Original Article

Knowledge of Cochrane, evidence-based medicine and the Cochrane Library at Defence Force Medical Services: a baseline cross-sectional survey among military health personnel in Zambia

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ABSTRACT

Objectives: Evidence-based medicine (EBM) is a core competency for all healthcare professions including military healthcare personnel. We surveyed military health personnel knowledge and experience with Cochrane, EBM and the Cochrane Library at Defence Force Medical Services in Zambia.

Materials and Methods: During May 2013 and March 2014, we used a pretested self-administered survey to collect data from the study participants. Categorical associations was tested by Chi-squared or Fisher's exact test. The strength of association between categorical variables was expressed using odds ratio (OR) with 95% confidence interval (CI).

Results: The overall participation rate was 92% (57/62). The sample consisted of doctors, nurses, clinical officers, medical licentiates and other professions. Nearly 44% worked in military clinics, 28% hospitals, 23% head office and 5% in training schools. Most (79%) of respondents have heard of EBM, but 84% had low knowledge and 88% lacked EBM training. Nearly 77% agreed that EBM was useful in clinical practice, 98% showed interest in EBM training and 46% declared workplace EBM promotion. Awareness about Cochrane was 53% and only two recognized Cochrane South Africa as their reference centre. Awareness and usage of the Cochrane Library was generally very poor and only one knew the database. Medical doctors were roughly five times more likely to cite organizational barriers to the Cochrane Library compared to nurses and clinical officers (Adjusted OR=5.19, 95% CI, 1.15–23.52, P=0.03).

Conclusions: Military medical personnel encounter considerable barriers to adopt EBM in clinical practice. Addressing their multifaceted barriers would facilitate the delivery of evidence-based healthcare and improve patient outcomes.

INTRODUCTION

Evidence-based medicine (EBM) is gaining global recognition by becoming part of medical practice and medical education.[1,2] The EBM refers to the integration of clinical expertise with the best research evidence, and patient values and preferences.[3] Informed clinical decision using the best available evidence has considerable benefits in

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Keywords: *Evidence-based medicine, Cochrane, Cochrane Library, barriers, military healthcare practitioners, Zambia*

clinical practice. It improves the quality of care, patient outcomes, makes the most rational use of scarce resources and treatment cost-effective.[4,5] It also reduces harmful and ineffective practices and bridges the gap between best practice and traditional care.[4,5]

Learning and applying EBM in clinical practice is a core competency for all healthcare professionals and recommended in medical education.[6–8] In Africa, clinicians lack EBM knowledge and skills, as it is not part of medical training.[9, 10] Many hurdles to EBM practice also exist in the workplace such as poor Information Communication and Technology infrastructure limiting access to information from online EBM clinical resources. There are also additional challenges to EBM in the public healthcare system in Africa.[11–21] This was the rationale for launching the 2012 Kigali declaration to improve EBM dissemination in healthcare systems and medical education.[9, 10]

In Africa, research is limited on military healthcare professionals' EBM knowledge and use of EBM resources to inform clinical practice. The qualitative study by Abdulwadud et al. was the only one to assess and report the relevance and barriers to EBM in military medical personnel in the Defence Force Medical Services *(DFMS)* in Zambia.[17] The *DFMS* is a large military healthcare organization serving the Zambian Army, Zambia Air Force and the Zambian National Service.[22] It also employees medical and allied health professionals, and manages a network of 54 healthcare facilities ranging from hospitals, clinics to training schools to serve military employees, their families and surrounding civilian communities.[23] We conducted a survey of military medical personnel to evaluate their awareness and experiences regarding Cochrane, EBM, and the Cochrane Library in Zambia.

METHODS

Study design and settings

Between May 2013 and March 2014, the American International Health Alliance (AIHA) delivered EBM training for military staff aimed to develop their capacity to practice EBM. As part of the training program*,* we conducted a cross-sectional survey to establish baseline data about the participants. Since 2005, the AIHA through PEPFAR funding and support from US Department of Defence has helped the DFMS in healthcare workforce development, health system strengthening, and institutional capacity building.[24] It has also set-up 15 Learning Resource Centres (Knowledge Management Centres) to ease access to EBM resources.[25]

Study Participants

They were military medical doctors, clinical officers (COs), medical licentiates (MLs), nurses, and other professions. They work in military hospitals, clinics, training schools and head offices, as well as represented various military ranks and geographical locations. The COs are trained in medical model for 3-4 years post-secondary education and perform general or specialized medical services and routine procedures. The MLs have advanced medicine and surgery training and work in rural military district hospitals. The COs and MLs are registered, licensed, and regulated by Health Professions Council of Zambia.[26] Registered nurses graduate from nursing schools and regulated by the General Nursing Council of Zambia.

Survey instrument

We adopted a survey designed by Cochrane South Arica (CSA), a regional Cochrane Centre for Africa in Cape Town.[27] The pretested self-administered survey had satisfactory internal consistency (Cronbach's alpha=0.78) and collected demographic data, EBM parameters, awareness of Cochrane and the Cochrane Library (CL). Six items in the survey assessed EBM domains: awareness (Yes/No), baseline knowledge level (none, poor, average, good, very good, excellent), prior training (Yes/No), perceived benefits in clinical practice (Yes/No/Don't know), workplace promotion (Yes/No/Don't know), and interest in EBM training (Yes/No/Don't know). Awareness of Cochrane was assessed using

(Yes/No/Don't know) responses. Familiarity with Cochrane regional centre for Africa was measured by (CSA/do not know) responses. Zambia has one-click free access to the CL.[28] Awareness of the CL measured by (Yes/No/Don't know) and method of accessing by (Free access, restricted to institutional or personal subscription, other, do not know). Two open-ended items evaluated respondents' barriers and facilitators (enablers) to the CL in the workplace.

Operational definitions

EBM knowledge level: Responses of participants were subjectively categorised as low and high. A response of "good", "very good" or "excellent" signified a high knowledge and a response of "none", "poor" or "average" represented a low knowledge.

Barriers to the Cochrane Library: We grouped perceived barriers as personal and organizational. Personal barriers included lack of awareness of the CL or lack of training in searching. Organizational barriers covered poor infrastructure, shortage of resources like computers, lack of access to online information and other hitches in the workplace.

Age group: The age groups of ≤30, 31-40, 41-50 and >50 years were collapsed into two age groups (≤40 years, ≥41 years).

Responses: We combined the responses of three professions (dental therapist, dispenser and researcher) with nurses, and those of five MLs with COs.

Data analysis

The survey data checked, entered and analyzed by IBM SPSS statistics for Windows (V 20.0). We used descriptive data analysis for closed-format responses, and open-format responses were classified thematically to identify key response categories. To evaluate categorical variables univariate associations, Chi-squared (Fisher's exact) test was applied. Bivariate and multivariate analyses evaluated the relationship between covariates and barrier types to the Cochrane Library and results were expressed using odds ratios with 95% confidence interval.

RESULTS

Participation and demographic details

Of the total 62 eligible participants who attended the EBM training, 57 completed and returned the survey (participation rate 92%). The majority were males and aged ≤40 years old. The study sample consisted of doctors, nurses, clinical officers (COs), medical licentiates (MLs), and three other professions (dental therapist, dispenser and researcher), and drawn from different military clinics, hospitals, head office and training schools (Table 1). About 37% spoke English as first language, 25% Bemba or Lozi, 18% Nyanja or Tonga, and 20% spoke nine other local languages.

Table 1: Selected demographic characteristics of military medical personnel, by profession, gender, age group and place of work, Zambia

Profession	Gender n (%)*		Age group (Yrs) n (%)*		Place of work n (%)*			
	Male	Female	≤40	≥41	Clinic	Hospital	Head office	Training school
Doctor	17 (45)	2 (11)	14 (36)	5 (28)	4 (16)	9 (56)	6 (46)	0 (0)
CO[†]	9 (24)	4 (21)	12 (31)	1 (6)	10 (40)	2 (13)	1 (8)	0 (0)
ML[§]	5 (13)	0 (0)	1 (3)	4 (22)	1 (4)	1 (6)	1 (8)	2 (67)
Nurse	4 (11)	13 (68)	10 (26)	7 (39)	7 (28)	4 (25)	5 (38)	1 (33)
Other[‡]	3 (8)	0 (0)	2 (5)	1 (6)	3 (12)	0 (0)	0 (0)	0 (0)
Total	**38 (67)**	**19 (33)**	**39 (68)**	**18 (32)**	**25 (44)**	**16 (28)**	**13 (23)**	**3 (5)**

*Percentages rounded to the nearest whole number   [†] Clinical Officers   [§] Medical Licentiate

[‡] include dental therapist, dispenser and a researcher

Awareness, knowledge and attitude towards evidence-based medicine

Close to 79% have heard of EBM and 21% have not. Awareness of EBM was 95% in doctors, 65% nurses and 78% COs, with no significant differences (*P*=0.07). Only 12% had attended EBM training and 88% did not. About 21% of doctors, 5% nurse and 11% of COs had attended prior EBM training (*P*=0.32). Overall, 74% of respondents had positive attitude and agreed that EBM was beneficial in the management of patients in clinical practice, while 26% differed. This response did not vary between doctors (89%), nurses (75%) and COs (56%) (*P*=0.07). About 46% of respondents reported workplace EBM promotion and 54% disagreed or not sure. Doctors (63%), nurses (35%) and Cos (39%) gave comparable responses about workplace EBM promotion (X²=3.59, df=2, *P*=0.17). The majority (98%) were eager to attend EBM training. All doctors, 95% nurses and all COs showed enthusiasm to attend EBM training, with no statistically significant difference in their responses (*P*=0.87).

As shown in Figure 1, no respondent assessed baseline EBM knowledge as excellent. However, 45% of respondents rated their knowledge level as illiterate or poor, 39% average and 16% as good or very good. None of the doctors, 25% of nurses and 33% of COs alleged that they were EBM illiterate (*P*=0.02). Their self-assessment of EBM knowledge was significantly associated with believing in utility of EBM in clinical practice (*P*<0.001) and with the assertion that EBM was promoted in workplace (*P*=0.002). However, EBM knowledge assessment was not associated with age group, gender, EBM course attendance, awareness of Cochrane or interest in EBM course. Using respondents' responses, 16% had a high EBM knowledge and 84% a low EBM knowledge. Significantly more doctors (37%) than COs (11%) and nurses (0%) were judged to have high knowledge (*P*=0.003).
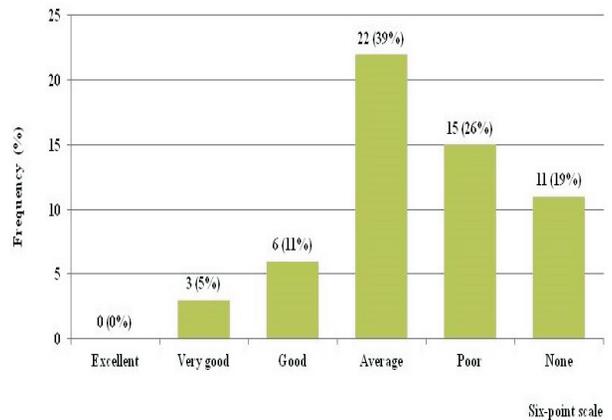

Fig 1: Military health personnel self-assessment of baseline EBM lnowledge level

Awareness about the Cochrane Collaboration

Awareness of Cochrane was only 53% and 47% were unaware. Close to 37% first heard of Cochrane from supervisors or internet sites, 47% colleagues or conferences, and 17% from journal articles or training. Almost 74% doctors, 30% nurses and 56% of COs have heard of Cochrane, signifying more doctors were familiar with Cochrane (X²=7.55, df=2, *P*=0.02). In the follow-up question, we asked respondents to name the Cochrane reference centre for Zambia. Two doctors recognised Cochrane South Africa and the majority (96%) did not.

Knowledge of the Cochrane Library

Only one male medical licentiate (ML) knew Zambia has one-click free access to the Cochrane Library and the large majority (98%) were unaware. Nearly 19% felt the database was restricted to subscriptions and 45 (79%) had no idea. The ML with awareness of the database did not either use the database in clinical practice.

Perceived barriers to the Cochrane Library in the workplace

The majority (88%) described various types of barriers to awareness and use of the Cochrane Library. Most (65%) cited personal level barriers and 35% organizational barriers. The main personal

barriers stated were lack of knowledge (awareness) about the database (98%) and not having training in searching (33%). Respondents described their hitches as follows: the database was unknown to health workers and not used in clinical practice; do not know about the database; never heard of the database; do not have it in workplace; and the database is not accessible to higher health institutions in Zambia. As to organizational barriers, 51% of respondents assumed poor infrastructure and 20% alleged scarce resources in the workplace (e.g. computers, resource centre), overcrowding and shortage of space.

Proposed enablers to enhance awareness and use of the Cochrane Library

To overcome personal hurdles and enhance the use of the database, 42% of respondents proposed creating and raising awareness among healthcare professionals in Zambia, 37% wanted skill building training in the use of the database, and 21% suggested teaching the database in higher educational institutions in Zambia. To deal with their organizational difficulties, 35% of respondents recommended upgrading the workplace information communication and technology infrastructure to improve access to online health information, 16% wanted computers and resource centres to be accessible at workplace, 5% addressing workplace overcrowding by expanding the sites, and 4% promoting the use of smart phones. Additional suggestions included organising training in research methods and data analysis, as well as strengthening the research team in DFMS.

Factors associated with perceived barriers to the Cochrane Library

Perceived types of barriers to the Cochrane Library (CL) were associated with professions and marginally with awareness of Cochrane (Table 2). Organizational barriers perceived by doctors was higher compared to nurses and COs (x^2=9.88, df=2, P=0.007). Equally, those with awareness of Cochrane were slightly more likely to state

organizational barriers to the CL than those lacking awareness (x^2=3.73, df=1, P=0.05). No relationships between barrier types and gender (x^2=0.96, df=1, P=0.33), age (x^2=0.04, df=1, P=0.85), perceived EBM benefits (x^2=0.22, df=1, P=0.64), and workplace EBM promotion (x^2=0.39, df=1, P=0.53).

Table 2: Factors associated with barriers to the Cochrane Library among military medical personnel, Zambia

Characteristics	Total (%)[a]	Barrier types perceived		P value
		Personal related no. (%)[a]	Organizational related no. (%)[a]	
Age (Years)				
≤40	39 (68)	25 (68)	14 (70)	0.85
≥41	18 (32)	12 (32)	6 (30)	
Gender				
Female	19 (33)	14 (38)	5 (25)	0.33
Male	38 (67)	23 (62)	15 (75)	
Workplace				
Clinic	25 (44)	17 (46)	8 (40)	
Hospital	16 (28)	10 (27)	6 (30)	0.94
Head office	13 (23)	8 (22)	5 (25)	
Training School	3 (5)	2 (5)	1 (5)	
Profession				
Nurse[‡]	20 (35)	16 (43)	4 (20)	0.007
Medical doctor	19 (33)	7 (19)	12 (60)	
Clinical Officer[†]	18 (32)	14 (38)	4 (20)	
Aware of Cochrane				
No	27 (47)	21 (57)	6 (30)	0.054
Yes	30 (53)	16 (43)	14 (70)	

[a] percentages rounded to the nearest whole number

[‡] included dental therapist, dispenser and a researcher

[†] included five medical licentiates

As shown in Table 3, perceived type of barriers to the CL was significantly associated with profession, and slightly with awareness of Cochrane. After controlling for awareness of Cochrane, profession was the only predictor of barrier type to the CL. Explicitly, medical doctors were 5.19 times more likely to report organizational barrier to the CL at workplace compared to nurses and clinical officers.

Table 3: Bivariate and multivariate analysis of factors associated with barriers to the Cochrane Library among military health personnel, Zambia

Characteristics	Multiple logistic regression analysis			
	Crude OR[a] (95% CI[b])	*P* value	Adjusted OR[a] (95% CI[b])	*P* value
Profession				
Nurses[‡]	1.0 [c]	-	1.0[c]	-
Medical doctor	6.86 (1.63-28.89)	0.009	5.19 (1.15 – 23.52)	0.03
Clinical Officer[†]	1.14 (0.24-5.44)	0.87	0.94 (0.19 – 4.73)	0.94
Aware of Cochrane				
No	1.0[c]	-	1.0[c]	-
Yes	3.06 (0.96-9.74)	0.05	2.11 (0.58-7.62)	0.26

[a] odds ratio   [b] Confidence interval   [c] Reference category

[‡] included dental therapist, dispenser, researcher   [†] include 5 medical licentiates

DISCUSSIONS

This baseline survey assessed military medical personnel knowledge and experience with Cochrane, EBM, and the Cochrane Library in Zambian Defence Force Medical Services (DFMS). Their attitude towards EBM was good and most believed that EBM was helpful in clinical practice. These findings are consistent with the literature.[13,15,19,21] Most (79%) have heard of EBM, but 84% had low EBM knowledge and 88% lacked EBM training. Although there are no similar studies of military health personnel in Africa, our results concur with other studies in the region.[11, 18, 19, 21, 29] Such evidence confirms that most of DFMS staffs never been exposed to EBM during their trainings. Shortage of EBM knowledge and skills can hinder adopting EBM in clinical setting. Learning EBM develops performance and skills to formulate a clinical question as well as to search for evidence to improve the quality of patient care and outcomes.[1] The majority (98%) of our sample showed interest in EBM course, thus their unmet training needs requires EBM education as part of continuing medical education program.[1]

Awareness of Cochrane in our sample was 53%, consistent with Ethiopian health professional's studies.[18,30] Despite a difference in a survey used, a study in South India found that 66% of nursing faculties had awareness of Cochrane.[31] In this survey, two respondents had awareness of and recognized Cochrane South Africa (CSA) as their reference centre. This is not surprising as most health workers in Africa lack awareness of CSA,[18, 30] which is based in Cape Town, South Africa.[32] The CSA provides capacity-building courses for reviewers in 25 countries including Zambia.[32] The low awareness of CSA among DFMS clinicians calls for awareness raising campaign about CSA.

In the present survey, one respondent knew the CL however did not use it in clinical practice. Usually, awareness and use of the CL in Africa and elsewhere are poor.[11, 16, 20, 21,30, 33–35] A cross-sectional study of 135 Nigerian doctors at the University of Ilorin Teaching Hospital revealed that 90% of doctors hardly use EBM resources while 10% use the CL.[11] The results are consistent with past studies in Nigeria[16], Ethiopia[18], Jordan[33] and Sri-Lanka[34]. The CL contains high-quality systematic reviews on pregnancy and childbirth, HIV/AIDS, infectious diseases, acute respiratory infections and other priority health conditions pertinent to Zambia.[36] This justifies the use of evidence from the CL to improve the quality of patient care in Zambia. Therefore, our findings have implications for good patient management. Future strategies to manage patients must include the use of evidence from the critical CL.

Our sample cited many personal and organizational barriers to the CL similar to those reported by earlier studies from Africa[11, 12,14, 16–19, 29] and a quantitative study.[17] Notably, the identified barriers are not limited to DFMS, but widespread in Africa. For example, hospital clinicians in Rwanda and Uganda could not practice EBM because of poor facilities, information and communication technology infrastructure and internet access.[12] In Nigeria also 80% of hospital doctors lack access to internet, online databases, and use private internet cybercafés

instead.[11] In Nigeria again, physicians do not have confidence to download full-text articles from online sources because they lack searching skills, internet access and face information overload.[16] To address the barriers perceived by our sample, awareness creation, search skills development through training, and efficient workplace infrastructure to access online evidence remain essential.[4] The DFMS can also encourage local stakeholders (e.g. higher education sectors) to teach the CL to undergraduates and postgraduates as part of the curricula. Failure to address the perceived barriers could have a negative effect on EBM practice.[17, 19]

The present survey has both strengths and limitations. It was the second ever survey in a military health system in Africa, and achieved a high participation rate similar to other surveys conducted in Africa.[16, 20] We adopted the survey from Cochrane South Africa, pretested before data collection and reported its internal consistency. Equally, we conducted the research as part of EBM training with no additional funding. Regardless, our survey has limitations. The use of a convenient sampling technique, a cross-sectional study design and total reliance on respondents' self-assessment of outcomes might have biased the findings. Total reliance on self-report responses is prone to social desirability bias, as subject might give flattering answers instead of truthful. Importantly, we had neither the logistics nor funding to recruit a representative sample. While the findings cannot be generalizable to all staffs at DFMS, it will add to knowledge base and help to optimize the uptake of EBM in clinical settings. We also recommend further research with a representative sample to assess the exact barriers and develop strategies to support staff to engage in EBM practice.

In conclusion, our survey revealed that the attitude of military health personnel towards EBM was generally good. However, they lacked adequate EBM knowledge, formal training, and awareness of Cochrane South Africa. Knowledge and use of the Cochrane Library in clinical practice is also low.

Respondents face personal and organizational barriers to awareness and use of the Cochrane Library. The DFMS have the capacity and resources to overcome the challenges to EBM practice. By developing and implementing proper interventions, including educational initiatives, it can create the right EBM culture for clinical staff and facilitate evidence-based clinical decisions to improve the quality of patient care services.

ACKNOWLEDGEMENTS

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