58.5%) (Table 2).

Table 2: Bucco-dental Healthcare Workers' Knowledge of Standard Precautions in Referral Hospitals in Yaoundé, April 2021 (n=40).

Variables	Count (n)	Frequency (%)
Ever Heard of Infection Prevention and Control		
Standard precautions	20	50
Universal precautions	5	12.5
Prevention practices	10	25
I don't know what it means	5	12.5
Received Training on Infection Prevention & Control		
Yes	14	35
No	26	75
Most Recent Training		
None	26	65
Less than 5 years	9	22.5
More than 5 years	5	12.5
Hand Hygiene Knowledge		
Before any procedure	40	100
After removal of gloves	40	100
After accidental exposure to biological fluids	40	100

Use of Personal PPE		
Systematic use of glove during procedures	30	75
Systematic used of mask during procedures	40	100
Use of goggles for aerosol producing care	38	95
Disinfection Practices		
Disinfection of work surface between patients	40	100
Immediate disinfection of surfaces when soiled	37	92.5
Daily cleaning and disinfection of work station	37	92.5
Decontamination and Sterilization		
Immediate and systematic immersion of used equipment in a disinfectant	40	100
Mastery of sterilization process	31	77.5
Summary Knowledge Score		
Good	23	58.5
Average	10	24
Insufficient	5	13
Poor	2	4.5

Observance of Standard Precautions

Half of the participants (50%) reported washing their hands before procedures. Most dental staff reported a systematic use of Personal Protective Equipment (PPE). However, more than half were confronted with PPE shortcut during dental treatment (55%).

All participants reported wearing facial, surgical (92.5%) and FFP2 (7.5%) masks while delivering dental care. More than two-thirds (70%) reported disposing single-use devices correctly. BHCW had inadequate (60%) and detrimental (15%) sharp waste disposal scores (Table 3).

Table 3: Compliance with Standard Precautions among Dental Care staff in Yaoundé Referral Hospitals, April 2021 (n=40).

Standard Precaution	Count (n)	Frequency (%)
Use of Disinfection Solution		
Yes	32	80
No	8	20
Hand Hygiene Practices		
Short nails and or no nail varnish	28	70
Use of disposable hand towels after hand washing	11	27.5
Time of Hand Wash		
Before any procedure	20	50
After any procedure	40	100
Before and after any procedure	33	82.5
After removal of gloves	30	75
Personal Protective Equipment		
Use of PPE (gown, cap, clog, over gown, on shoe)	32	80
PPE shortcut (gown, cap, mask, clog, over gown, overshoe)	22	55
Systematic use of goggles/visor	10	25
Systematic use of gloves	33	82.5
Systematic use of facial mask	40	100
Change of gloves between patients	40	100
Change of mask between patients	8	20
Disposal of single-use PPE after use	12	30

Respiratory Hygiene		
Mandatory wearing of masks on entering the dental service	37	92.5
social distancing required between patients	28	70
Isolation of patients with flu-like symptoms	21	52.5
Waste Management and Instruments Sterilization		
Correct disposal of single-use devices	28	70
Immersion of used equipment in a disinfectant bath	33	82.5
Sterilization in the autoclave at 134°C for 18 minutes	6	15
Rotating Instruments		
Disinfection of rotating instruments	37	92.5
Sterilization of rotating instruments	5	12.5
Practice Score		
Adequate	5	12.5
Inadequate	24	60
Very poor	5	12,5
Detrimental	6	15

Accidental Exposure to Body Fluids

More than half of the respondents (60%) had experience AEBF in the last three months. The exposures were related to needle stick

injuries (NSI). Less than half of the BDHCW (47,5%) were fully vaccinated against Hepatitis B, while 30% were knowledgeable about the immediate action of washing the wound with soap and water after a NSI (Table 4).

Table 4: Practices related to Occupational Exposure among Dental Care Staff in Yaoundé Referral Hospitals, April 2021 (n=40).

Variable	Count (n)	Frequency (%)
Experienced Exposure in the Last 3 Months		
Yes	24	60
No	16	40
Immediate Post-Exposure Action		
Allow the wound to bleed	12	30
Wash with soap and water	12	30
Rinse thoroughly with water	24	60
Soak in bleach for 5 minutes	24	60
Knowledge of Post-Exposure Referral Service		
Yes	12	30
No	8	20
Don't know	4	10
Practice of Needle Recapping		
One-hand	35	87,5
Two-hands	5	12,5
Safe Injection Practice		
One needle per patient	39	97,5
Sterilization of cartridge syringes between patients	26	65
Disinfection of the rubber septum for multi-dose anesthetics	4	10
Use of safety box for sharp objects	35	87,5

Hepatitis B Vaccination		
Yes	19	47,5
No	21	52,5

Constraints to the Observance of Standard Precautions

Reasons for not adhering to SP were the inadequacy or lack of medical supplies (40%), shortages in PPE (90%), lack of training

and lack of time attributable to workload (33%). Discomfort was cited as a reason for not using the FFP2 masks, face shield and goggles (Figure 1).

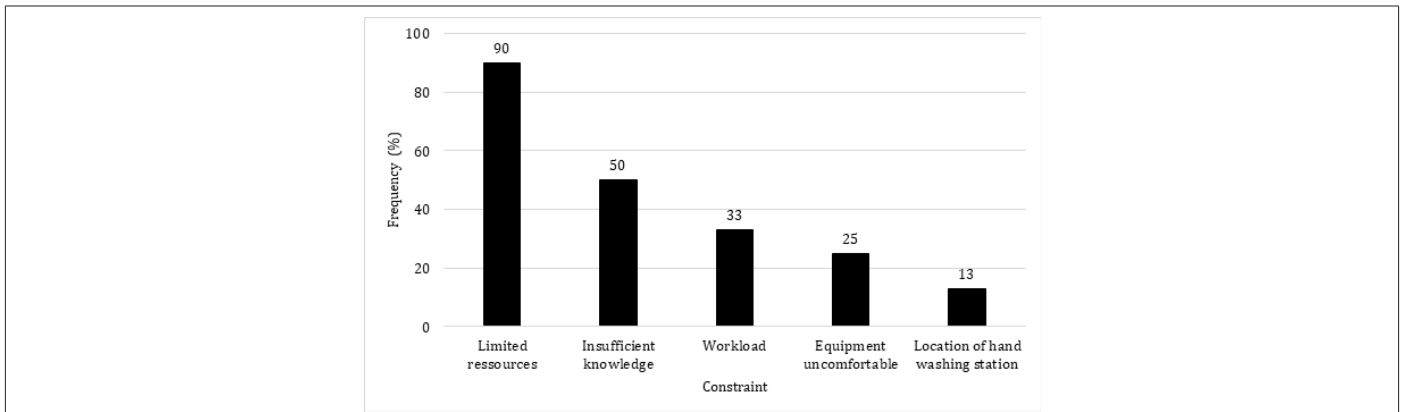


Figure 1: Reported Barriers to the Observance of Standard Precautions among Bucco-dental Health Workers in Yaoundé Referral Hospitals (n=40).

Discussion

In the present study, we report a low level of knowledge of standard precautions among BDHW. This may be related to the inadequacy of the health and medical education systems to cover such in the initial curricula or as part of the continued education activities. The practice of bucco-dental medicine requires a closer contact with patients than standard clinical work, exposing to a higher risk of transmission of pathogens. Dental therapeutic procedures are often invasive and produce aerosols that contain biological fluids. All caregivers, patients and the working environment may be subject to soiling. Knowledge and adherence to standard precautions by BDHW is essential to manage their specific health risk.

The research team did not receive confirmation on the existence of infection control committees in the study settings. There is a need to include capacity building at the strategic level, training HCW and ensuring that equipment and supplies are provided to sustain infection prevention activities. Such measures should be nurtured and prioritized in health policies. Despite the low number of training sessions, participants had a good understanding of the practice of hand washing and the systematic use of gloves during bucco-dental care. The low proportion of participants having received SP training in the last five years corroborates observations made elsewhere [19-21]. There is a need to sustain adherence to good practice through continued education activities, as BDHW face evolving health technologies and emerging health challenges.

Deficiencies in the supply of PPE, the universal availability of disinfectants, the location of hand washing points were reported as barriers explaining poor compliance with SP among bucco-dental

healthcare workers [10]. Though outside the IPC network of activities, heavy workload was reported as a barrier to compliance with standard precautions [22]. Working greater than eight hours per day, on night shifts are associated with exposure to occupational hazards and medical errors among HCW [23].

Almost all participants reported good knowledge, adequate practices related to hand washing. Lower adherence rates (19.4%) were reported in dental care settings in Tunisia [24,25] and Saudi Arabia [26]. The higher adherence reported in the present investigation could be explained by the interest aroused by the COVID-19 pandemic, as there was a widespread availability of disinfectants in healthcare settings. The present study took place during the third phase of the COVID-19 pandemic, as the country witnessed the promotion and distribution of alcohol-based hand sanitizers in health facilities and public places. Most participants reported using personal protective equipment, including masks, gloves and gowns when on duty in accordance with the usual instructions [27]. While gloves were routinely worn for all oral and dental care, they were not changed when care was interrupted, a practice similar to those reported in other dental care settings [25-28].

The low rate of use of FFP2 mask was explained by its unavailability in different departments, and its high cost when acquired at the user's own expense, similar to reports in Pakistan [27] and Morocco [21]. Less than half of the participants were fully vaccinated against viral hepatitis B. The financial accessibility of the vaccine and the vaccine hesitancy under the COVID-19 interventions, could account for the low coverage. Establishing mandatory pre-engagement vaccination against hepatitis B for health workers could be an option [29,30].

The high prevalence of occupational exposure reported in this study is worrying, although it is similar to that reported in Morocco (58.9%) and Côte d'Ivoire (60%) [21,31]. A comprehensive approach including training, awareness raising, implementation of surveillance activities and ensuring adequate supply of necessary equipment and facilities are warranted [29,32]. Such measures should be scaled to bucco-dental health facilities at the regional and national levels.

Conclusion

Only half of the bucco-dental healthcare workers had good knowledge of standard precautions. The prevalence of accidental exposure to body fluids was unacceptably high and less than half of the BDHW were fully immunized against hepatitis B. Limited resources, insufficient knowledge and workload were the main barriers to compliance with standard precautions. There is an urgent need to set up infection control committees in the study settings to monitor and sustain measure for the occupational safety, the regular supply of PPE, training, promotion of vaccination and other infection prevention and control activities.

Declaration

Author's Contribution

Drafting of the protocol, data collection, analysis and interpretation: ZFM; Drafting of original manuscript: ZFM and AN; Critical revision of the manuscript: FZLC and ML; Conception, design, supervision of implementation, editing and final validation of the manuscript: IT.

Funding Source

This study received no funding from any agency or organization.

Ethical Approval Statement

The protocol was approved by Institutional Review Board (IRB) of the Faculty of Medicine and Biomedical Sciences of Yaoundé and the ethical clearance: N°188/UY1/FMS/VDRC/DAASR/CSD issued. Informed consent was obtained from participants prior to inclusion in the study.

Declaration of Interests

All authors declare no conflict of interest and approve the final article.

Acknowledgements

We thank all the health personnel who participated in this study as well as the management of the hospitals who gave their authorization for this study to be carried out in their hospitals.

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