Indicators for measuring health promotion practice among healthcare workers in the Nelson Mandela Bay Municipality, South Africa: A cross sectional study

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Abstract

Background: Measuring indicators for health promotion (HP) practice among healthcare workers is essential if health goals and objectives must be achieved. Such indicators provide connections between health policies and health outcomes; and ultimately add value to healthcare. This study identified indicators of health promotion among healthcare workers and compared them across levels of healthcare facilities in Nelson Mandela Bay Municipality, South Africa.

Method: A cross sectional study involving 495 healthcare workers randomly sampled from 23 hospitals including primary, secondary, and tertiary level hospitals was conducted. Questionnaires were distributed to medical doctors, nurses, and allied health workers (AHW) such as social workers, physiotherapists, occupational therapists, and speech therapist. Questions (hereto referred to as dimensions) in the questionnaires were categorized to address Facility Related Indicators (FRI), Health worker related indicators (HRI) and Outcome related indicators (ORI). Descriptive and bivariate analysis were used to identify the indicators of HP among the three HCW groups from the three levels of health care. Indicators observed to be significant in the bivariate analysis were subjected to a multivariate analysis using the multinomial regression model. (p -value < 0.05).

Results: Emerging Indicators were grouped into three categories: facility related indicators (FRI), healthcare workers' related indicators (HRI), and outcome related indicators (ORI). Four FRI dimensions were observed to be predictors of HP among doctors. Two dimensions were positively associated with HP practices while two others were negatively associated with HP practices among medical doctors and AHWs. On the other hand, seven HRI dimensions were significantly associated with HP among medical doctors and AHW. Furthermore, 5 outcome related indicator (ORI) dimensions were significant predictors of HP among medical doctors while only two dimensions were predictors of HP among AHW. The generalized Hosmer–Lemeshow Chi-square test showed that the models for the different HP indicators fit the data.

Conclusions:

We identified indicators for measuring HP that can be applied at primary, secondary and tertiary hospitals in Nelson Mandela Bay Municipality, South Africa. These indicators which healthcare workers and health systems' managers in the study area should be aware of may be adapted for use in other areas.

Background

Worldwide, performance measurement of health promotion (HP) practice among healthcare workers (HCWs) is a contemporary theme in health systems (1, 2). However, there is no consensus on the approach for measuring HP practice among healthcare workers. For instance, existing HP indicators focus on specific HP programmes and not on overall HP practices of healthcare workers (3, 4). Developing such indicators will provide the health system tools for assessing the effectiveness and quality of HP services by the HCWs. This will improve the performance of HCW to discharge HP services and ultimately reduce pressure at healthcare facilities as patients and the general community become empowered. Clearly defined indicators are critical as instruments for methodical execution of HP practices. This enhances practice objectivity, improves understanding, decision making, ensures feedback on the way things are progressing and provide for prompt warning signs to authorities (5).

Healthcare delivery faces significant challenges (6, 7) ranging from costs associated with healthcare to basic healthcare infrastructures. Globally, serious shortcomings have been documented across several domains in healthcare (8) and this may have long term effects on human health. Many low and middle income countries (LMIC) suffer from poor quality of care described by the World Health Organization (WHO) as worrisome particularly for Africa (9). In an analysis of healthcare services assessed against health outcomes, Africa scored an overall index of 0.48 (9) indicating that the continent utilizes only 48% of imaginable health services required for the health and well-being of its population. For instance, in Malawi, the healthcare delivery system is saddled with poor distribution of resources, disintegration of services and staff shortage (10). Similarly in Nigeria, the healthcare system is laden with poor service delivery and infrastructure (11).

In South Africa, there is a strong commitment by the state to improve the healthcare delivery system evident from supportive policies and programmes implemented; and the funding invested (12–14). Despite these efforts, health outcomes remain polarised, unequal and unfair (12). Currently the country has a two-tiered system (15) that provides services to the population - the public and the private healthcare sectors. The public health care provides free health services and is fully funded by the state hence strongly overstretched. The private healthcare sector mainly provides services to wealthier and employed classes who subscribe to private health insurance schemes (16,17). This healthcare system has been described as one under increased strain as a result of overstretch of her HCWs capacity and operational resources (18).

The success of any healthcare system is largely dependent on performance of HCWs, and worldwide, millions of patients visit the healthcare facilities daily to meet the HCWs for various health needs. Establishing a set of indicators for measuring HP practices among HCWs will enhance HP awareness and practice among the HCWs. Such HP indicators will provide HCWs with vital tools for systematically conducting follow-up and have an effective HP practices (3). These tools will assist in unravelling areas for improvement and intervention. Good sets of indicators will assist policy makers and stakeholders to monitor and evaluate HP practices of HCWs. Metrics for such measurement will require clear HP indicators and a framework that integrates relationships across the different elements of HP practices. This study identified selected measures or attributes for assessing HCWs HP practices and compared them across the various levels of healthcare in the Nelson Mandela Bay Municipality, South Africa.

Method

Study area

The Nelson Mandela Bay Municipality (NMBM), is one of eight category A or metropolitan municipalities (19) in South Africa. NMBM is the largest of two Category A Metropolitan Municipalities in the Southern coast of the Eastern Cape Province (20).

With a population of 1 271 776, NMBM makes up approximately 17% of the population of the Eastern Cape Province (20). The Municipality is comprised of the City of Port Elizabeth, Despatch (21), peri urban as well as rural areas. The population is diverse with black people being the majority, followed by coloured and whites. The NMBM has the largest economy in the province largely driven by the automotive industry and tourism sector. However, the municipality is laden with major challenges of poverty, overcrowding in townships, informal settlements, unemployment social inequalities, poor infrastructure, and poor service delivery. The Eastern Cape Province's average unemployment rate was 37.4% in 2011 (22) and has a low life expectancy (Males – 59.6 years, females - 67.1 years) compared to the national life expectancy (males 61.5 years, female - 67.7 years) (23). The major causes of death include many preventable causes. As is the case for the whole country, NMBM has primary, secondary and tertiary healthcare facilities.

Study design

A quantitative cross-sectional study was carried out between January and March 2020 in twenty-three public hospitals in NMBM. Sampled hospitals included primary, secondary, and tertiary hospitals. The study participants comprised of medical doctors, nurses, and allied health workers (AHW) (physiotherapists, occupational therapists, speech therapists, dieticians, and social workers). A sample size of 384 respondents was determined based on 95% of confidence level and an error margin of 5%. The initial sample size was adjusted by 25% to 480 to cater for non-response. Questions (hereto referred to as dimensions) in the questionnaires were categorized to address Facility Related Indicators (FRI), Health worker related indicators (HRI) and Outcome related indicators (ORI). A total of 520 questionnaires were randomly distributed and 501 participants returned completed the questionnaire. Of the 501 responses, six participants did not include their professions and were therefore excluded from the final analysis.

Data collection and Analysis

A standardised and piloted questionnaire adopted from existing studies (24,25), and modified to include additional questions and adapted to fit the South Africa Health system. This questionnaire was administered to HCWs from 23 health facilities in the study area. Each participant completed a self-administered semi-structured questionnaire with the following sections relating to HP and practices: sociodemographic profile of the participant(s) (sex, occupation, level of health care facility, and HP dimensions). The dimensions were categorized as Facility Related Indicators (FRI), Health worker related indicators (HRI) and Outcome related indicators (ORI). FRI dimensions included HP communication channel, coordination, HP budget, data capturing and evaluation, HP structure, quality assessment, provision to assess patients need, assessment done at first contact, documentation of HP records, availability of guidelines and policy, socio-cultural background, induction training and performance appraisal; HRI dimensions comprised - education on disease condition, guidance on diet and lifestyle, routine check-up, adequate knowledge on patients condition, fitness and health screening, assistance with welfare services, participation in training, coordinated HP training, home visits, community based placement, follow-up, patient empowerment, notification of patient on risk factors; and ORI dimensions (coverage of target population, reduction in number of deaths, reduction in number of diseases, reduction in number of injuries and disabilities, reduced inequities in health, improved need assessment and improved community mobilization and participation). The data collection process is summarized in Fig. 1.

Data collected were captured in Microsoft Excel 2016 Spreadsheet, cleaned, and analyzed using StataIC 15 (Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC). Descriptive and inferential statistics were used to describe and analyze the data collected using univariate, bivariate and multivariate statistics. Descriptive statistics were used to summarize the data. Associations between categorical variables were determined using chi-square tests. In our analysis, we controlled for level of healthcare facility. HCWs were categorized as medical doctors, nurses, and allied health workers (AHW) (social workers, physiotherapists, occupational therapists, and speech therapist). To determine the influence of the indicators on the HP dimensions, a multinomial logistic model was fitted with the classification of healthcare workers (HCWs) as the dependent variable. To fit this model, all indicators that had a p-value of less than 0.1 in the Univariate model were used in the model. The fit of the final models for different HP indicators which included varied number of explanatory variables were assessed using the generalized Hosmer–Lemeshow goodness-of-fit test, chi-square test and models were regarded significant if the resulting p-value was greater than 0.05 (26).

The Hosmer–Lemeshow goodness-of-fit and chi-square tests were employed in assessing the final model for the various HP and DP enablers.

Results

Demographic characteristics

Of the 520 health care workers (HCWs) who were enrolled into the study, only 495 participants were considered for the final analysis (Figure 1). Of these, 39% (n=192) were medical doctors, 47% (n=234) were nurses and 14% (n=69) were allied health workers. The results further show that 26.26% (n=130) of the HCWs were from primary healthcare, 4% (n=17) were from secondary and 70.30% (n=348) were from tertiary healthcare facilities. Among these respondents, 75.42% (n=362) were females while 24.58% (n=118) were males.

Facility Related Indicator (FRI)

Fourteen dimensions were associated with health promotion practices among HCWs in the study area. These include - HP communication channel, HP coordinator, HP budget, data routinely captured on HP interventions, data available to staff for HP evaluation, HP quality assessment programme, provision to assess patient HP need, documentation of patient's HP record, guidelines for reassessing patients HP need at discharge, guidelines for reassessing patients HP need post intervention, update on patients' sociocultural background, HP policy, HP induction training for new staff, and HP performance appraisal system (See Additional file 1). When corrected for healthcare facility level, 14 dimensions were significant indicators of HP at tertiary facility level while only two dimensions were significant indicators of HP at primary healthcare level. On the other hand, none of the FRI dimension was a significant indicator of HP at secondary healthcare level (Table 1).

Table 1: Correlations of Facility Related Indicator Dimensions with level of health care Facility													
FRI Dimensions	Profession	Primary Healthcare Level				Secondary Healthcare Level				Tertiary Healthcare Level			
		Yes	No	I don't Know	P value	Yes	No	I don't Know	P value	Yes	No	I don't Know	P value
Any communication channel for HP in your facility	Doctors	2.48% (n=3)	3.31% (n=4)	0% (n=0)	0.447	6.25% (n=1)	31.25% (n=5)	0% (n=0)	0.117	7.29% (n=24)	44.68% (n=147)	0% (n=0)	0.000
	Nurses	52.90% (n=64)	34.71% (n=42)	0% (n=0)		12.50% (n=2)	6.25% (n=1)	0% (n=0)		15.81% (n=52)	16.72% (n=55)	0% (n=0)	
	Allied HW	4.96% (n=6)	1.65% (n=2)	0% (n=0)		31.25% (n=5)	12.50% (n=2)	0% (n=0)		5.17% (n=17)	10.33% (n=34)	0% (n=0)	
HP coordinator	Doctors	0.78% (n=1)	1.55% (n=2)	3.10% (n=4)	0.197	0% (n=0)	31.25% (n=5)	6.25% (n=1)	0.321	3.89% (n=13)	19.46% (n=65)	29.04% (n=97)	0.000
	Nurses	51.94% (n=67)	16.28% (n=21)	20.16% (n=26)		6.25% (n=1)	6.25% (n=1)	6.25% (n=1)		10.48% (n=35)	9.28% (n=31)	12.28% (n=41)	
	Allied HW	3.88% (n=5)	0.08% (n=1)	1.55% (n=2)		12.50% (n=2)	12.50% (n=2)	43.75% (n=7)		4.49% (n=15)	2.40% (n=8)	8.68% (n=29)	
HP budget	Doctors	0% (n=0)	12.50% (n=2)	31.25% (n=5)	0.284	0% (n=0)	18.75% (n=3)	18.75% (n=3)	0.180	0.29% (n=1)	10.26% (n=35)	41.39% (n=141)	0.000
	Nurses	11.72% (n=15)	18.75% (n=24)	57.81% (n=74)		0% (n=0)	0% (n=0)	18.75% (n=3)		5.87% (n=20)	4.99% (n=17)	21.70% (n=74)	
	Allied HW	0% (n=0)	3.13% (n=4)	3.13% (n=4)		0% (n=0)	6.25% (n=1)	37.50% (n=6)		1.47% (n=5)	4.11% (n=14)	9.97% (n=34)	
Data routinely captured on HP interventions?	Doctors	1.56% (n=2)	0% (n=0)	3.91% (n=5)	0.384	0% (n=0)	18.75% (n=3)	18.75% (n=3)	0.111	1.18% (n=4)	15.09% (n=51)	33.14% (n=122)	0.000
	Nurses	44.53% (n=57)	13.28% (n=17)	30.47% (n=39)		6.25% (n=1)	0% (n=0)	12.50% (n=2)		9.76% (n=33)	4.14% (n=14)	18.05% (n=61)	
	Allied HW	3.13% (n=4)	0.78% (n=1)	2.34% (n=3)		0% (n=0)	6.25% (n=1)	37.50% (n=6)		1.78% (n=6)	3.55% (n=12)	10.36% (n=35)	
Data available to staff for HP evaluation?	Doctors	1.57% (n=2)	0.79% (n=1)	3.15% (n=4)	0.669	0% (n=0)	18.75% (n=3)	18.75% (n=3)	0.184	1.12% (n=4)	15.63% (n=53)	34.81% (n=118)	0.000
	Nurses	38.58% (n=49)	21.26% (n=27)	28.35% (n=36)		6.25% (n=1)	0% (n=0)	12.50% (n=2)		9.44% (n=32)	6.79% (n=23)	16.52% (n=56)	
	Allied HW	3.15% (n=4)	0.79% (n=1)	2.36% (n=3)		0% (n=0)	12.50% (n=2)	31.25% (n=5)		1.77% (n=6)	2.95% (n=10)	10.91% (n=37)	
HP structures and facilities required	Doctors	3.97% (n=5)	1.59% (n=2)	0% (n=0)	0.865	31.25% (n=5)	6.25% (n=1)	0% (n=0)	0.768	32.93% (n=109)	18.73% (n=62)	0% (n=0)	0.356
	Nurses	58.73% (n=74)	29.37% (n=37)	0% (n=0)		12.50% (n=2)	6.25% (n=1)	0% (n=0)		21.45% (n=71)	11.48% (n=38)	0% (n=0)	
	Allied HW	4.76% (n=6)	1.59% (n=2)	0% (n=0)		37.50% (n=6)	6.25% (n=1)	0% (n=0)		11.48% (n=38)	3.93% (n=13)	0% (n=0)	
HP quality assessment program	Doctors	1.65% (n=2)	1.65% (n=2)	2.48% (n=3)	0.052	0% (n=0)	6.25% (n=1)	31.25% (n=5)	0.432	4.23% (n=14)	10.57% (n=35)	37.16% (n=123)	0.000
	Nurses	41.32% (n=50)	14.88% (n=18)	31.40% (n=38)		6.25% (n=1)	0% (n=0)	12.50% (n=2)		16.31% (n=54)	3.93% (n=13)	12.39% (n=41)	
	Allied HW	0.83% (n=1)	0% (n=0)	5.79% (n=7)		2.48% (n=3)	6.25% (n=1)	18.75% (n=3)		3.66% (n=12)	2.42% (n=8)	9.37% (n=31)	
Provision to access patients HP need	Doctors	2.48% (n=3)	3.31% (n=4)	0% (n=0)	0.137	12.50% (n=2)	25.00% (n=4)	0% (n=0)	0.149	5.41% (n=49)	37.11% (n=118)	0.31% (n=1)	0.000
	Nurses	49.59% (n=60)	21.49% (n=26)	0% (n=0)		12.50% (n=2)	6.25% (n=1)	0% (n=0)		23.27% (n=74)	10.06% (n=32)	0.31% (n=1)	
	Allied HW	4.13% (n=5)	2.48% (n=3)	0% (n=0)		37.50% (n=6)	6.25% (n=1)	0% (n=0)		5.66% (n=18)	7.86% (n=25)	0% (n=0)	
HP need assessment done at first contact with hospital	Doctors	5.00% (n=4)	0% (n=0)	0% (n=0)	0.562	11.11% (n=1)	11.11% (n=1)	0% (n=0)	0.347	20.00% (n=33)	21.21% (n=35)	0% (n=0)	0.549
	Nurses	70.00% (n=56)	20.00% (n=16)	0% (n=0)		22.22% (n=2)	0% (n=0)	0% (n=0)		24.24% (n=40)	20.60% (n=34)	1.12% (n=2)	
	Allied HW	3.75% (n=3)	1.25% (n=1)	0% (n=0)		22.22% (n=2)	33.33% (n=3)	0% (n=0)		7.27% (n=12)	5.45% (n=9)	0% (n=0)	

Documentation of patient's HP record	Doctors	0.83% (n=1)	2.48% (n=3)	2.48% (n=3)	0.061	0% (n=0)	18.75% (n=3)	18.75% (n=3)	0.193	10.61% (n=35)	20.30% (n=67)	20.61% (n=68)	0.000
	Nurses.	54.55% (n=66)	10.74% (n=13)	22.31% (n=27)		12.50% (n=2)	0% (n=0)	6.25% (n=1)		18.49% (n=61)	6.67% (n=22)	7.58% (n=25)	
	Allied HW	19.01% (n=23)	1.65% (n=2)	2.48% (n=3)		18.75% (n=3)	6.25% (n=1)	18.75% (n=3)		4.55% (n=15)	4.85% (n=16)	6.36% (n=21)	
Guidelines for reassessing patients HP needs at discharge	Doctors	0.84% (n=1)	2.52% (n=3)	2.52% (n=3)	0.228	0% (n=0)	18.75% (n=3)	18.75% (n=3)	0.059	6.27% (n=21)	19.10% (n=64)	25.97% (n=87)	0.000
	Nurses	34.45% (n=41)	15.13% (n=18)	38.66% (n=46)		12.50% (n=2)	6.25% (n=1)	0% (n=0)		17.02% (n=57)	7.46% (n=25)	8.66% (n=29)	
	Allied HW	1.68% (n=2)	2.52% (n=3)	1.68% (n=2)		12.50% (n=2)	0% (n=0)	31.25% (n=5)		1.79% (n=6%)	4.18% (n=14)	9.55% (n=32)	
Guidelines for reassessing patients HP needs post intervention	Doctors	1.67% (n=2)	1.67% (n=2)	2.50% (n=3)	0.835	0% (n=0)	18.75% (n=3)	18.75% (n=3)	0.328	6.97% (n=23)	19.09% (n=63)	26.36% (n=87)	0.000
	Nurses	37.50% (n=45)	13.33% (n=16)	36.67% (n=44)		6.25% (n=1)	0% (n=0)	12.50% (n=2)		16.06% (n=53)	8.18% (n=27)	7.88% (n=26)	
	Allied HW	2.50% (n=3)	1.67% (n=2)	2.50% (n=3)		6.25% (n=1)	6.25% (n=1)	31.25% (n=5)		1.81% (n=6)	4.85% (n=16)	8.79% (n=29)	
Update on patient's socio-cultural background	Doctors	0.81% (n=1)	2.44% (n=3)	2.44% (n=3)	0.020	6.25% (n=1)	12.50% (n=2)	18.75% (n=3)	0.842	15.38% (n=52)	15.98% (n=54)	19.82% (n=67)	0.000
	Nurses	57.72% (n=71)	15.45% (n=19)	14.63% (n=18)		6.25% (n=1)	6.25% (n=1)	6.25% (n=1)		24.56% (n=83)	4.73% (n=16)	3.85% (n=13)	
	Allied HW	2.44% (n=3)	3.25% (n=4)	0.81% (n=1)		18.75% (n=3)	6.25% (n=1)	18.75% (n=3)		10.36% (n=35)	0.89% (n=3)	4.44% (n=15)	
Any health promotion policy	Doctors	0% (n=0)	1.63% (n=2)	4.07% (n=5)	0.034	6.25% (n=1)	6.25% (n=1)	25% (n=4)	0.683	4.49% (n=15)	8.08% (n=27)	39.82% (n=133)	0.000
	Nurses	41.46% (n=51)	4.88% (n=6)	41.46% (n=51)		6.25% (n=1)	0% (n=0)	12.50% (n=2)		16.47% (n=55)	1.80% (n=6)	13.77% (n=46)	
	Allied HW	2.44% (n=3)	0% (n=0)	4.07% (n=5)		6.25% (n=1)	0% (n=0)	37.50% (n=6)		2.10% (n=7)	2.10% (n=7)	11.38% (n=38)	
HP induction training for new staff	Doctors	1.61% (n=2)	1.61% (n=2)	2.42% (n=3)	0.468	0% (n=0)	18.75% (n=3)	18.75% (n=3)	0.251	2.70% (n=9)	21.62% (n=72)	28.23% (n=94)	0.000
	Nurses	36.29% (n=45)	19.35% (n=24)	32.26% (n=40)		12.50% (n=2)	0% (n=0)	6.25% (n=1)		21.62% (n=72)	3.00% (n=10)	7.51% (n=25)	
	Allied HW	1.61% (n=2)	3.23% (n=4)	1.61% (n=2)		12.50% (n=2)	12.50% (n=2)	18.75% (n=3)		3.90% (n=13)	4.50% (n=15)	6.91% (n=23)	
HP performance appraisal system	Doctors	0.81% (n=1)	3.25% (n=4)	1.63% (n=2)	0.151	0% (n=0)	18.75% (n=3)	18.75% (n=3)	0.773	2.40% (n=8)	18.62% (n=62)	31.53% (n=105)	0.000
	Nurses	34.96% (n=43)	21.95% (n=27)	30.89% (n=38)		0% (n=0)	6.25% (n=1)	12.50% (n=2)		17.11% (n=57)	5.71% (n=19)	9.31% (n=31)	
	Allied HW	0.81% (n=1)	1.61% (n=2)	4.07% (n=5)		6.25% (n=1)	12.50% (n=2)	25.00% (n=4)		2.10% (n=7)	3.00% (n=10)	10.21% (n=34)	

Results obtained from a multinomial regression indicated that 6 dimensions were significantly associated with HP among health workers (Table 2). For medical doctors, four dimensions were observed to be significant in the final adjusted model. FRI dimensions observed to be predictors of HP among doctors were HP data available for evaluation (Coeff: 0.988, 95% CI: 0.369 – 1.607) and quality assessment program (Coeff: 0.787, 95% CI: 0.208 - 1.366), which were observe to be 0.99 and 0.79 times respectively, higher compared to nurses. Other FRI dimensions - Provision to access patients HP need (Coeff: -2.695, 95% CI: -3.942 - -1.448) and HP need assessment done at first contact with the hospital (Coeff: -0.751, 95% CI: -1.444 - -0.057,) were observed to be negative predictors of HP among medical doctors (Table 2).

HP data available for evaluation (Coeff: 0.954, 95% CI: 0.149 - 1.759) and HP structures and facilities required (Coeff:1.787, 95% CI: 0.488 - 3.087) were positively associated with HP among AHW. These factors were 0.75 and 1.8 times higher compared to nurses, respectively. On the other hand, HP Budget

(Coeff: -0.726, 95% CI: -1.361 - -0.091) and Provision to access patients HP need (Coeff: -1.798, 95% CI: -3.428 - -0.167) were negatively associated with HP practices among AHW (Table 2). The generalized Hosmer–Lemeshow test Chi-square was 16.13 with p-value 0.444, indicating a good fit of the final model.

Table 2: Facility Related Indicators' dimension associated with Health Promotion in a multivariate analysis

FRI dimensions	Professions	Coeff (unadjusted)	95% conf. interval	Coeff (adjusted)	95% conf. interval
HP Budget	Nurses (base outcome)				
	Doctors	0.293	-0.364 - 0.950	0.163	-0.422 - 0.747
	Allied workers	-0.805	-1.524 - -0.086	-0.726	-1.361 - -0.091
HP data available for evaluation	Nurses (base outcome)				
	Doctors	0.886	0.235 - 1.537	0.988	0.369 - 1.608
	Allied workers	1.113	0.205 - 2.022	0.954	0.149 - 1.759
HP Structures & Facilities required	Nurses (base outcome)				
	Doctors	0.944	0.122 - 1.765	0.563	-0.179 - 1.305
	Allied workers	1.742	0.404 - 3.081	1.787	0.488 - 3.087
Quality assessment program	Nurses (base outcome)				
	Doctors	0.642	0.001 - 1.283	0.787	0.208 - 1.366
	Allied workers	0.513	-0.248 - 1.274	0.573	-0.143 - 1.289
Prov to access HP need	Nurses (base outcome)				
	Doctors	-2.888	-4.244 - -1.532	-2.695	-3.942 - -1.448
	Allied workers	-1.814	-3.566 - 0.063	-1.798	-3.428 - -0.167
HP need assessment done at first contact with the hospital	Nurses (base outcome)				
	Doctors	-0.675	-1.409 - 0.060	-0.751	-1.444 - -0.057
	Allied workers	-0.814	-1.766 - 0.133	-0.789	-1.679 - 0.099

Health workers Related Indicator (HRI)

Ten dimensions comprising - education on disease condition, guidance on diet & lifestyle, need for routine check-up, adequate knowledge on patient condition, fitness and health screening, assist with welfare services, participation in HP training, coordinated HP training for staff, home visit, community-based placements, and follow up post discharge were associated with HP practice among HCWs (See Additional file 2). At health facility level, eight dimensions were statistically significant indicators of HP at tertiary level, three at the secondary level, and only one at the primary level (Table 3). The indicator dimensions that were statistically significant at the different healthcare levels are listed in Table 3.

Table 3: Correlations of Health workers Related Indicator Dimensions with level of health care Facility

HRI Dimensions	Responses	Primary Health Care Level				Secondary Health Care level				Tertiary Health care level			
		Doctors	Nurses	AHWs	P-value	Doctors	Nurses	AHWs	P-value	Doctors	Nurses	AHWs	P-value
Educate on disease condition	Strongly disagree	0% (n=0)	0% (n=0)	0% (n=0)	0.136	0% (n=0)	0% (n=0)	0% (n=0)	0.190	0.29% (n=1)	0.88% (n=3)	0.59% (n=2)	0.052
	Disagree	0% (n=0)	0% (n=0)	0% (n=0)		0% (n=0)	5.88% (n=1)	0% (n=0)		1.76% (n=6)	0.29% (n=1)	0% (n=0)	
	Neutral	0% (n=0)	1.57% (n=2)	0% (n=0)		0% (n=0)	0% (n=0)	5.88% (n=1)		3.81% (n=13)	1.17% (n=4)	0.59% (n=2)	
	Agree	00% (n=0)	27.56% (n=35)	0% (n=0)		23.53% (n=4)	5.88% (n=1)	5.88% (n=1)		24.05% (n=82)	10.85% (n=37)	6.16% (n=21)	
	Strongly agree	5.51% (n=7)	59.06% (n=75)	6.30% (n=8)		17.65% (n=3)	5.88% (n=1)	29.41% (n=5)		21.99% (n=75)	19.06% (n=65)	8.50% (n=29)	
Guidance on diet and lifestyle	Strongly disagree	0% (n=0)	0% (n=0)	0% (n=0)	0.389	0% (n=0)	0% (n=0)	0% (n=0)	0.356	0.59% (n=2)	0.88% (n=3)	0.29% (n=1)	0.000
	Disagree	0% (n=0)	0% (n=0)	0% (n=0)		0% (n=0)	0% (n=0)	0% (n=0)		4.41% (n=15)	0.29% (n=1)	0.29% (n=1)	
	Neutral	0% (n=0)	0% (n=0)	0% (n=0)		5.88% (n=1)	0% (n=0)	11.76% (n=2)		10.00% (n=34)	2.05% (n=7)	1.76% (n=6)	
	Agree	1.57% (n=2)	31.50% (n=40)	0.79% (n=1)		29.41% (n=5)	5.88% (n=1)	11.76% (n=2)		24.71% (n=84)	9.12% (n=31)	6.77% (n=23)	
	Strongly agree	3.94% (n=5)	56.69% (n=72)	5.51% (n=7)		5.88% (n=1)	11.76% (n=2)	17.65% (n=3)		12.35% (n=42)	20.00% (n=68)	6.47% (n=22)	
Need for routine checkup	Strongly disagree	0% (n=0)	0.79% (n=1)	0.79% (n=1)	0.426	0% (n=0)	0% (n=0)	0% (n=0)	0.505	0.89% (n=3)	0.89% (n=3)	1.48% (n=5)	0.000
	Disagree	0% (n=0)	0.79% (n=1)	0% (n=0)		0% (n=0)	0% (n=0)	0% (n=0)		2.37% (n=8)	1.18% (n=4)	0% (n=0)	
	Neutral	0% (n=0)	0.79% (n=1)	0% (n=0)		11.76% (n=2)	0% (n=0)	0% (n=0)		5.33% (n=18)	1.78% (n=6)	3.55% (n=12)	
	Agree	0.79% (n=1)	29.37% (n=37)	1.59% (n=2)		11.76% (n=2)	5.88% (n=1)	17.65% (n=3)		28.40% (n=96)	8.88% (n=30)	5.62% (n=19)	
	Strongly agree	4.76% (n=6)	56.35% (n=71)	3.97% (n=5)		17.65% (n=3)	11.76% (n=2)	23.53% (n=4)		15.09% (n=51)	19.23% (n=65)	5.32% (n=18)	
Adequate knowledge on patient condition	Strongly disagree	0% (n=0)	4.65% (n=6)	0% (n=0)	0.946	0% (n=0)	0% (n=0)	0% (n=0)	0.120	0.59% (n=2)	1.76% (n=6)	1.17% (n=4)	0.003
	Disagree	0% (n=0)	3.88% (n=5)	0% (n=0)		0% (n=0)	0% (n=0)	11.76% (n=2)		2.05% (n=7)	2.05% (n=7)	1.47% (n=5)	
	Neutral	0% (n=0)	4.65% (n=6)	0.78% (n=1)		0% (n=0)	0% (n=0)	11.76% (n=2)		5.57% (n=19)	2.64% (n=9)	1.76% (n=6)	
	Agree	3.10% (n=4)	40.31% (n=52)	3.10% (n=4)		41.18% (n=7)	17.65% (n=3)	11.76% (n=2)		33.43% (n=114)	14.08% (n=48)	6.74% (n=23)	
	Strongly agree	2.33% (n=3)	34.88% (n=45)	2.33% (n=3)		0% (n=0)	0% (n=0)	5.88% (n=1)		10.26% (n=35)	11.73% (n=40)	4.69% (n=16)	
Fitness and health screening	Strongly disagree	0% (n=0)	0% (n=0)	0% (n=0)	0.727	0% (n=0)	0% (n=0)	0% (n=0)	0.213	1.46% (n=5)	0% (n=0)	0.29% (n=1)	0.000
	Disagree	0% (n=0)	0% (n=0)	0% (n=0)		11.76% (n=2)	5.88% (n=1)	0% (n=0)		7.60% (n=26)	0.88% (n=3)	0.88% (n=3)	
	Neutral	0% (n=0)	7.75% (n=10)	0% (n=0)		0% (n=0)	5.88% (n=1)	0% (n=0)		14.62% (n=50)	2.34% (n=8)	6.14% (n=21)	
	Agree	3.88% (n=5)	51.16% (n=66)	4.65% (n=6)		23.53% (n=4)	5.88% (n=1)	29.41% (n=5)		23.68% (n=81)	18.13% (n=62)	6.73% (n=23)	
	Strongly agree	1.55% (n=2)	29.46% (n=38)	1.55% (n=2)		5.88% (n=1)	0% (n=0)	11.76% (n=2)		4.39% (n=15)	11.11% (n=38)	1.75% (n=6)	
Assist with welfare services	Strongly disagree	0% (n=0)	3.88% (n=5)	0% (n=0)	0.827	0% (n=0)	0% (n=0)	0% (n=0)	0.687	4.18% (n=14)	1.47% (n=5)	1.47% (n=5)	0.331
	Disagree	0.78% (n=1)	10.85% (n=14)	0% (n=0)		5.88% (n=1)	5.88% (n=1)	0% (n=0)		7.94% (n=27)	5.88% (n=20)	2.06% (n=7)	

	Neutral	2.33% (n=3)	20.16% (n=26)	2.33% (n=3)		5.88% (n=1)	5.88% (n=1)	5.88% (n=1)		13.53% (n=46)	5.59% (n=19)	4.41% (n=15)	
	Agree	2.33% (n=3)	41.09% (n=53)	3.10% (n=4)		17.65% (n=3)	5.88% (n=1)	17.65% (n=3)		21.18% (n=72)	13.24% (n=45)	5.29% (n=18)	
	Strongly agree	0% (n=0)	12.40% (n=16)	0.78% (n=1)		11.76% (n=2)	0% (n=0)	17.65% (n=3)		5.29% (n=18)	5.88% (n=20)	2.65% (n=9)	
Participated in HP training	No	3.20% (n=4)	44.80% (n=56)	4.80% (n=6)	0.408	29.41% (n=5)	12.50% (n=2)	29.41% (n=5)	0.827	34.34% (n=114)	20.78% (n=69)	6.02% (n=20)	0.001
	Yes	2.40% (n=3)	43.20% (n=54)	1.60% (n=2)		5.88% (n=1)	6.25% (n=1)	12.50% (n=2)		18.37% (n=61)	10.84% (n=36)	9.64% (n=32)	
Coordinated HP training for staff	No	3.20% (n=4)	52.00% (n=65)	4.00% (n=5)	0.976	37.50% (n=6)	6.25% (n=1)	31.25% (n=5)	0.090	48.50% (n=162)	20.06% (n=67)	13.17% (n=44)	0.000
	Yes	2.40% (n=3)	36.00% (n=45)	2.40% (n=3)		0% (n=0)	12.50% (n=2)	12.50% (n=2)		4.19% (n=14)	11.08% (n=37)	2.99% (n=10)	
Home visits	No	5.56% (n=7)	58.73% (n=74)	3.75% (n=4)	0.104	37.50% (n=6)	18.75% (n=3)	18.75% (n=3)	0.032	50.59% (n=171)	29.59% (n=100)	13.61% (n=46)	0.013
	Yes	0% (n=0)	29.37% (n=37)	3.75% (n=4)		0% (n=0)	0% (n=0)	25.00% (n=4)		1.48% (n=5)	2.66% (n=9)	2.07% (n=7)	
Community based placements	No	5.65% (n=7)	70.97% (n=88)	2.42% (n=3)	0.006	37.50% (n=6)	18.75% (n=3)	18.75% (n=3)	0.032	51.04% (n=172)	30.56% (n=103)	13.65% (n=46)	0.020
	Yes	0% (n=0)	16.94% (n=21)	4.03% (n=5)		0% (n=0)	0% (n=0)	25.00% (n=4)		1.19% (n=4)	1.78% (n=6)	1.78% (n=6)	
Follow up post discharge	No	1.65% (n=2)	30.58% (n=37)	0% (n=0)	0.162	0% (n=0)	18.75% (n=3)	0% (n=0)	0.000	20.35% (n=69)	23.60% (n=80)	4.42% (n=15)	0.000
	Yes	4.13% (n=5)	57.85% (n=70)	5.79% (n=7)		37.50% (n=6)	0% (n=0)	43.75% (n=7)		31.27% (n=106)	8.85% (n=30)	11.50% (n=39)	
Patient empowerment	No	5.60% (n=7)	76.00% (n=95)	4.80% (n=6)	0.370	37.50% (n=6)	18.75% (n=3)	31.25% (n=5)	0.230	48.51% (n=163)	30.06% (n=101)	14.58% (n=49)	0.687
	Yes	0% (n=0)	12.00% (n=15)	1.60% (n=2)		0% (n=0)	0% (n=0)	12.50% (n=2)		3.57% (n=12)	1.79% (n=6)	1.49% (n=5)	
Informs patient of risk factors	No	4.80% (n=6)	79.20% (n=99)	6.40% (n=8)	0.592	31.25% (n=5)	18.75% (n=3)	43.75% (n=7)	0.411	46.41% (n=155)	28.74% (n=96)	13.77% (n=46)	0.175
	Yes	0% (n=0)	0% (n=0)	0% (n=0)		6.25% (n=1)	0% (n=0)	0% (n=0)		1.50% (n=5)	2.69% (n=9)	0.60% (n=2)	
	I don't know	0.80% (n=1)	8.80% (n=11)	0% (n=0)		0% (n=0)	0% (n=0)	0% (n=0)		3.59% (n=12)	1.50% (n=4)	1.50% (n=5)	

A total of ten HRI dimensions were significantly associated with HP among HCW (Table 4). Among the medical doctors, significant positive predictors of HP among the HRI dimensions were education on disease condition (Coeff: 2.273, 95% CI 1.393 - 3.710), guidance on diet and lifestyle (Coeff: 0.361, 95% CI 0.228 - 0.570), fitness and health screening (Coeff: 0.325, 95% CI 0.224 - 0.474), coordinated HP training for staff (Coeff: 0.216, 95% CI 0.106 - 0.441), home visits (Coeff: 0.141, 95% CI 0.039 - 0.501), and follow up post discharge (Coeff: 2.743, 95% CI 1.618 - 4.648) and patient empowerment (Coeff: 3.919, 95% CI 1.102 - 13.931). Furthermore, seven significant dimensions predictors of HRI emerged among AHW. These included - education on disease condition (Coeff: 2.117, 95% CI 1.107 - 4.048) and community-based placements (Coeff: 3.914, 95% CI 1.147 - 13.351) (Table 4). Other dimensions that were significant predictors of HP compared to nurses were need for routine check-up (Coeff: 0.564, 95% CI 0.389 - 0.818) Fitness and health screening (Coeff: 0.448, 95% CI 0.389 - 0.818) and (Coeff: 1.977, 95% CI 1.018 - 3.838). The adjusted multivariable model adequately fit the data (Generalized Hosmer-Lemeshow goodness-of-fit test statistic = 17.32, df. = 16, $p = 0.365$).

Table 4: Healthcare Workers Related Indicators' dimensions associated with Health Promotion in a multivariate analysis

Dimensions	Professions	Coeff (unadjusted)	95% conf. interval	Coeff (adjusted)	95% conf. interval
Education on disease condition	Nurses (base outcome)				
	Doctors	2.270	1.358 - 3.796	2.273	1.393 - 3.710
	Allied HW	2.291	1.176 - 4.462	2.117	1.107 - 4.048
Guidance on diet and lifestyle	Nurses (base outcome)				
	Doctors	0.347	0.216 - 0.559	0.361	0.228 - 0.570
	Allied HW	0.581	0.318 - 1.062	0.640	0.356 - 1.153
Need for routine check-up	Nurses (base outcome)				
	Doctors	0.990	0.670 - 1.464	1.048	0.717 - 1.532
	Allied HW	0.560	0.383 - 0.821	0.564	0.389 - 0.818
Fitness and health screening	Nurses (base outcome)				
	Doctors	0.304	0.204 - 0.453	0.325	0.224 - 0.474
	Allied HW	0.463	0.291 - 0.732	0.448	0.291 - 0.689
Participated in HP training	Nurses (base outcome)				
	Doctors	1.109	0.634 - 1.942	1.130	0.653 - 1.955
	Allied HW	2.099	1.073 - 4.108	1.977	1.018 - 3.838
Coordinated HP training for staff	Nurses (base outcome)				
	Doctors	0.193	0.092 - 0.406	0.216	0.106 - 0.441
	Allied HW	0.273	0.116 - 0.640	0.318	0.140 - 0.721
Home visits	Nurses (base outcome)				
	Doctors	0.114	0.030 - 0.429	0.141	0.039 - 0.501
	Allied HW	0.296	0.086 - 1.023	0.404	0.128 - 1.275
Community based placements	Nurses (base outcome)				
	Doctors	0.472	0.104 - 2.134	0.399	0.090 - 1.772
	Allied HW	4.848	1.343 - 17.502	3.914	1.147 - 13.351
Follow up post discharge	Nurses (base outcome)				
	Doctors	2.513	1.458 - 4.331	2.743	1.618 - 4.648
	Allied HW	5.154	2.354 - 11.287	5.005	2.350 - 10.660
Patient empowerment	Nurses (base outcome)				
	Doctors	4.811	1.294 - 17.886	3.919	1.102 - 13.931
	Allied HW	1.007	0.295 - 3.442	0.829	0.247 - 2.777

Outcome Related Indicator (ORI)

Eight indicator dimensions focussing on outcome related indicator were identified. The dimensions that were statistically significant in the study area were reduction of number of diseases, reduction of number of disabilities, and reduced health inequities. Others are improved needs assessments and improved community participation and mobilization (See Additional file 3). Further analysis at the facility levels showed that three indicator dimensions; reduction of number of diseases, reduction of number of disabilities and improved need assessment were statistically significant at the tertiary healthcare level. However, no indicator dimensions were statistically significant at both primary and secondary healthcare levels (Table 5).

Table 5: Correlations of Outcome Related Indicator Dimensions with level of health care Facility

ORI Dimensions	Responses	Primary Health Care level				Secondary Health Care level				Tertiary Health care level			
		Doctors	Nurses	AHWs	<i>p-value</i>	Doctors	Nurses	AHWs	<i>P-value</i>	Doctors	Nurses	AHWs	<i>p-value</i>
Coverage of target population	No	3.96% (n=4)	33.66% (n=34)	3.96% (n=4)	0.171	11.11% (n=1)	22.22% (n=2)	22.22% (n=2)	0.325	34.05% (n=63)	23.78% (n=44)	10.81% (n=20)	0.440
	Yes	1.98% (n=2)	54.55% (n=55)	1.98% (n=2)		22.22% (n=2)	0.00% (n=0)	22.22% (n=2)		16.76% (n=31)	8.11% (n=15)	6.49% (n=12)	
Reduction of number of deaths	No	4.95% (n=5)	48.51% (n=49)	29.70% (n=3)	0.380	0.00% (n=0)	11.11% (n=1)	22.22% (n=2)	0.325	20.00% (n=38)	13.16% (n=25)	10.53% (n=20)	0.096
	Yes	0.99% (n=1)	39.60% (n=40)	29.70% (n=3)		33.33% (n=3)	11.11% (n=1)	22.22% (n=2)		30.53% (n=58)	18.95% (n=36)	6.84% (n=13)	
Reduction of number of diseases	No	29.70% (n=3)	41.58% (n=42)	29.70% (n=3)	0.983	0.00% (n=0)	11.11% (n=1)	33.33% (n=3)	0.140	15.34% (n=29)	16.40% (n=31)	10.05% (n=19)	0.006
	Yes	29.70% (n=3)	46.53% (n=47)	29.70% (n=3)		33.33% (n=3)	11.11% (n=1)	11.11% (n=1)		34.92% (n=66)	15.87% (n=30)	7.41% (n=14)	
Reduction of number of injuries	No	4.95% (n=5)	59.41% (n=60)	3.96% (n=4)	0.717	11.11% (n=1)	11.11% (n=1)	33.33% (n=3)	0.539	31.74% (n=60)	16.93% (n=32)	12.70% (n=24)	0.138
	Yes	0.99% (n=1)	28.71% (n=29)	1.98% (n=2)		22.22% (n=2)	11.11% (n=1)	11.11% (n=1)		18.52% (n=35)	15.34% (n=29)	4.76% (n=9)	
Reduction of number of disabilities	No	3.96% (n=4)	62.38% (n=63)	1.98% (n=2)	0.161	11.11% (n=1)	22.22% (n=2)	44.44% (n=4)	0.076	28.57% (n=54)	25.40% (n=48)	12.70% (n=24)	0.013
	Yes	1.98% (n=2)	25.74% (n=26)	3.96% (n=4)		22.22% (n=2)	0.00% (n=0)	0.00% (n=0)		21.69% (n=41)	6.88% (n=13)	4.76% (n=9)	
Reduce health inequities	No	29.70% (n=3)	50.50% (n=51)	4.95% (n=5)	0.416	11.11% (n=1)	22.22% (n=2)	44.44% (n=4)	0.076	37.04% (n=70)	20.63% (n=39)	14.81% (n=28)	0.089
	Yes	29.70% (n=3)	37.62% (n=38)	0.99% (n=1)		22.22% (n=2)	0.00% (n=0)	0.00% (n=0)		13.23% (n=25)	11.64% (n=22)	2.65% (n=5)	
Improved needs assessments	No	4.00% (n=4)	51% (n=51)	5% (n=5)	0.444	22.22% (n=2)	0.00% (n=0)	33.33% (n=3)	0.196	41.27% (n=78)	20.11% (n=38)	11.11% (n=21)	0.012
	Yes	2% (n=2)	37% (n=37)	1% (n=1)		11.11% (n=1)	22.22% (n=2)	11.11% (n=1)		8.99% (n=17)	12.17% (n=23)	6.35% (n=12)	
Improved community participation and mobilization	No	4.95% (n=5)	42.57% (n=43)	1.98% (n=2)	0.180	11.11% (n=1)	22.22% (n=2)	44.44% (n=4)	0.076	37.76% (n=71)	24.47% (n=46)	9.57% (n=18)	0.099
	Yes	0.99% (n=1)	45.54% (n=46)	3.96% (n=4)		22.22% (n=2)	0	0		12.76% (n=24)	7.98% (n=15)	7.44% (n=14)	

Five dimensions were identified in the unadjusted and adjusted models for medical doctors (Table 6). The significant dimensions for medical doctors include reduction of number of diseases (Coeff 3.151, 95% CI 1.643 - 6.041), reduction of number of injuries (Coeff 0.412, 95% CI 0.191 - 0.886), Reduction of number of disabilities (Coeff 4.497, 95% CI 2.084 - 9.705), reduced health inequities (Coeff 0.424, 95% CI 0.215 - 0.835), and Improved needs assessments (Coeff 0.319, 95% CI 0.164 - 0.620). Among AHWs, 2 predictors each were significant for the unadjusted and adjusted models respectively and include - reduction of number of disabilities, (Coeff 3.522, 95% CI 1.333 - 9.304), and reduced health inequities (Coeff 0.181, 95% CI 0.063 - 0.524). The generalized Hosmer–Lemeshow test Chi-square was 8.47 with *p*-value 0.933, indicating a good fit of the final model.

Table 6: Outcome Related Indicators' (ORI) dimension associated with Health Promotion in a multivariate analysis

ORI Dimensions		Coeff (unadjusted)	95% conf. interval	Coeff (adjusted)	95% conf. interval
	Professions				
Reduction of number of diseases	Nurses (base outcome)				
	Doctors	2.869	1.466 - 5.615	3.151	1.643 - 6.041
	Allied HW	1.135	0.469 - 2.745	1.014	0.439 - 2.344
Reduction of number of injuries	Nurses (base outcome)				
	Doctors	0.391	0.177 - 0.866	0.412	0.191 - 0.886
	Allied HW	0.520	0.185 - 1.461	0.535	0.199 - 1.434
Reduction of number of disabilities	Nurses (base outcome)				
	Doctors	4.829	2.198 - 10.612	4.497	2.084 - 9.705
	Allied HW	3.554	1.297 - 9.739	3.522	1.333 - 9.304
Reduced health inequities	Nurses (base outcome)				
	Doctors	0.488	0.246 - 0.969	0.424	0.215 - 0.835
	Allied HW	0.145	0.046 - 0.464	0.181	0.063 - 0.524
Improved needs assessments	Nurses (base outcome)				
	Doctors	0.378	0.189 - 0.756	0.319	0.164 - 0.620
	Allied HW	1.019	0.451 - 2.305	0.986	0.454 - 2.140

Discussion

This study was aimed at identifying indicators for HP practice among HCWs from different health care levels in the NMBM, South Africa. We identified three indicator categories that may be used for measuring health promotion (HP) performance of HCWs: (1) facility related indicators (FRI), (2) Healthcare workers related indicators (HRI), and (3) Outcome related indicators (ORI). Association between dimensions and HCWs identified significant FRI dimensions including HP budget, HP communication channel, coordination, and policy and guidelines. Some of the emerging HRI dimensions included guidance on diet & lifestyle, adequate knowledge on patient condition, follow up and home visits; and ORI dimensions such as reductions in diseases and disabilities, health inequities and improved need assessment. Exploration of relationships between dimensions and various levels of health facilities revealed correlations between HCWs, policy and guidelines at the primary healthcare level. The results further showed association between HCWs and community-based placement (CBP) at the primary level; and HCWs with CBP, home visits and follow up at the secondary level.

The indicators explored in the current study are selected measures or dimensions pointing to adequacy or inadequacy (27) of HP quality. Most respondents in this study reported absence or ignorance of both communication channel and HP coordination in their facilities; The absence of these dimensions could affect the optimal functioning of HP within the health care system. Our results are in concordance with previous reports that have linked the adequate and established channels of communication from within the organization to enhanced health promotion. For instance, Fassl (28) showed that organizations and work environment thrive when leaders adopt effective channels of communication. This also suggests that the success of the organizations and work environment are dependent on the availability of effective leaders that are skilled and confident to transform the vision into reality for improved public health. Hao & Yazdanifard (29) also concluded that leadership and a clear organization are vital for successful operations (29). To enhance the realization of dimension that improve health promotions, there is need for increased coordination and effective channel of communication. According to Mohr et al (30), enhanced care coordination is largely attributed to favourable patient experiences, cost management and cost effectiveness. This further suggests that FRI has the potential to influence other indicator categories.

Budget was another significant FRI dimension identified in our study. In South Africa, the public health system is funded through the general tax revenue to provide universal coverage to all citizens. Our results showed that participants emphasized the importance of financial allocation through adequate HP budgets. However, most of the respondents reported absence or unawareness of any financial budget for HP activities in the study area. Furthermore, the health system which is dependent on general tax revenue has also been affected by severe austerity measures leading to ineffective functioning of public hospitals. This also may affect the implementation of health promotion policies thus having long term implications on the disease prevention and health promotion outcomes. Financial budget is an all-important driver of health at all levels of care (31–33). This unfavourable response on HP budget may imply a possible lack of structural plan for HP at the policy level or lack of understanding of the potentially accruable benefits from HP.

This study further highlighted low involvement in HP induction training by medical doctors and AHW. The observed low or absence of HP induction training reported by the HCWs may translate to poor HP knowledge by HCWs hence, inadequate HP practices. A recent study by Liu et al (34), which explored the experiences of health-care providers during the COVID-19 crisis in China emphasised the impact of training in enhancing the communication skills and preparedness of HCWs in healthcare management. Furthermore, previous studies reported significant improvement in confidence, knowledge and attitude of employers following a workplace health promotion training programme (35). Health care workers' poor participation in HP training or unawareness of its

existence in their facilities, may suggest inadequate awareness of HP programmes in the study area. This compares well with findings from a previous study which showed poor HP awareness among HCWs in the facilities (36). However, regarding educating patients on their disease condition, all HCWs fared well in this dimension. This may be because most information communicated to patient in this dimension focuses on biomedical evidence which forms part of the core professional training and not necessarily on HP. Most of the medical doctors and AHW reported absence or ignorance of HP guidelines and policy in their facilities. The observed poor participation in HP practices among HCWs in the study area may be due to lack of or inadequate HP guidelines and policy. A recent study observed that poor knowledge of HP policy among most HCWs may contribute to poor HP practice among HCWs (37). This emphasizes the need for HCWs to have standardized guideline, policy, and programme appraisal to ensure efficient HP practices by HCWs at all levels.

Findings from the study further showed that HCWs responses regarding home visits to promote patients' health was poor. A previous study showed that most physicians indicated that home care should be provided to patients who are bedridden, incapacitated or patients lacking family support (38). According to these authors, the physicians who participated in the study showed dissatisfaction concerning abuse of services suggesting the need for defined guidelines and policy to protect the interest of both patients and HCWs. Our findings corroborate with a study done in Canada which showed a very good rate of patients' follow-up post discharge (39). However, the Canadian study reported a higher rate of follow-up of patients from bigger urban settings compared to those from the rural areas. The variations observed between home visits and follow-up in our study may suggest that most patients make conscious effort to come back to the hospital, and when they do, they must be attended to. The problem with this is that several patients may be unable to come back to the hospital due to cost, poor health, or other reasons and are therefore excluded from HP care and empowerment. This undermines the goal of Universal Health Care (UHC). For the agenda of UHC to be achieved, there must be a shift from the status quo that focuses only on patients visiting the health care facilities to HCWs visiting patients (40).

Furthermore, reduction in disease and disability were identified as HP outcome measures in the current study. This compares well with a previous study in which Maredza et al (41) showed that the best approach to reduce the burden of stroke is through HP. Reduction in health inequity also emerged as a dimension in measuring HP outcomes and this may be traceable to the historical apartheid background of South Africa that demarcated people along racial lines. The socioeconomic impact of this systemic divide is still evident in the South African healthcare system (42) as the quality of care differs along socioeconomic strata.

To our knowledge, this study is the first to identify HP indicators among healthcare workers in the study area and this is the first time a comparison of HP indicators among HCWs have been compared among different healthcare professionals and at the various levels of health care facilities.

Since this study focused on public hospitals, its findings may have limitations to provide information regarding the private sector. Furthermore, the study was carried out in one municipality and hence the results may not be directly extrapolated to all other municipalities in the country. We therefore recommend further studies to explore the healthcare workers HP practices and perceptions using triangulation methods and possibly in other provinces in South Africa to providing further insight.

Conclusion

Healthcare systems worldwide are increasingly embracing health promotion as a strategy to attaining universal health coverage. Performance measurement of healthcare workers' health promotion practice using a set of indicators is central to achieving desired goals. Our study has not only identified these indicators but highlighted areas that need improvement. The relevance of individual dimensions classified as FRI, HRI and ORI in this study provides a template for the potentials in healthcare workers to be maximally harnessed. Adoption of these indicators will empower people to take control over their health while reducing cost. Since healthcare workers within health facilities have lasting impact on influencing patients and their relatives' behaviour, this study strives to make a case for HP in healthcare facilities.

We however note that the pathway to institutionalizing measuring indicators may be a long one considering the rigours required of government to address manpower needs, deliberations, setting benchmarks, and defining expected goals for HCWs. This study is therefore a contribution towards initiation of that change process.

Abbreviations

HP: Health Promotion; HCWs: Healthcare workers; NMBM: Nelson Mandela Bay Municipality, HPCSA: Health Professions Council of South Africa; FRI: Facility relate indicators; HRI: Healthcare worker related indicators; ORI: Outcome related indicators; OECD: Organisation for Economic Co-operation and Development; HP: Health Promotion; LMIC: Low and Middle Income Countries; WHO: World Health Organization; SDG: Sustainable Development Goals; AHW: Allied Health workers; UHC: Universal Health coverage; CBP: community-based placement; NDoH: National Department of Health.

Declarations

Ethics approval and consent to participate

The study prior to data collected received ethical approvals from the University of KwaZulu Natal Biomedical Research Ethics committee (BREC), reference – BREC /00000088/2019, and the Eastern Cape Health Research committee, reference – EC_201910_012. Gatekeeper approvals were obtained from the respective Healthcare facilities. A written informed consent was received from all the participants before proceeding with the study.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

HM conceived the study idea, conducted proposal writing, data collection and prepared the manuscript. MC is the project supervisor and contributed to subsequent revisions of manuscript. CK analysed the data and contributed to revisions of the manuscript. All authors approved the final manuscript.

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Figures

Figure 1

Sampling methodology of Healthcare workers in the NMBM

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