Public Health Action

International Union Against Tuberculosis and Lung Disease
Health solutions for the poor

VOL 7 NO 2 PUBLISHED 21 JUNE 2017

NOTES FROM THE FIELD

Operational implementation and impact of The Union's online childhood TB training course in South Africa

L. du Plessis,[1] F. Black,[1] A. Detjen,[2] A. C. Hesseling,[1] K. du Preez[1]

http://dx.doi.org/10.5588/pha.16.0116

Novel, effective tuberculosis (TB) training strategies are needed in developing settings to scale up training and improve TB management at facility level. This study evaluated the feasibility of implementing an online childhood TB training course for community-based health-care workers in the Eastern Cape Province, South Africa, and measured its impact on knowledge. Training sessions were convened and participants completed the course independently. A total of 220 primary care participants completed pre- and post-training tests. The mean knowledge increase was 8% (95% confidence interval 7.0–8.8, $P < 0.001$). The course proved an acceptable, versatile option for decentralised training in childhood TB, provided that the technology requirements can be met.

The World Health Organization (WHO) estimated that approximately 1 million tuberculosis (TB) cases occurred globally in 2015 in children aged < 15 years.[1] The most recent WHO End TB strategy specifically highlights the need to better address childhood TB.[2]

In settings with a high burden of TB-HIV (human immunodeficiency virus), frontline level health-care workers (HCWs), typically nurses, often receive limited training in childhood TB, although they are often tasked with managing childhood TB at the primary care level.[3] Without adequate knowledge and clinical skills, missed opportunities for TB diagnosis, treatment and preventive therapy in children will continue to occur, perpetuating significant policy-practice gaps.[4]

The International Union Against Tuberculosis and Lung Disease (The Union, Paris, France) developed an online childhood TB training course in 2015. This course reflects current WHO guidelines and uses the Union Desk Guide for childhood TB. The course is aimed at decentralised-level HCWs, and provides interactive self-learning content. The course has six modules—epidemiology, diagnosis, treatment, TB-HIV, prevention and practice—and is available free of charge on The Union's Childhood TB internet portal (www.childhoodtb.theunion.org). Online registration (with e-mail accounts) and completion, including real-time evaluation, are required to obtain a certificate. The course can be downloaded for offline use in the absence of an adequate internet connection.[5]

Globally, most children with TB live in developing countries. These countries have to train proportionally more HCWs with fewer available resources compared to high-income countries. The Union course may be particularly useful for decentralised childhood TB training in such settings. Studies measuring the impact of TB training are limited.[6] We evaluated the feasibility of implementing The Union course in South Africa and measured the impact of the training on childhood TB knowledge amongst HCWs.

INTERVENTION

Almost 6.5 million people live in the Eastern Cape, South Africa's second largest province.[7] In 2013, overall TB notification rates were 839 per 100 000 population, and 592/100 000 amongst children aged < 15 years (unpublished data, Eastern Cape Department of Health).

The TB Kids e-Training Project was implemented from March to August 2015 in Nelson Mandela Bay, the second largest of the eight provincial health districts. In collaboration with the district office of the National TB Programme (NTP), childhood TB training, utilising The Union course, was offered to approximately 300 nurses and 36 doctors working in 53 district health-care facilities. HCWs across all disciplines were recruited, as children with TB rarely present directly to the TB services for diagnosis, due to the non-specific nature of TB symptoms and signs in children.[8]

Training sessions were convened at a central computer laboratory by a training coordinator, who liaised with facilities to recruit participants and to complete the project administration. Participation was completely voluntary. Attendance was supported and facility managers agreed to provide a 2-day leave of absence for trainees. The district health office, a local nongovernmental organisation and research team provided information technology (IT) support. Participants completed the course independently and received IT support as needed. Voluntary written informed consent was obtained to complete a 60-point multiple-choice test (MCT) to assess childhood TB knowledge before and immediately after completing the course. All participants received a certificate of completion, regardless of whether they completed the MCT. Questions were drawn from the course's practice questions, which were validated prior to the launch of the course on The Union website. Univariate and stratified analyses were completed, comparing the mean difference in knowledge between the pre- and post-test scores. Access to an e-mail account was used as proxy for IT experience. Feedback regarding the fea-

AFFILIATIONS
1 Desmond Tutu TB Centre, Department of Paediatrics and Child Health, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa
2 International Union Against Tuberculosis and Lung Disease, Paris, France

CORRESPONDENCE
Lienki Du Plessis
Desmond Tutu TB Centre
Department of Paediatrics and Child Health
Faculty of Medicine and Health Sciences
Stellenbosch University
P O Box 241
Cape Town 8000
South Africa
e-mail: lienkiduplessis@gmail.com

KEY WORDS
paediatric tuberculosis; health worker education; computer course

Received 8 December 2016
Accepted 9 February 2017

PHA2017;7(2):175–177
© 2017 The Union

TABLE Impact of The Union's online course on childhood TB for health-care workers on overall knowledge of TB in children, stratified by HCWs' area of work and age category (n = 220)

Overall results	Pre-test mean % (SD)	Post-test mean % (SD)	Increase mean % (SD)	95%CI	P value*
All participants	65.3 (7.9)	73.1 (8.6)	7.9 (6.8)	7.0–8.8	<0.001
Area of current clinical work†					
Includes TB	68.3 (8.8)	73.5 (9.7)	5.2 (5.2)	3.9–6.5	<0.001
Non-TB nurses‡	64.1 (7.3)	73.1 (8.1)	9.0 (7.0)	7.9–10.1	<0.001
Difference, mean, %			3.8	1.8–5.7	<0.001
Age category,§ years					
<40	65.2 (7.6)	74.7 (7.7)	9.6 (7.3)	8.1–11.0	<0.001
⩾40	65.4 (8.3)	71.8 (9.1)	6.4 (5.9)	5.3–7.5	<0.001
Difference, mean, %			3.1	1.3–4.9	<0.001

*The t-test was used for hypothesis testing.
†Sample size (n = 220). Current scope includes TB (n = 60) vs. not currently working in TB services (n = 160).
‡From across all primary care disciplines, i.e., maternal and child health, family medicine, emergency services.
§Sample size (n = 217): age < 40 years (n = 99); age ⩾ 40 years (n = 118); date of birth missing for 3 participants.
TB = tuberculosis; HCW = health-care worker; SD = standard deviation; CI = confidence interval.

sibility and acceptability of the course was obtained from the participants and the NTP stakeholders.

The study was approved by the Eastern Cape Department of Health (Eastern Cape, South Africa) and the Human Research Ethics Committee, Stellenbosch University (N15/01/007) (Stellenbosch, South Africa).

RESULTS

A total of 37 2-day training sessions were convened, including 237 HCWs from 49/53 facilities. Trainees were nurse practitioners, programme and facility managers and nursing students working across all health disciplines. No doctors attended the training despite repeated recruitment efforts. Only 56/237 (24%) participants had e-mail accounts, of whom only 17 (7.2%) completed the course online due to insufficient multi-user internet connectivity.

Overall feedback regarding the course's acceptability was positive. The main concern raised was the need for contextualisation of the contents (i.e., treatment differences, scope of practice) to help facilitate application to the local context.

A total of 220/237 (93%) participants completed both the pre- and post-tests. The mean age of the participants was 42 years (standard deviation [SD] 11.8); 200 (91%) were female, 60 (27%) currently worked in TB services and 48 (22%) had an e-mail account.

Mean baseline knowledge was 65% (SD 8%), and increased by 7.9% (95% confidence interval [CI] 7.0–8.8, P < 0.001) after completing the course (Table). Nurses aged <40 years gained more knowledge than older nurses (3.1%; 95%CI 1.3–4.9, P < 0.001) and those not working in TB services gained more knowledge than nurses currently working in TB services (3.8%; 95%CI 1.8–5.7, P < 0.001). Access to an e-mail account did not impact learning.

DISCUSSION AND CONCLUSIONS

Results from this pilot study showed that The Union childhood TB course is a versatile self-learning strategy that improved knowledge of childhood TB amongst frontline HCWs. Age may be an important factor contributing to effective learning using internet technology and should be considered when choosing platforms for HCW training. As has been demonstrated in other studies, younger trainees may be more comfortable with IT and adapt to new learning tools more rapidly than older trainees.[9]

The availability of adequate internet access may be an obstacle to online training in some settings. Attention should be given to evaluating the setting-specific resources and requirements before conducting online training.[10] Access to cellular telephones in developing settings does not necessarily indicate computer or IT experience, and the need to have e-mail accounts for registration purposes should be considered prior to planning online training. The offline course provided a practical alternative, but completing the course without the online real-time evaluation was a drawback. Different recruitment strategies may be necessary to engage different types of HCWs in future training initiatives, including doctors.

Encouragingly, course implementation required few human resources. Adding facilitation by someone with the setting-specific experience of TB guidelines and practice may be important to contextualise the course for optimisation of learning.

Evaluation of the knowledge translation to practice was beyond the scope of this pilot study, but will be required to assess the impact of the course on clinical practice and on the outcomes for childhood TB in high-burden settings.

References

1 World Health Organization. Global tuberculosis report, 2016. WHO/HTM/TB/2016.13. Geneva, Switzerland: WHO, 2016. http://www.who.int/tb/publications/global_report/en/ Accessed May 2017.
2 World Health Organization. End TB strategy. WHO/HTM/TB/2015.19. Geneva, Switzerland: WHO, 2016. http://www.who.int/tb/post2015_strategy/en/ Accessed May 2017.
3 Isaacs W, Duma S, Mayers P. Registered nurses' role in diagnosing childhood tuberculosis in South Africa. Africa J Nurs Midwifery 2013; 15: 42–53.

ACKNOWLEDGEMENTS
This study was made possible by the support of the American people through the United States Agency for International Development (USAID, Washington, DC, USA). The findings of this study are the sole responsibility of the Desmond Tutu TB Centre, Stellenbosch University (Stellenbosch, South Africa) and do not necessarily reflect the views of the USAID or the United States government.
This study was funded by the USAID under the USAID Tuberculosis Care II Cooperative Agreement (AID-OAA-A-10-00021).
The investigators would like to thank the following stakeholders for participating and providing support for the project: B Ncanywe and the district office of the South African National TB Programme (Cape Town, South Africa); the personnel from the Nelson Mandela Bay District Health Offices and the managers of the health facilities in the Nelson Mandela Bay District (Port Elizabeth, South Africa); S Jali, Eastern Cape Department of Health (Eastern Cape, South Africa); L Zonke, Lilitha College of Nursing (Port Elizabeth, South Africa); B Norubela, Health Information Systems Trainer, Foundation for Professional Development (Eastern Cape, South Africa); T Ncandana, Training Coordinator; E Mhlope, Technical Advisor, University Research Co (URC Johannesburg, South Africa); R Matji, URC; all the study participants.
Conflicts of interest: none declared.

4 World Health Organization. Roadmap for childhood tuberculosis. WHO/HTM/TB/2013.12. Geneva, Switzerland: WHO, 2013. http://apps.who.int/iris/bitstream/10665/89506/1/9789241506137_eng.pdf Accessed May 2017.
5 International Union Against Tuberculosis and Lung Disease. Childhood TB for healthcare workers. Paris, France: The Union, 2017. http://www.theunion.org/what-we-do/courses/child/childhood-tb-for-heathcare-workers Accessed May 2017.
6 Wu S, Roychowdhury I, Khan M. Evaluating the impact of healthcare provider training to improve tuberculosis management: a systematic review of methods and outcome indicators used. Int J Infect Dis 2017; 56: 105–110.
7 Statistics South Africa. Provincial profile : Eastern Cape Census 2011. Pretoria, South Africa: Stats SA, 2017. http://www.statssa.gov.za/?page_id=3839 Accessed May 2017.
8 Marais B J. Tuberculosis in children. J Paediatr Child Health 2014; 50: 759–767.
9 Johnson R, Gueutal H, Falbe C. Technology, trainees, metacognitive activity and e-learning effectiveness. J Manag Psychol 2009; 24: 545–556.
10 Sukums F, Mensah N, Mpembeni R, Kaltschmidt J, Haefeli W E, Blank A. Health workers' knowledge of and attitudes towards computer applications in rural African health facilities. Glob Health Action 2014; 7: 24 534.

De nouvelles stratégies efficaces de formation à la tuberculose (TB) sont requises dans les pays en développement afin d'accélérer la formation et d'améliorer la prise en charge de la TB au niveau des structures de santé. Cette étude a évalué la faisabilité de la mise en œuvre d'un cours de formation en ligne à la TB de l'enfant pour les travailleurs de santé en communauté dans la province du Cap Est, Afrique du Sud, et a mesuré l'impact sur les connaissances. Des séances de formation ont été organisées et les participants ont terminé le cours indépendamment. Un total de 220 participants travaillant en soins de santé primaires ont fait les tests avant et après la formation. L'augmentation moyenne des connaissances a été de 8% (intervalle de confiance 95% 7,0–8,8 ; $P < 0,001$). Le cours s'est avéré une option acceptable et souple pour une formation décentralisée à la TB de l'enfant si les exigences techniques le permettent.

En los entornos poco desarrollados se precisan estrategias de capacitación innovadoras y eficaces en materia de tuberculosis (TB) con el objeto de ampliar la escala de las iniciativas de formación y mejorar la coordinación asistencial de la TB en los establecimientos de salud. El objetivo del estudio fue evaluar la factibilidad de poner en práctica un curso de capacitación en línea sobre la TB en la niñez dirigido a los agentes de salud comunitarios en la Provincia Oriental del Cabo en Suráfrica y medir su repercusión sobre el nivel de conocimientos de los profesionales. Se convocaron sesiones de formación y luego los participantes completaron por su cuenta el curso. Doscientos veinte profesionales de atención primaria participantes completaron los cuestionarios antes y después de la capacitación. Se observó un progreso promedio de los conocimientos de 8% (intervalo de confianza del 95% 7,0–8,8; $P < 0,001$). Se demostró que el curso representa una opción aceptable y versátil de formación descentralizada sobre la TB en la niñez, siempre y cuando se puedan cumplir los requisitos tecnológicos.

Public Health Action (PHA) The voice for operational research.
Published by The Union (www.theunion.org), PHA provides a platform to fulfil its mission, 'Health solutions for the poor'. PHA publishes high-quality scientific research that provides new knowledge to improve the accessibility, equity, quality and efficiency of health systems and services.

e-ISSN 2220-8372
Editor-in-Chief: Dermot Maher, MD, Switzerland
Contact: pha@theunion.org
PHA website: http://www.theunion.org/what-we-do/journals/pha
Article submission: http://mc.manuscriptcentral.com/pha