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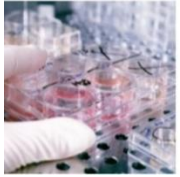

The status of infection control measures in healthcare facilities in South Africa

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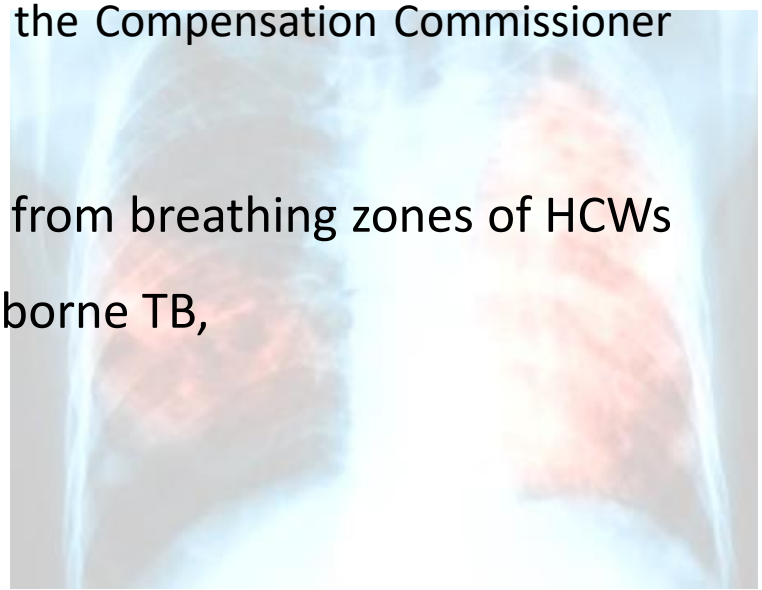
INTRODUCTION

- In middle income countries, TB rates among HCWs are higher than the general population.
- HCWs have a 5 to 6 fold increased rate of hospital admission with MDR-TB or XDR-TB compared with non-HCWs.
- In a study done by Malangu & Legothoane (2012)
  - TB was the most common HAI that affected HCWs in Limpopo
  - TB accounted for 83.9% of all cases reported to the Compensation Commissioner (2007 - 2009).
- In air samples collected by Matuka *et al*., 2015 from breathing zones of HCWs at a hospital in South Africa for detection of airborne TB,
  - Medical doctors - 50% MTB positive
  - Nurses - 23% MTB positive



Aim & Objectives

Aim

To evaluate the impact of the infection prevention and control (IPC) measures that are currently in place in healthcare facilities (HCFs) in South Africa in minimising occupational acquisition of TB amongst health workers (HWs).

Objectives

- To administer a health assessment questionnaire at nine HCFs in three provinces in South Africa.
- To evaluate the implementation and practise of infection control measures at HCFs in South Africa in relation to TB amongst HWs.

Methodology

Study Sites

- 3 Provinces (Gauteng, Western Cape, KwaZulu-Natal)
- 9 Healthcare facilities (4 – primary healthcare, 3 – TB specialized hospitals, 2 – district hospitals)

Data collection

- Healthcare Facility Assessment Questionnaire
- Interviews
- Walkthrough inspection

Data Analysis

- Descriptive analysis
- STATA 15.1

Methodology: Health questionnaire

- **Administrative measures:**
  - initiatives taken by institutional managers about the structures and systems in place to curtail TB transmission
- **Clinical control measures:**
  - ensure that people with TB symptoms are promptly identified, separated and treated
  - aid in protecting HWs and other patients not yet infected with TB from contracting this disease
- **Occupational health measures:**
  - measures that are in place or are provided to the staff to prevent or minimise the acquisition of TB
- **Environmental & Engineering control measures:**
  - Initiatives to reduce the concentration of infectious agents in the air
  - control the direction of potentially infectious air

Results: Administrative control measures

Variable assessed		Healthcare facility type (n, %)			Total (n=9); n (%)
		TB (n=3)	District (n=2)	Public health clinic (n=4)	
Infection control policy		3 (100)	2 (100)	3 (75.0)	8 (88.9)
Staff trained on infection control policy		3 (100)	2 (100)	3 (100)	8 (100)
Infection Control training frequency	2/year:	2 (66.7)	0 (0)	1 (25.0)	3 (33.3)
	Regular:	0 (0)	1 (50.0)	1 (25.0)	2 (22.2)
	Yearly:	0 (0)	1 (33.3)	1 (33.3)	1 (11.1)
	2/¼year:	0 (0)	1 (50.0)	0 (0)	1 (11.1)
Training on TB infection control		3 (100)	2 (100)	4 (100)	9 (100)
Training provided by a competent person		3 (100)	2 (100)	3 (75.0)	8 (88.9)
Records of the training sessions kept		3 (100)	2 (100)	2 (50.0)	7 (77.8)
TB dedicated healthcare worker		1 (33.3)	2 (100)	3 (75.0)	6 (66.7)
TB register on site		3 (100)	0 (0)	1 (25.0)	4 (44.4)
Mean number of staff at the facilities		296	562	603	-
Mean of TB patients treated in facility		265	9	94	-
Does the facility do risk assessment		2 (66.7)	2 (100)	3 (75.0)	7 (77.8)

Discussion

- **8/9 (88.9%) HCFs reported having IC policy and received training on the policy**

- **All (100%) nine facilities received training on TB IC plan, 8 (88.9%) by a competent person**
  - This is a great achievement as studies have shown that training on IPC lowers TB cases amongst HCWs (Grobler *et al*., 2016)

- **7/9 (77.8%) of the HCFs conduct risk assessments, however one TB hospital and one PHC did not**
  - Risk assessment is still recommended whether cases are recorded or not to close gaps that may be present to prevent exposures in future

Results: Clinical control measures

Variable assessed		Healthcare facility type (n, %)			Total (n=9); n (%)
		TB (n=3)	District (n=2)	Public health clinic (n=4)	
Screening for TB occur on arrival		-	2 (100)	3 (75.0)	5 (55.6)
Place of screening (designated area available)		-	2 (100)	3 (75.0)	5 (55.6)
Are patients educated on TB infection policies		3 (100)	2 (100)	3 (75.0)	8 (88.9)
TB education for patients implemented		3 (100)	2 (100)	4 (100)	9 (100)
Educational material for patients		2 (66.7)	1 (50.0)	3 (75.0)	6 (66.7)
TB patients separated		-	0 (0)	1 (25.0)	1 (16.7)
Are TB patients given priority		-	1 (100)	2 (66.7)	3 (75.0)
Are TB patients placed in a separate room		-	1 (50.0)	3 (75.0)	4 (66.7)
Are suspect patients discharged / admitted	Discharged:	-	0 (0)	3 (75.0)	3 (33.3)
	Admitted:	-	1 (50.0)	1 (25.0)	2 (22.2)
	N/A:	-	1 (50.0)	0 (0)	4 (44.4)
Does a staff member observe patients who are asked to produce sputum		3 (100)	0 (0)	2 (50.0)	5 (55.6)

Discussion

- **The triaging and separation of TB patients from other patients can be improved**

- **Screening of TB patients**
  - District hospitals – 2/2 (100%)
  - Primary healthcare facilities – 3/4 (75%); **p-value = 0.4431**

- **Separating TB patient from other patients**
  - Non-TB specialised HCFs – 1/6 (16.7%)

- **TB patients are placed in a separate room**
  - Non-TB specialised HCFs – 4/6 (66.7%)

- **As TB is a nosocomial disease, separating TB patients from others will help in minimising the risk of transmission**

Results: Occupational Health control measures

Variable assessed		Healthcare facility type (n, %)			Total (n=9); n (%)
		TB (n=3)	District (n=2)	Public health clinic (n=4)	
Does the facility have a respiratory programme		3 (100)	1 (50.0)	3 (75.0)	7 (77.9)
All staff at risk use PPE		3 (100)	2 (100)	4 (100)	9 (100)
What type of respirator is used	N95:	2 (66.7)	2 (100)	4 (100)	8 (88.9)
	Other:	1 (33.3)	0 (0)	0 (0)	1 (11.1)
All HCWs undergone fit testing for respirator use		3 (100)	0 (0)	0 (0)	3 (33.3)
All staff members screened for TB		3 (100)	2 (100)	3 (75.0)	8 (88.9)
Baseline chest x-rays done for staff		3 (100)	1 (50.0)	2 (50.0)	6 (66.7)
Have HCWs in the facility been diagnosed with TB		2 (66.7)	1 (50.0)	4 (100)	7 (77.8)
If yes how many in the last 12 months		H4: 2/14 H2: 12/14	H5: 4/4	H1: 1/19 H6: 6/19 H7: 6/19 H8: 6/19	Total: 37
Case /s investigated		2 (100)	2 (100)	4 (100)	8 (100)
Corrective action taken		2 (100)	1 (50.0)	4 (100)	7 (77.8)
Have access to occupational health services and advice		3 (100)	1 (50.0)	4 (100)	8 (88.9)

Discussion

- **Wearing a respirator is not enough if it doesn't fit properly**
  - Staff that are at risk were provided with PPE: 9/9 (100%)
  - Respirator in use: N95 – 8/9 (88.9%) and other – 1/9 (11.1%)
  - Fit testing: 3/9 (33.3%) – only in TB specialised HCFs
- **PHCs had the highest number of staff (19) that has been diagnosed with TB in the previous 12 months**
  - Western Cape: more HCWs working at primary HCFs were diagnosed with TB compared to workers working at higher levels HCFs (Grobler *et al.*, 2016)
  - HWs at primary HCFs are more exposed to infectious yet undiagnosed TB patients compared to workers at higher level HCFs where patients are referred to
- **All employees at HCFs are at risk of contracting TB**
  - Staff members from both clinical and non-clinical job categories have been diagnosed with TB
  - Malotle *et al.*, 2017; ratio of non-clinical HCWs to nurses contracting TB (8.33% : 2.2%)

Results: Environmental and Engineering Controls

Variable assessed		Healthcare facility type (n, %)			Total (n=9); n (%)
		TB (n=3)	District (n=2)	Public health clinic (n=4)	
Designated area for sputum production		3 (100)	1 (50.0)	2 (50.0)	6 (66.7)
Type of ventilation system in a facility	Natural:	3 (100)	0 (0)	4 (100)	7 (77.8)
	Mechanical:	2 (66.7)	2 (100)	2 (50.0)	6 (66.7)
	Industrial fans	0 (0)	0 (0)	1 (25.0)	1 (11.1)
	Air conditioning	1 (33.3)	0 (0)	0 (0)	1 (11.1)
Natural ventilation exists high ceiling height (>3m)		3 (100)	0 (0)	2 (50.0)	5 (55.6)
Natural ventilation exists_vents		0 (0)	2 (50.0)	3 (75.0)	4 (44.4)
Natural ventilation exists_open windows on opposite walls, unrestricted airflow		3 (100)	1 (50.0)	3 (75.0)	7 (77.8)
Windows always kept open directly to the outside		3 (100)	1 (50.0)	2 (50.0)	6 (66.7)
Directional airflow controlled and checked		1 (33.3)	0 (0)	1 (25.0)	2 (22.2)
Air cleaning methods used in the facility	None:	-	1 (50.0)	2 (50.0)	3 (33.3)
	UVGI:	3 (100)	-	1 (25.0)	4 (44.4)
	HEPA filtration:	-	1 (50.0)	-	1 (11.1)
	Negative pressure:	-	-	1 (25.0)	1 (11.1)
	Other:	-	-	1 (25.0)	1 (11.1)

Discussion

- **Designated area for sputum production**
  - 6/9 (66.7%) HCFs have such an area
  - 3/3 (100%) for TB specialised hospitals
  - This practise minimises the spread and transmission of the disease

- **Ventilation**
  - All TB specialised and PHC facilities used natural ventilation
  - Majority of these facilities (TB specialised and PHC) with an exception of one facility use additional ventilation systems
  - Natural ventilation is able to dilute airborne pathogens suspended in the air and is economically viable
  - No certainty that a single air cleaning method is adequate to eliminate airborne TB, using more than one method may be more beneficial in eliminating the pathogen from the environment, cost depending

- **Use of mechanical air cleaning methods**
  - Used in 6/9 (66.7%) HCFs, 4 – UVGI; 1 – HEPA; 1 – Negative pressure; 1 – other
  - There was lack of maintenance of the equipment which may give HWs a false security especially when they are not functioning optimally

Conclusion

- According to WHO and the South African National Department of Health TB infection control guidelines, 100% compliance to the infection control measures is recommended to ensure that HWs are protected from contracting TB from work
- Based on the evidence gathered from this study, 100% compliance has not been achieved
- It is imperative that infection control training is provided to all HWs including the non-clinical staff as evidence shows that non-clinical staff have contracted and have been diagnosed with TB
- Whether the HWs diagnosed with TB acquired the disease in the workplace is unknown, however the risk exists

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Thank you!
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