ORIGINAL ARTICLE

Effect of a Brief Training Program on the Knowledge of Filipino Primary Care Providers in a Rural and a Remote Setting: a Before and After Study

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ABSTRACT

Background and Objective. Primary care providers are key players in providing quality care to patients and advancing Universal Health Care (UHC). However, effective and quality healthcare delivery may be affected by inadequate knowledge and failure to adhere to evidence-based guidelines among providers. The Philippine Primary Care Studies (PPCS) is a five-year program that pilot tested interventions aimed at strengthening the primary care system in the country. Evidence-based training modules for healthcare providers were administered in Sorsogon and Bataan from the years 2018 to 2021. Module topics were selected based on common health conditions encountered by providers in rural and remote settings. This program aimed to evaluate the effectiveness of training in increasing provider knowledge.

Methods. A series of training workshops were conducted among 184 remote- and 210 rural-based primary care providers [nurses, midwives, barangay or village health workers (BHWs)]. They covered four modules: essential intrapartum and newborn care (EINC), integrated management of childhood illness (IMCI), non-communicable diseases (NCD), and geriatrics. A decision support system (UpToDate) was provided as a supplementary resource for all participants. We administered pre-tests and post-tests consisting of multiple-choice questions on common health conditions. Data was analyzed using paired one-tailed t-test, with an alpha of 0.05.

Results. The knowledge of nurses, midwives, and BHWs improved after the training workshops were conducted. The largest increase from pre-test to post-test scores were observed among the midwives, with a mean difference (MD) of 32.9% (95% CI 23.9 to 41.9) on the EINC module, MD of 25.0% (95% CI 16.6 to 33.4) in the geriatrics module, and MD of 13.5% (95% CI 6.9 to 20.1) in the NCDs module. The nurses had the greatest improvement in the IMCI module (MD 10.8%, 95% CI 2.5 to 19.1). The knowledge of BHWs improved in all participated modules, with greatest improvement in the NCD module (MD 9.0%, 95% CI 5.77 to 12.14).

Conclusions. Primary care workshops, even if conducted as single-sessions and on a short-term basis, are effective in improving short-term knowledge of providers. However, this may not translate to long-term

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knowledge and application in practice. Furthermore, comparisons across provider categories cannot be made as participant composition for each training workshop varied. Ultimately, this study shows enhancing provider knowledge and competence in primary care will therefore require regular and diverse learning interventions and access to clinical decision support tools.

Keywords: capacity building, clinical decision support tools, health workforce, Philippines, primary care, UpToDate

BACKGROUND

Essential to quality care is the provision of evidence-based treatment plans and services that directly address a patient's underlying health conditions.[1] Health provider knowledge impacts the ability of a primary care system to address the needs of patients at all points of care.[2] More importantly, knowledgeable primary care providers contribute to advancing Universal Health Care (UHC) goals of providing quality and affordable healthcare to all, especially among those residing in rural and remote areas.[3,4] In these areas, providers encounter a variety of health conditions affecting all life spans: newborn care issues, common childhood illnesses, non-communicable diseases among adults, and geriatric health issues. These aforementioned issues are addressed by primary care. The implementation of UHC and provision of primary care services, however, have been negatively affected by the COVID-19 pandemic with increasing disparities in access to quality care particularly in low- and middle-income countries.[5]

Up-to-date clinical practice guidelines (CPGs) are central topics in traditional and blended educational interventions,[6] and are critical in ensuring quality care is provided to patients. CPGs give evidence-based directives to aid in the delivery of standardized treatment plans. Despite their role in improving healthcare delivery and processes,[7-9] as few as two in 10 health providers adhere to CPGs. Additionally, providers receive limited support in enhancing their knowledge and skills on primary care in the Philippine setting.

These issues emphasize the need for timely and adequate learning interventions to ensure that provider knowledge is optimal.

Continuous training among primary care providers is critical in providing appropriate responses to medical concerns.[10] Effective interventions to improve knowledge and service delivery processes include educational games,[11] mobile health technologies,[12] and peer education,[13] which are employed using traditional or blended learning approaches[14]. Passive methods such as mass mailings were reported to have less impact on knowledge compared to designs with interactive features.[15] However, unequal access to training opportunities – especially in remote communities where funding is limited and technological infrastructure is underdeveloped, affects provider knowledge and consequently impacts the delivery of quality primary care services.[3,16-18] Clinical decision support tools and online resources address this barrier by providing an alternative to in-person trainings.[19]

Health systems need to allocate resources to provide flexible and affordable avenues for learning, which are integral to augmenting the quality of healthcare delivery. Previous literature focused on evaluating the effectiveness of training for physicians, physician assistants, and nurse practitioners.[20,21] There are limited studies that evaluate knowledge improvement after training interventions for providers with no medical qualifications or formal medical training,[22] including *barangay* or village health workers (BHWs). In the Philippine health system, BHWs are essential members of the health workforce and play crucial roles in healthcare delivery.[23] Research on the effectiveness of training primary care providers, including BHWs, midwives, and nurses, is therefore needed to explore how various healthcare providers respond to educational interventions. This is especially relevant as the Philippine health system transitions towards UHC implementation.

The Philippine Primary Care Studies (PPCS) is a five-year program that aimed to strengthen the primary care system in three pilot sites in the Philippines. The program pilot tested interventions among patients and providers to improve the primary care system, one of which was the conduct of a series of training workshops on the management of health conditions among nurses, midwives, and BHWs. This paper aimed to evaluate the effectiveness of primary care training on four educational modules in increasing provider knowledge in rural and remote settings.

METHODS

Study Design

PPCS pilot tested a series of interventions among patients and health providers in remote, rural, and urban communities in the Philippines. This paper utilized pre- and post-training data collected from its rural and remote sites, situated in Bulusan, Sorsogon and Samal, Bataan, respectively. Data collection was conducted in both sites from November 2018 to May 2021. Training workshops on four modules were conducted: essential intrapartum and newborn care (EINC), integrated management of childhood illness (IMCI), non-communicable diseases (NCDs), and geriatrics. Additional details for each specific workshop and materials used are discussed in the Training Workshop subsection below.

Study Setting

Samal has one rural health unit (RHU) managed by a municipal health officer. There are also barangay health stations in each of the 14 barangays and a three-bed capacity maternity unit. As of 2019, four medical doctors, 16 nurses, 20 midwives, one medical technologist, and 100 BHWs cater to the medical needs in the community. No private clinics have been established in the site. Similarly, Bulusan has one

RHU supervised by a municipal health officer-in-charge. There are only six barangay health stations for a total of 24 barangays. As of 2019, they have three doctors, three nurses, six midwives, one medical technologist, and 141 BHWs. A total of three private practitioners specializing in orthopedics, obstetrics, gynecology, and pediatrics hold clinics in the municipality.

Study Participants

All primary care providers (physicians, nurses, midwives, medical technologists, BHWs) from both sites were invited to participate in the training workshops. Participants who attended the entire training module and submitted both pre- and post-tests were included in our analyses.

Training Workshops

The workshops were developed by physicians with knowledge and clinical experience in the respective topics. Training workshops on EINC, IMCI, NCDs, and geriatrics were conducted from 2018 to 2021. Workshops for the EINC module and IMCI module were conducted for two consecutive days each, the NCD module was delivered as a one-day training workshop, and the geriatrics module was delivered as a half-day training workshop. All workshops were conducted face to face. The workshops consisted of didactic lectures followed by interactive sessions based on prepared vignettes.

A brief introduction to primary care was given before the training proper. The pre-test was then administered, after which discussions on clinical vignettes were carried out in groups of 10-15 participants. Trained facilitators, selected based on their experience and knowledge of healthcare issues, guided participants in the group discussions. During the training workshops, participants were encouraged to use UpToDate – a mobile application that functions as an online clinical encyclopedia and provides medical information in English – and apply what they learned in their case presentations for the geriatric and NCD workshops. Participants were instructed to use the 'Patient' tab of UpToDate, which used fewer medical terms, to better facilitate understanding. Post-tests were administered immediately after each module. All clinical vignettes, instructional materials, training curricula, and exams were developed by credentialed health professionals and translated into Filipino. Translators were selected based on their fluency in both English and Filipino languages. A summary of the training workshops with their description is provided in Table 1.

Data Collection

Pre-tests and post-tests consisting of multiple-choice questions were administered via pen and paper, in Filipino. Conduct of tests were supervised by trained facilitators. The maximum score (raw value) that could be obtained per test were as follows: (a) EINC: 15, (b) IMCI: 13, (c) NCDs: 10, and (d) Geriatrics: 10. The scores of the participants in the pre-tests and post-tests were collected and analyzed for this study. Informal feedback was obtained from the participants through a self-administered feedback form asking about comments and overall feedback about the sessions provided after administration of the post-test.

Data Analysis

Descriptive statistics were used to examine the professional background and sex of respondents. For each of the training modules conducted, the scores in the pre- and post-tests were converted to percentages by dividing the number of correct answers by the total number of items, multiplied by a factor of 100. These were then averaged to obtain the mean scores for each training by profession. Using STATA 15, we compared pre- and post-test scores using a paired one-tailed t-test with a level of significance of 0.05. The difference in the mean change of knowledge was estimated at 95% confidence level separately for nurses, midwives, and BHWs.

Ethics Approval and Consent to Participate

This study was approved by the University of the Philippines Manila Research Ethics Board (UPMREB) under study protocol code UPMREB 2015-489-01, as well as the Single Joint Research Ethics Board (SJREB-2029-55). The study was conducted in compliance with the rules of these ethics boards and the Declaration of Helsinki. Verbal and written informed consent were obtained from all study participants.

Table 1. Summary of Information about the Primary Care Workshops Conducted from November 2018 to May 2021

Training	Date and duration	No. of facilitators	Time allotted for content development (in hours)
Essential intrapartum and newborn care (EINC)	November 19-20, 2018 8 to 5 PM	4	10
Integrated management of childhood illness (IMCI)	September 26-27, 2018 8 to 5 PM	5	9
Non-communicable diseases (NCDs)	July 15, 2019 8 to 5 PM	8	2.5
Geriatrics	April 27, 2021 for Samal; May 25, 2021 for Bulusan 8 to 11:30 AM	17	1.5

RESULTS

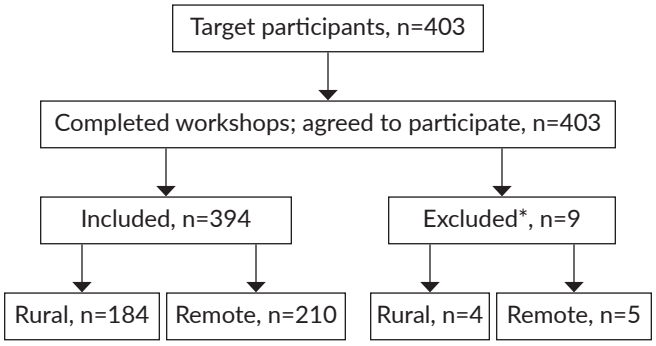
Characteristics of Participants

All 403 target participants attended a training workshop and completed the pre- and post-tests. Because of the low sample size of physicians (n=9) that would make forming conclusions on the effectiveness of workshops difficult, we excluded them from our analyses. Thus, only nurses, midwives, and BHWs were included in this study. The flow diagram of participants can be seen in Figure 1. There were no data points excluded due to incomplete information.

Of the 394 participants included in this study, more than half were from the remote site (210/394 or 53%). Majority of the participants were female (>93% for each of the training modules). For the EINC module, majority of the participants in the rural site were midwives (13/20, 65%) while majority of the participants in the remote site were nurses (8/10, 80%). For the IMCI, NCD, and geriatrics modules, majority of the participants were BHWs for both rural and remote sites (Table 2). All 394 participants are unique individuals, with no crossover participants across modules.

Effectiveness of Training Workshops

Midwives had relatively low pre-test scores in the EINC module, with an average of 55.6%. Both the midwives and nurses had a marked improvement in their post-test scores. There was a greater change in the pre- and post-test scores of midwives (mean difference [MD]=32.9%, 95% confidence interval [CI] 23.90 to 41.87) compared to the nurses (MD=28.4%, 95% CI 17.96 to 38.93). No BHW attended the EINC module. Overall, there was a significant improvement in the knowledge of nurses and midwives after the EINC training (p<0.01), as shown in Table 3.



** Excluded participants were all physicians. This provider category's low sample sizes in each training module made forming conclusions of workshop effectiveness difficult.*

Figure 1. Study inclusion-exclusion flow diagram.

In the IMCI module, the nurses and midwives had good pre-test and post-test scores. In contrast, BHWs had relatively low pre-test and post-test scores. The greatest improvement in test scores was seen among nurses (MD=10.8%, 95% CI 2.48 to 19.05), while the smallest improvement was seen among midwives (MD=4.6%, 95% CI -1.61 to 10.84). Overall, there was an improvement in the health worker scores after the IMCI training, with the difference reaching statistical significance for nurses (p=0.02) and BHWs (p<0.01), as shown in Table 4.

For the NCD module, the nurses had relatively high pre-test scores with a small increase after the workshop (MD=4.7%, 95% CI -4.03 to 13.45). The midwives had the greatest increase in scores after the training (MD=13.5%, 95% CI 6.88 to 20.08). The BHWs had the lowest average pre-test scores, with significant improvement observed after the training (MD=9.0%, 95% CI 5.77 to 12.14). The improvement in knowledge after the NCD training was statistically significant for midwives and BHWs (p<0.01), as shown in Table 5.

In the Geriatrics module, the nurses had good pre-test scores with even higher post-test scores. The midwives showed the greatest improvement in test scores (MD=25.0%, 95% CI 16.57 to 33.43). The BHWs had the lowest average pre-test scores, with improvement observed after the training workshop (MD=8.3%, 95% CI 3.92 to 12.74). Overall, there was a significant improvement in the knowledge of nurses, midwives, and BHWs after the Geriatrics training (p<0.01), as shown in Table 6.

Informal feedback obtained through the self-administered feedback form yielded generally positive comments. Some respondents expressed that the training workshops were well-conducted and they enjoyed the learning experience. Respondents also requested for future training workshops. Some respondents commented that the audio was not so good, while others requested for more time allotment for the workshops to allow participants more preparation time for the interactive sessions.

Table 2. Distribution of Participants by Module and Profession (n=394)

Workshop Site	EINC (n, %)		IMCI (n, %)		NCD (n, %)		Geriatrics (n, %)	
	Rural (n=20)	Remote (n=10)	Rural (n=48)	Remote (n=82)	Rural (n=76)	Remote (n=60)	Rural (n=40)	Remote (n=58)
Nurses (n=58)	7 (35.0)	8 (80.0)	8 (16.7)	2 (2.4)	9 (11.8)	8 (13.3)	7 (17.5)	9 (15.5)
Midwives (n=68)	13 (65.0)	2 (20.0)	18 (37.5)	2 (2.4)	15 (19.7)	8 (13.3)	10 (25.0)	0
BHWs (n=268)	0	0	22 (45.8)	78 (95.1)	52 (68.4)	44 (73.3)	23 (57.5)	49 (84.5)

EINC – Essential Intrapartum and Newborn Care, IMCI – Integrated Management of Childhood Illness, NCD – Non-Communicable Diseases, BHW – Barangay Health Worker

Table 3. Effectiveness of EINC Training Workshop (n=30)

Participant	Pre-test score, Mean (SD)	Post-test score, Mean (SD)	Mean Difference, (95% CI)	*p*-value
Nurses (n=15)	67.6 (17.79)	96.0 (4.91)	28.4 (17.96, 38.93)	<0.01
Midwives (n=15)	55.6 (20.26)	88.4 (9.58)	32.9 (23.90, 41.87)	<0.01

SD – standard deviation, CI – confidence interval

Table 4. Effectiveness of IMCI Training Workshop (n=130)

Participant	Pre-test score, Mean (SD)	Post-test score, Mean (SD)	Mean Difference, (95% CI)	*p*-value
Nurses (n=10)	73.1 (6.54)	83.8 (9.21)	10.8 (2.48, 19.05)	0.02
Midwives (n=20)	78.5 (11.86)	83.1 (10.76)	4.6 (-1.61, 10.84)	0.14
BHWs (n=100)	57.8 (13.37)	66.5 (12.63)	8.8 (6.20, 11.34)	<0.01

SD – standard deviation, CI – confidence interval, BHW – Barangay Health Worker

Table 5. Effectiveness of NCD Training Workshop (n=136)

Participant	Pre-test score, Mean (SD)	Post-test score, Mean (SD)	Mean Difference, (95% CI)	*p*-value
Nurses (n=17)	76.5 (9.96)	81.2 (11.66)	4.7 (-4.03, 13.45)	0.27
Midwives (n=23)	68.3 (10.29)	81.7 (8.34)	13.5 (6.88. 20.08)	<0.01
BHWs (n=96)	62.8 (15.34)	71.8 (17.04)	9.0 (5.77, 12.14)	<0.01

SD – standard deviation, CI – confidence interval, BHW – Barangay Health Worker

Table 6. Effectiveness of Geriatrics Training Workshop (n=98)

Participant	Pre-test score, Mean (SD)	Post-test score, Mean (SD)	Mean Difference, (95% CI)	*p*-value
Nurses (n=16)	79.4 (12.89)	87.5 (12.91)	8.1 (3.68, 12.57)	<0.01
Midwives (n=10)	71.0 (12.87)	96.0 (6.99)	25.0 (16.57, 33.43)	<0.01
BHWs (n=72)	66.5 (16.45)	74.9 (17.52)	8.3 (3.92, 12.74)	<0.01

SD – standard deviation, CI – confidence interval, BHW – Barangay Health Worker

DISCUSSION

Our study findings showed that training workshops were generally effective in improving provider knowledge on the four topics covered, namely, EINC, IMCI, NCDs, and geriatrics. The midwives had the greatest improvement in the modules on EINC (MD=32.9%, 95% CI 23.90 to 41.87), NCD (MD=13.5%, 95% CI 6.88 to 20.08), and geriatrics (MD=25.0%, 95% CI 16.57 to 33.43). The nurses had the greatest improvement in the IMCI module (MD=10.8%, 95% CI 2.48 to 19.05). The knowledge of BHWs also improved across all training modules, although both pre- and post-test scores were relatively low. These findings are consistent with published research that show that even single-session and short duration trainings can make modest and immediate gains in knowledge.[24] Additionally, our findings suggest that more support is needed for providers without medical qualifications such as BHWs, who are essential members of the health system.[23,25] This support may include providing them medical information in lay terms and access to user-friendly digital technologies.[25]

The quantitative change in knowledge may be affected by participant baseline knowledge,[26] and familiarity and use of supplementary online tools such as UpToDate.[27] In our assessments, medical terminologies were not translated into lay language. This may have affected baseline scores of primary care providers who have less exposure to medical education, such as BHWs who are voluntary health workers in the communities.[28] UpToDate was provided as a supplementary resource for all participants in the NCD and geriatrics modules, and participants were allowed to access UpToDate during the assessments for these modules. UpToDate may have been utilized more by participants who were familiar in navigating online resources or using such tools (i.e., nurses than midwives and BHWs).[25] Support for digital solutions, in addition to training on primary care content and delivery, is necessary especially for BHWs in rural and remote settings.[3]

Diverse learning methods for the health workforce, including interactive methods and small-group learning, have reported benefits including greater participation and reach in rural or satellite locations.[3] Our training workshops were conducted with participation from a variety of health providers who have worked together in some capacity or who were familiar with each other. This encouraged participants to actively engage in the sessions and improve their knowledge. Providers' attitudes towards such learning interventions can be positively influenced by addressing their needs (e.g.,

flexibility with schedules) and providing support through their peers and digital resources.[3]

We found that even single-session and short-term workshops are effective in increasing knowledge on primary care; however, results of post-tests that are conducted immediately after may be reflective of immediate effects and may not predict long-term improvement in knowledge.[29] Regardless of the learning approach employed – traditional, online or blended – learning interventions and programs that are brief may not lead to increased competence, more effective service delivery, and better patient outcomes.[30] Enhancing knowledge among primary care providers therefore requires constant retraining and more sustainable learning approaches.[3,11,14,25,30] The decision on the frequency of training workshops to promote both short-term and long-term benefits is subject to multiple variables: economic capacity, political will, availability of resource personnel, and availability of participants. The introduction of hybrid training modules can also play a role in the effective implementation of workshops in the future.

In the interim, clinical decision support tools such as UpToDate may be a potential resource for self-directed learning, since it contains standardized evidence-based guidelines and decision-making strategies. While such tools have a role in promoting learning among allied medical professionals, it must be noted, however, that UpToDate information is largely based on Western practices.[3,14,25,31] The availability of diagnostics and medications listed on the application are not always applicable to the Filipino setting. Accessibility to management recommendations listed is also a concern especially in remote and resource-poor areas.

This study has several limitations. First, the sample size of this study is small and findings may only be generalizable to providers with similar characteristics to those included in our study and from similar settings. We also could not do subgroup analysis based on length of service due to the small sample size. Second, UpToDate was only provided and used in two out of the four training modules. While this may have influenced the resulting test scores, examining the potential effect of UpToDate use or any other confounder on healthcare provider scores was outside the scope of the study. Third, this study only measured short-term improvement in knowledge given the brevity of the workshops, and the short interval between trainings and assessments. We cannot make conclusions about the effectiveness of training over time because no follow-up data was collected from participants. Furthermore, no comparisons across provider categories could be made as participant composition for each training workshop varied. The results of the few physicians who attended the modules were also not included in this paper. Pilot testing of the training workshops and assessment tools were not done. No framework was used in designing the assessment tools, and the assessment tools were not translated to lay language, which may have affected the scores of midwives and BHWs relative to nurses who received relevant formal training on patient management. Lastly, qualitative feedback was not formally collected and analyzed.

CONCLUSIONS

Primary care workshops, even if single-session and short-term, are effective in contributing to improved short-term knowledge transfer among primary care providers in rural and remote settings. However, this may not translate to long-term knowledge and application in practice. Enhancing provider knowledge and competence will therefore require regular and diverse learning interventions and access to clinical decision support tools such as UpToDate. Such tools may especially be beneficial for providers in resource-limited settings, where in-person training is not always feasible. Efforts to strengthen the primary care system should be inclusive of BHWs and responsive to their learning needs. This will ensure delivery of quality and effective services, even in communities with significant health workforce and physician maldistribution.

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Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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REFERENCES

1. Connor L, Dean J, McNett M, Tydings DM, Shrout A, Gorsuch PF, et al. Evidence-based practice improves patient outcomes and healthcare system return on investment: Findings from a scoping review. Worldviews Evid Based Nurs. 2023 Feb;20(1):6-15. doi: 10.1111/wvn.12621. PMID: 36751881.
2. Galingana CLT, De Mesa RYH, Marfori JRA, Paterno RP, Rey MP, Co EEA, et al. Setting core competencies of health workers towards quality primary care: Proceedings of a national consultative workshop. Acta Med Philipp. 2020 Oct 5. doi: 10.47895/amp.v54i0.2068.

3. Jacob RR, Duggan K, Allen P, Erwin PC, Aisaka K, Yang SC, et al. Preparing public health professionals to make evidence-based decisions: a comparison of training delivery methods in the United States. Front Public Health. 2018 Sep 13;6:257. doi: 10.3389/fpubh.2018.00257. PMID: 30271767; PMCID: PMC6146213.
4. Department of Health. Implementing Rules and Regulations of the Universal Health Care Act (Republic Act No. 11223) [Internet]. 2019 [cited 2023 Feb]. Available from: https://www.philhealth.gov.ph/about_us/UHC-IRR_Signed.pdf
5. Amit AML, Pepito VCF, Dayrit MM. Advancing Universal Health Coverage in the Philippines through self-care interventions. Lancet Reg Health West Pac. 2022 Sep 5;26:100579. doi: 10.1016/j.lanwpc.2022.100579. PMID: 36105555; PMCID: PMC9465409.
6. Miguel RTD, Silvestre MAA, Imperial MLS, Ho BLC, Dans LF. Appraisal of the methodological quality of clinical practice guidelines in the Philippines. Int J Health Plann Manage. 2019 Oct;34(4):e1723-e1735. doi: 10.1002/hpm.2886. PMID: 31433544.
7. Lugtenberg M, Burgers JS, Westert GP. Effects of evidence-based clinical practice guidelines on quality of care: a systematic review. Qual Saf Health Care. 2009 Oct;18(5):385-92. doi: 10.1136/qshc.2008.028043. PMID: 19812102.
8. Erasmus V, Daha TJ, Brug H, Richardus JH, Behrendt MD, Vos MC, et al. Systematic review of studies on compliance with hand hygiene guidelines in hospital care. Infect Control Hosp Epidemiol. 2010 Mar;31(3):283-94. doi: 10.1086/650451. PMID: 20088678.
9. Wetterneck TB, Pak MH. Using clinical practice guidelines to improve patient care. WMJ. 2005 Apr;104(3):30-3. PMID: 15966629.
10. Fairall L, Bateman E, Cornick R, Faris G, Timmerman V, Folb N, et al. Innovating to improve primary care in less developed countries: towards a global model. BMJ Innov. 2015 Oct;1(4):196-203. doi: 10.1136/bmjinnov-2015-000045. PMID: 26692199; PMCID: PMC4680195.
11. Akl EA, Kairouz VF, Sackett KM, Erdley WS, Mustafa RA, Fiander M, et al. Educational games for health professionals. Cochrane Database Syst Rev. 2013 Mar 28;2013(3):CD006411. doi: 10.1002/14651858.CD006411.pub4. PMID: 23543543; PMCID: PMC7389433.
12. Free C, Phillips G, Watson L, Galli L, Felix L, Edwards P, et al. The effectiveness of mobile-health technologies to improve health care service delivery processes: a systematic review and meta-analysis. PLoS Med. 2013;10(1):e1001363. doi: 10.1371/journal.pmed.1001363. PMID: 23458994; PMCID: PMC3566926.
13. Charandabi SM, Vahidi R, Marions L, Wahlström R. Effect of a peer-educational intervention on provider knowledge and reported performance in family planning services: a cluster randomized trial. BMC Med Educ. 2010 Feb 2;10:11. doi: 10.1186/1472-6920-10-11. PMID: 20122176; PMCID: PMC2830222.
14. Mastellos N, Tran T, Dharmayat K, Cecil E, Lee HY, Wong CCP, et al. Training community healthcare workers on the use of information and communication technologies: a randomised controlled trial of traditional versus blended learning in Malawi, Africa. BMC Med Educ. 2018 Apr 2;18(1):61. doi: 10.1186/s12909-018-1175-5. PMID: 29609596; PMCID: PMC5879741.
15. Sasaki N, Yamaguchi N, Okumura A, Yoshida M, Sugawara H, Shin JH, et al. Factors affecting the use of clinical practice guidelines by hospital physicians: the interplay of IT infrastructure and physician attitudes. Implement Sci. 2020 Nov 25;15(1):101. doi: 10.1186/s13012-020-01056-1. PMID: 33239076; PMCID: PMC7687727.
16. Yamashita T, Suplido SA, Llave C, Tuliao MTR, Tanaka Y, Matsuo H. Understanding postpartum healthcare services and exploring the challenges and motivations of maternal health service providers in the Philippines: a qualitative study. Trop Med Health. 2015 Jun;43(2):123-30. doi: 10.2149/tmh.2014-40. Epub 2015 Mar 14. PMID: 26161030; PMCID: PMC4491496.
17. World Health Organization. Retention of the health workforce in rural and remote areas: a systematic review [Internet]. 2020 [cited 2022 Oct 23]. Available from: https://apps.who.int/iris/bitstream/handle/10665/337195/9789240013889-eng.pdf
18. Strasser R, Neusy AJ. Context counts: training health workers in and for rural and remote areas. Bull World Health Organ. 2010 Oct 1;88(10):777-82. doi: 10.2471/BLT.09.072462. PMID: 20931063; PMCID: PMC2947041.
19. Long LA, Pariyo G, Kallander K. Digital technologies for health workforce development in low- and middle-income countries: a scoping review. Glob Health Sci Pract. 2018 Oct 10;6(Suppl 1):S41–48. doi: 10.9745/GHSP-D-18-00167. PMID: 30305338; PMCID: PMC6203417.
20. Stoner SA, Mikko AT, Carpenter KM. Web-based training for primary care providers on screening, brief intervention, and referral to treatment (SBIRT) for alcohol, tobacco, and other drugs. J Subst Abuse Treat. 2014 Nov-Dec;47(5):362-70. doi: 10.1016/j.jsat.2014.06.009. PMID: 25115136; PMCID: PMC4196703.
21. Helitzer DL, Lanoue M, Wilson B, de Hernandez BU, Warner T, Roter D. A randomized controlled trial of communication training with primary care providers to improve patient-centeredness and health risk communication. Patient Educ Couns. 2011 Jan;82(1):21-9. doi: 10.1016/j.pec.2010.01.021. PMID: 20219315; PMCID: PMC3539754.
22. Das J, Holla A, Das V, Mohanan M, Tabak D, Chan B. In urban and rural India, a standardized patient study showed low levels of provider training and huge quality gaps. Health Aff (Millwood). 2012 Dec;31(12):2774-84. doi: 10.1377/hlthaff.2011.1356. PMID: 23213162; PMCID: PMC3730274.
23. Mallari E, Lasco G, Sayman DJ, Amit AML, Balabanova D, McKee M, et al. Connecting communities to primary care: a qualitative study on the roles, motivations and lived experiences of community health workers in the Philippines. BMC Health Serv Res. 2020 Sep 11;20(1):860. doi: 10.1186/s12913-020-05699-0. PMID: 32917203; PMCID: PMC7488850.
24. Novak I, McIntyre S. The effect of education with workplace supports on practitioners' evidence-based practice knowledge and implementation behaviours. Aust Occup Ther J. 2010 Dec;57(6):386-93. doi: 10.1111/j.1440-1630.2010.00861.x. PMID: 21091704.
25. Huang W, Long H, Li J, Tao S, Zheng P, Tang S, et al. Delivery of public health services by community health workers (CHWs) in primary health care settings in China: a systematic review (1996-2016). Glob Health Res Policy. 2018 Jun 6;3:18. doi: 10.1186/s41256-018-0072-0. PMID: 29992191; PMCID: PMC5989355.
26. Labeau SO, Rello J, Dimopoulos G, Lipman J, Sarikaya A, Oztürk C, et al. The value of e-learning for the prevention of healthcare-associated infections. Infect Control Hosp Epidemiol. 2016 Sep;37(9):1052-9. doi: 10.1017/ice.2016.107. PMID: 27174463.
27. Ozdalga E, Ozdalga A, Ahuja N. The smartphone in medicine: a review of current and potential use among physicians and students. J Med Internet Res. 2012 Sep 27;14(5):e128. doi: 10.2196/jmir.1994. PMID: 23017375; PMCID: PMC3510747.
28. Ugolini D, Casanova G, Ceppi M, Mattei F, Neri M. Familiarity of physicians, translational researchers, nurses, and other health professionals with evidence-based medicine terms and resources. J Cancer Educ. 2014 Sep;29(3):514-21. doi: 10.1007/s13187-014-0631-0. PMID: 24585401.
29. Murugesan N, Shobana R, Snehalatha C, Kapur A, Ramachandran A. Immediate impact of a diabetes training programme for primary care physicians--an endeavour for national capacity building for diabetes management in India. Diabetes Res Clin Pract. 2009 Jan;83(1):140-4. doi: 10.1016/j.diabres.2008.11.005. PMID: 19095326.
30. Valenstein-Mah H, Greer N, McKenzie L, Hansen L, Strom TQ, Wiltsey Stirman S, et al. Effectiveness of training methods for delivery of evidence-based psychotherapies: a systematic review. Implement Sci. 2020 May 27;15(1):40. doi: 10.1186/s13012-020-00998-w. PMID: 32460866; PMCID: PMC7251851.
31. Isaac T, Zheng J, Jha A. Use of UpToDate and outcomes in US hospitals. J Hosp Med. 2012 Feb;7(2):85-90. doi: 10.1002/jhm.944. PMID: 22095750.