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Title page

Medical Education does not match needs of future practice: a study from Ecuador.

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Medical Education does not match needs of future practice: a study from Ecuador.

Abstract

Background:

Physicians acquire relevant knowledge, skills and attitudes in medical school. In some countries recent medical graduates are exposed to provide rural health services. The purpose of this research is to assess the possible mismatch of obstetrical skills between the training offered in Ecuadorian medical schools and the tasks required for rural service

Methods:

A web based survey was developed with twenty one obstetrical skills. The questionnaire was sent to all rural doctors who work in Loja province, Southern Ecuador, at the Ministry of Health (n=92).

We measured two categories: "importance of skills in rural practice" with a five point Likert-type scale (1= strongly disagree; 5= strongly agree); and "clerkship experience" using a nominal scale divided in five levels: level 1 (not seen, not performed) to level 5 (performed 10 times or more).

Spearman's rank correlation coefficient (r) was used to observe associations.

Results

A negative correlation was found in the skills: "episiotomy and repair", "umbilical vein catheterization", "speculum examination", "evaluation of cervical dilatation during active labor", "neonatal resuscitation" and "vacuum assisted vaginal delivery". For instance "Episiotomy and repair" is important (strongly agree and agree) to 100% of respondents, but in practice, only 38.9% of rural doctors performed the task three times and 8.3% only once during the internship, similar pattern is seen in the others.

Conclusion

In this study we have noted the gap between the medical needs of populations in rural areas and training provided during the clerkship experiences of physicians during their rural service year.

It is imperative to ensure that rural doctors are appropriately trained and skilled in the performance of routine obstetrical duties. This will help to decrease perinatal morbidity and mortality in rural Ecuador.

Strengths and limitations of this study

- This study is the first that assess the perception of obstetrical skills training in recent graduates doing a compulsory rural year in Ecuador.
- Possible effects of memory recall of the clerkships experience affects the results even the recent graduates are now facing the problems of doing rural service.

INTRODUCTION

Generally, it is assumed that physicians acquire relevant knowledge, skills and attitudes in medical school. After the undergraduate level, graduates must be prepared to work as trainees in a specialty. Some countries include compulsory programs of various lengths to perform medical services outside of the medical campus or hospitals.[1]

In Ecuador recent graduates are required to work for the public health system in order to help distribute the medical workforce to rural communities. The rural health facilities are located between 30 minutes to two hours from the capital of each province. They vary in size but the majorities are small. They are open 5 days a week and should serve as referral link to the hospitals.[2] The recent graduate *médico básico* serves one year in a rural health center to obtain the license to practice and to apply for further residency training.[3][4] This compulsory year exposes them to the realities of providing rural health services and should improve their skills.[5]

As in most other Latin American countries, in Ecuador, undergraduate medical training is provided in large cities by public and private universities.[6] Medical education is still based on Flexner’s pedagogical principles where the hospitals are the foundation of medical teaching and learning during clinical training. This focus on hospital diseases often excludes the common health problems of the general population.[6][7]

The six-year undergraduate curriculum comprises of two years of mainly lecture-based basic science courses, and four years of clinical education, consisting of clerkship rotations, most in hospital settings between one to three months of length. During their final year or internship, medical students practice in five rotations in training hospitals in the following areas: internal medicine, surgery, obstetrics and gynecology, pediatrics, and pre-rural.[8][9] The traditional teaching of procedural skills is described as “see one, do one, teach one”. Tutors teach residents and students according to their own personal experiences.[10]

After graduation and the lottery for the rural year, all new rural doctors receive a five day course to prepare them for the rural service experience. In this training they learn the Ministry of Health administrative process and clinical guidelines.[11]

Recent data show that in these rural areas, the medical needs of the population are often unmet. For instance, in Ecuador the maternal mortality rate increased from 52.5 in 2007 to 92.6 maternal deaths per 100.000 live births in 2010. Postpartum hemorrhage remains the leading preventable cause of maternal death.[12][13] One explanation could be that young, rural doctors are not trained according to the tasks they must perform in those areas, and may pose a potential risk for their patients.[14][15]

This study was performed to examine if rural doctors are adequately prepared to perform well in rural settings. The purpose is to assess the possible mismatch of obstetrical skills between the training offered in Ecuadorian medical schools and the tasks required of rural service physicians.

METHODOLOGY

Instrument and participants

A web based survey was developed using the procedures of two medical school’s curricula:

Universidad Técnica Particular de Loja – UTPL and Pontificia Universidad Católica del Ecuador – PUCE.

We focused on twenty one obstetrical skills divided into three groups: basic obstetrical skills, delivery skills and complication management skills. (Table 1) The questionnaire was sent to rural doctors who work in Loja province (Southern Ecuador) and are listed at the Ministry of Health (n=92). Two

reminders in a period of two months were sent to non-responders. The results were anonymous, but IP addresses were checked to exclude possible redundancy.

Two categories were measured. Firstly, the “importance of skills in rural practice” was assessed on a five point Likert-type scale (1= strongly disagree; 5= strongly agree). Secondly, participants were asked to reflect on their former “clerkship experience” by using a nominal scale used in research by Peeraer G, et al. The scale is divided in five levels: level 1 (not seen, not performed), level 2 (demonstrated, but not performed), level 3 (performed one time), level 4 (performed approximately three times) and level 5 (performed 10 times or more). The questionnaire was pilot tested prior to administration for comprehensibility and clarity.

Data was collected using a free online survey tool (KwikSurveys, <http://www.kwiksurveys.com/>) that allowed checking submissions by IP address.

Ethical issues

The Universidad Técnica Particular de Loja and the research committee of Pontificia Universidad Católica de Ecuador approved the study protocol and the questionnaire. The Chief of the Dirección Provincial de Salud de Loja authorized sending the questionnaire to the rural doctors. In the survey an Informed Consent form was included to allow the participants to accept or decline participation.

Statistical analysis

Descriptive statistics were performed using SPSS software (version 20.0.0). Spearman’s rank correlation coefficient (r) was used to observe associations. The significance level was set at 0.05 for all items.

RESULTS

Ninety rural doctors completed the questionnaire (26 men, 64 women), two respondents did not answer.

The perceptions between skill importance in rural areas and clerkship experience of obstetrical skills are summarized in Table 1.

Table 1 Perceptions of rural doctors between previous clerkship experience and obstetrical skills importance during the compulsory year in Southern Ecuador

	Clerkship experience		Skills importance		Spearman's Correlation	
	Median	Range (a)	Median	Range (b)	Rs	p
Obstetrical skills						
Taking blood pressure	5	1 (4-5)	5	1 (4-5)	-,016	,880
Taking blood simple	5	2 (3-5)	5	3 (2-5)	,188	,080
Cardiotocography interpretation	5	2 (3-5)	5	1 (4-5)	,630*	,000
Perform speculum examination during pregnancy	4	4 (1-5)	5	2 (3-5)	,211*	,048
Pregnancy ultrasound scans	4	3 (2-5)	5	3 (2-5)	,066	,540
Delivery skills						
Pudendal anesthesia	2	4 (1-5)	4	3 (2-5)	,553*	,000
Perform normal delivery	5	2 (3-5)	5	1 (4-5)	-0,020	0,852
Episiotomy and repair	5	1 (4-5)	5	1 (4-5)	-,308*	0,004
Evaluation of cervical dilatation during active labor	5	3 (2-5)	5	1 (4-5)	,284*	0,007
Partogram interpretation	5	2 (3-5)	5	2 (3-5)	-0,041	0,708
Obstetrical complications skills						
Neonatal resuscitation	4	3 (2-5)	5	2 (3-5)	,270*	,011
Foley catheterization	5	3 (2-5)	4	3 (2-5)	,527*	,000
Periferic line	5	3 (2-5)	5	3 (2-5)	,366*	,000
Umbilical line	2	2 (1-3)	4	2 (3-5)	-,338*	,001
Manual placental removal	3	4 (1-5)	5	2 (3-5)	,822*	,000
Postpartum Hemorrhage management	5	2 (3-5)	5	2 (3-5)	,931*	,000
Forceps assisted vaginal delivery	3	3 (1-4)	3	4 (1-5)	0,084	,441
Vacuum assisted vaginal delivery	2	2 (1-3)	3	3 (2-5)	,252*	,018
Emergency C-section	4	4 (1-5)	4	3 (2-5)	-0,016	,882
External cephalic versión	2	4 (1-5)	4	2 (3-5)	-0,109	,313
Repair of Obstetric Perineal Lacerations	4	2 (3-5)	5	2 (3-5)	-0,108	,315

(a) 1=not seen, not performed; 2=demonstrated, but not performed; 3=performed once; 4=performed 3 times; 5=performed + 10 times

(b) 1=strongly disagree; 2=disagree; 3=Neither agree nor disagree; 4=agree; 5=strongly agree

Error! Reference source not found. *correlation is significant

A positive correlation means if the perception of importance in the internship increases, the internship experience also increases. Those with statistical significance are: "management of postpartum hemorrhage" with very high positive correlation ($r = .9$ to 1); "manual placental removal" with high positive correlation ($r = .7$ to $.9$). The skills with moderate positive correlation ($r = .5$ to $.7$)

are “cardiotocography interpretation”, “pudendal anesthesia”, and “foley catheterization”. The skill with low positive correlation ($r = .3$ to $.5$) is “peripheral line for hydration”.

The negative correlation means that one variable increase as another decrease and the negligible correlation means that there is no relationship between the two variables. The skills with low negative correlation ($r = -.3$ to $-.5$) are “episiotomy and repair”, and “umbilical vein catheterization”.

The skills with negligible positive or negative correlation ($r = .0$ to $.3$ or $.0$ to $-.3$) are “speculum examination”, “evaluation of cervical dilatation during active labor”, “neonatal resuscitation” and “vacuum assisted vaginal delivery”.

For these six skills with negligible or negative correlation we show the differences in the associations between the skill importance and clerkship experience in figure 1.

As the data obtained shows the skill “Episiotomy and repair” is important (strongly agree and agree) to 100% of respondents. However in practice, only 38.9% of rural doctors performed the task three times and 8.3% only once during the internship. For “umbilical vein catheterization” is important in 98.9% of respondents and 30.7% have practiced once, 40.9% have seen and 28.4% have not seen nor practice at all during the internship.

The skill “speculum examination during pregnancy” is important to 98.8 % of rural doctors; during the internship only 8.3% of rural doctors performed the task three times and 25% only once. The “evaluation of cervical dilatation during active labor” is important for 100 % of respondents, 86% have practiced the skills more than 10 times, 5.6% at least 3 times, 2.8% once and 5.6% had not seen nor performed during the clerkships. The “neonatal resuscitation” skill is important for 98.8% of respondents, 27.3% have performed more than 10 times, 56.8% three times and 14.8% have practiced once during the clerkships. The skill “vacuum assisted vaginal delivery” is important for 31.8% of rural doctors, 22% have practiced more than 10 times, 5,6% three times, 27.8% only once and 44.4% only during the internship.

DISCUSSION

This study shows that six skills are appropriately practiced in the internships while six other skills may not have been adequately learned. The results indicate lack of practice for several of the most frequent and important obstetrical skills in undergraduate curriculum in Ecuador.

The data suggest the partial mismatch in Ecuadorian undergraduate curricula with the skills required of rural service physicians. Other studies have identified such mismatch.[16][17][18][19][20]

However, in Ecuador because of the use of young graduates in rural areas, these mismatches directly influence epidemiological data and may increase morbidity and even maternal or neonatal mortality.

Medical competence may be defined as the integration of knowledge, skills and attitudes to enable proper management of health problems.[21][22][23] However, of the skills included in this study, the minimum number of procedures that needs to be performed in the undergraduate curriculum to ensure competency and adequate performance in the subsequent rural year is unknown.

Competency is influenced by learner's proficiency, learning capacity, number practice opportunities in the clerkship and the interest to perform a skill.[24][25] The skill "Episiotomy and repair" is frequently required in rural practice. However, 39% of survey respondents practiced it three times and 8% only once during their internship. These figures seem inappropriate to safely manage this obstetrical problem.

Some studies attribute the lack of opportunities to practice clinical skills during the internship due to factors such as: the increasing number of students posted in training hospitals, without a proportionate increase in the practice opportunities;[17] difficulty in training during internships;[16][26] and inadequate and inappropriate supervision, feedback and assessment.[21] These result in an inconsistent level of student exposure to the skills that they need to competently perform as practicing medical doctors.[15]

Methodological considerations

This study is limited to rural doctors from one province in Southern Ecuador. The inherent bias of participant's selection and the high response rate due to a pressure to fill the survey are acknowledged. Possible effects of memory recall of the clerkships experience in the obstetrical skills

should be taken into account. In the other side rural doctors are facing the real needs of its population.

The study only accounted for subjective opinions of survey respondents, and the actual dexterity of performing the skills was not assessed. At the participating Universities, we have introduced skill lab training focusing on the perinatal skills. Therefore, future research on this topic can measure knowledge, skills and behaviors with objective structured clinical examinations (OSCE) prior and after the internship.

The present study only investigates the perceptions of the important skills in rural areas and clerkship experiences. Other aspects such as the way that perinatal care is taught in the medical schools remains not investigated. Despite recent reforms in higher education in Ecuador, the availability of well-trained faculty at medical schools remains unstable, and there are few mechanisms currently in place to ensure quality and supply of teaching staff.[6]

We did not analyze internship experiences in function of the University the students graduated from. In Ecuador, the use of a standard medical curriculum is problematic. In 2008 a constitutional mandate began the evaluation of the higher education system. Those universities that did not improve and did not meet the minimum quality standards were closed in 2012. The governmental control agency continues monitoring and evaluating colleges and careers to improve higher education in Ecuador. The last assessment conducted was in 2013.[27]

Implications for Ecuadorian medical training

Although the effectiveness of self-assessment on identification of learner needs and learner activity may have limitations, the gap between the perceptions of skills needed and actual practice has been demonstrated. Extending the study using other sources of feedback and assessment could provide a more complete appraisal of competence in obstetrical skills required for the rural year.[28]

Improvements in the training programs are required. Beyond faculty development more emphasis should be given to those obstetrical skills important for practice in rural areas. Skills Labs should be incorporated as a new learning strategy for their acquisition and practice.

A collaborative approach between the faculty, the Ministry of Health and rural doctors is proposed with the objective to improve the undergraduate curriculum and better meet the needs of the recent graduates entering into rural service.[20][29][30] One option would be to offer more exposure to rural communities in the undergraduate curriculum.[31][32][33] This can be supplemented with virtual monitoring and materials for online or continuing medical education. The implementation of skills laboratory training can better prepare students for clerkships.[34]

These results also raise several questions regarding current training for the recent graduates: Should all basic doctors be trained to perform a core set of obstetrical procedures, or should students be trained with a focus towards the location of the rural year? What skills are then really needed?

Taking into account that after the rural year these doctors choose their specialty, not necessarily related to obstetrics, is it necessary to teach those skills? From the public health perspective, future work is needed to study the training of nurses and midwives and the collaboration with the rural doctors.

Conclusion

In this study we have noted the gap between the medical needs of populations in rural areas and training provided during the clerkship experiences of physicians during their rural service year.

The universities have to check their curriculum to meet the needs of rural doctors and improve their skills.

It is imperative to ensure that rural doctors are appropriately trained and skilled in the performance of routine obstetrical duties. This will help to decrease perinatal morbidity and mortality in rural Ecuador.

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BIBLIOGRAPHY

1 Frehywot S, Mullan F, Payne PW, *et al.* Compulsory service programmes for recruiting health
workers in remote and rural areas: do they work? *Bulletin of the World Health Organization*
2010;**88**:364–70. doi:10.2471/BLT.09.071605

2 Cavender A, Albán M. Compulsory medical service in Ecuador: the physician’s perspective.
Social Science & Medicine 1998;**47**:1937–46. doi:10.1016/S0277-9536(98)00335-9

3 Ley Orgánica de Salud. *Registro Oficial* 2006;**Nro 423**.

4 Decreto Supremo No 44. Ecuador: 1970.

5 *Health systems profile. Ecuador. Monitoring and analysis health systems change/reform*. Third
edit. Washington, D.C.: : USAID, Pan American Health Organization 2008.
http://www2.paho.org/hq/dmdocuments/2010/Health_System_Profile-Ecuador_2008.pdf

6 Carrillo J, Delgado B, Kosik RO, *et al.* Medical education in Ecuador. *Medical teacher* 2013;;1–
6. doi:10.3109/0142159X.2013.826789

7 Borrell RM. La educación médica en América Latina: debates centrales sobre los paradigmas
científicos y epistemológicos. In: *Proceso de transformación Curricular: otro paradigma es*
posible. Rosario, Argentina: Universidad Nacional de Rosario 2005. 1–32.

8 Universidad Técnica Particular de Loja. Pensum Carrera de Medicina.
2010.<http://www.utpl.edu.ec/academia/pregrado/area-biologica>

9 Pontificia Universidad Católica del Ecuador. Malla Curricular de la carrera de Medicina. 2008.
<http://www.puce.edu.ec/documentos/mallas-curriculares/vigentes/PUCE-MED-Medicina.pdf>

10 Sanders CW, Edwards JC, Burdenski TK. A survey of basic technical skills of medical students.
Academic medicine : journal of the Association of American Medical Colleges 2004;**79**:873–
5.<http://www.ncbi.nlm.nih.gov/pubmed/15326014> (accessed 26 Apr2013).

11 Ministerio de Salud Pública. Año de Salud Rural. 2013.<http://www.salud.gob.ec/ano-de-salud-rural/>

- 1
2
3 12 Instituto Nacional de Estadísticas y Censos. Indicadores básicos de salud. Ecuador 2009. Quito:
4 2009. <http://new.paho.org/ecu/index.php>
5
6
7 13 Instituto Nacional de Estadísticas y Censos. Indicadores básicos de salud. Ecuador 2011. Quito:
8 2011.
9
10
11 14 Clack GB. Medical graduates evaluate the effectiveness of their education. *Medical Education*
12 1994;**28**:418–31. doi:10.1111/j.1365-2923.1994.tb02553.x
13
14
15 15 Remmen R, Denekens J, Scherpbier A, *et al*. An evaluation study of the didactic quality of
16 clerkships. *Medical education* 2000;**34**:460–4.
17 <http://www.ncbi.nlm.nih.gov/pubmed/10792687> (accessed 3 Oct 2013).
18
19
20 16 Remmen R, Derese A, Scherpbier A, *et al*. Can medical schools rely on clerkships to train
21 students in basic clinical skills? *Medical Education* 1999;**33**:600–5. doi:10.1046/j.1365-
22 2923.1999.00467.x
23
24
25 17 Lai NM, Sivalingam N, Ramesh JC. Medical students in their final six months of training :
26 progress in self-perceived clinical competence , and relationship between experience and
27 confidence in practical skills. *Singapore Medical Journal* 2007;**48**:1018–27.
28 <http://smj.sma.org.sg/4811/4811a7.pdf>
29
30
31 18 Lyss-Lerman P, Teherani A, Aagaard E, *et al*. What training is needed in the fourth year of
32 medical school? Views of residency program directors. *Academic medicine : journal of the*
33 *Association of American Medical Colleges* 2009;**84**:823–9.
34 doi:10.1097/ACM.0b013e3181a82426
35
36
37 19 Galli A, Gregorio MJ de. Competencias adquiridas en la carrera de Medicina: Comparación
38 entre egresados de dos universidades, una pública y otra privada. *Educación Médica*
39 2006;**9**:21–6. doi:10.4321/S1575-18132006000100006
40
41
42 20 Moercke AM, Eika B. What are the clinical skills levels of newly graduated physicians? Self-
43 assessment study of an intended curriculum identified by a Delphi process. *Medical education*
44 2002;**36**:472–8.
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

21 Daelmans HEM, Hoogenboom RJI, Donker a JM, *et al.* Effectiveness of clinical rotations as a learning environment for achieving competences. *Medical teacher* 2004;**26**:305–12. doi:10.1080/01421590410001683195

22 Ireland J, Bryers H, van Teijlingen E, *et al.* Competencies and skills for remote and rural maternity care: a review of the literature. *Journal of advanced nursing* 2007;**58**:105–15. doi:10.1111/j.1365-2648.2007.04246.x

23 Van der Vleuten CPM, Schuwirth LWT, Scheele F, *et al.* The assessment of professional competence: building blocks for theory development. *Best practice & research Clinical obstetrics & gynaecology* 2010;**24**:703–19. doi:10.1016/j.bpobgyn.2010.04.001

24 Kelly BF, Sicilia JM, Forman S, *et al.* Advanced procedural training in family medicine: a group consensus statement. *Family medicine* 2009;**41**:398-404. <http://www.ncbi.nlm.nih.gov/pubmed/19492186>

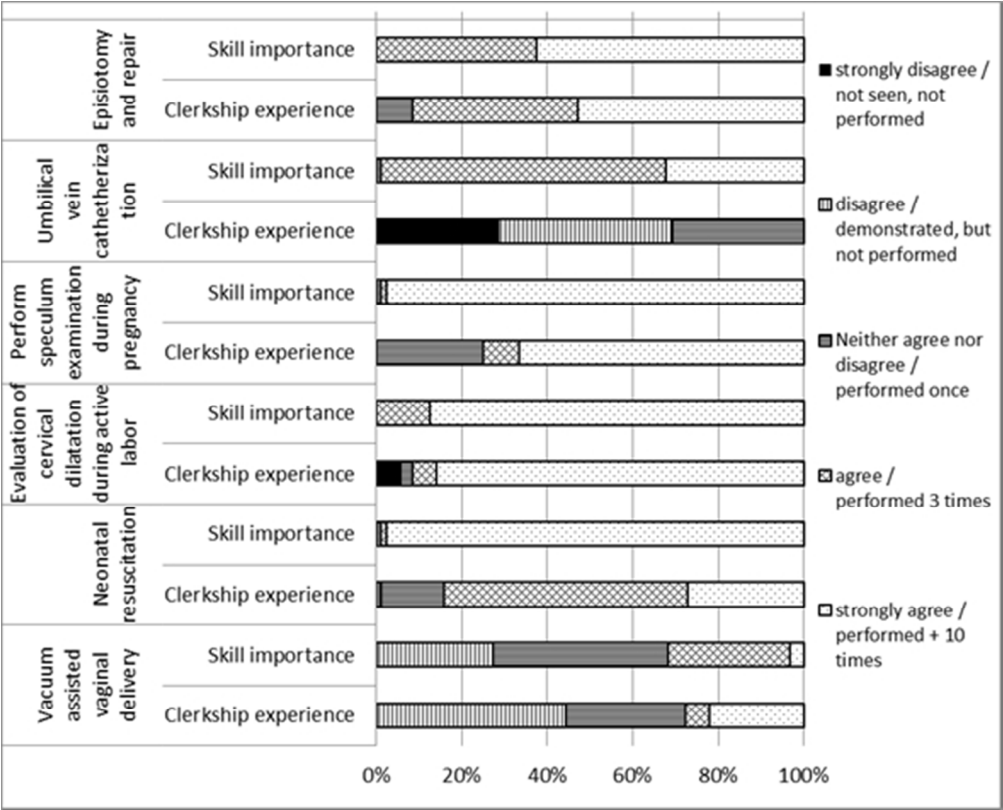
25 Sicaja M, Romić D, Prka Z. Medical students' clinical skills do not match their teachers' expectations: survey at Zagreb University School of Medicine, Croatia. *Croatian medical journal* 2006;**47**:169–75. <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2080370&tool=pmcentrez&rendertype=abstract>

26 De Villiers MR, De Villiers PJT. The knowledge and skills gap of medical practitioners delivering district hospital services in the Western Cape , South Africa. *South African Family Practice* 2006;**48**:2–5.

27 Consejo Nacional de Evaluación y Acreditación de Educación Superior del Ecuador. Mandato 14. Modelo de evaluación de desempeño institucional de las instituciones de educación superior. 2009. http://www.ceaaces.gob.ec/images/stories/documentacion/mandato_14/informe_2009/2_modelo_evaluacion/Descripción_Modelo_Final.pdf

- 28 Colthart I, Bagnall G, Evans A, *et al.* The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. *Medical teacher* 2008;**30**:124–45. doi:10.1080/01421590701881699
- 29 Peeraer G, De Winter BY, Muijtjens a MM, *et al.* Evaluating the effectiveness of curriculum change. Is there a difference between graduating student outcomes from two different curricula? *Medical teacher* 2009;**31**:e64–8. doi:10.1080/01421590802512920
- 30 Wenrich M, Jackson MB, Scherpbier AJ, *et al.* Ready or not? Expectations of faculty and medical students for clinical skills preparation for clerkships. *Medical education online* 2010;**15**:1–8. doi:10.3402/meo.v15i0.5295
- 31 Zink T, Halaas GW, Finstad D, *et al.* The rural physician associate program: the value of immersion learning for third-year medical students. *The Journal of rural health : official journal of the American Rural Health Association and the National Rural Health Care Association* 2008;**24**:353–9. doi:10.1111/j.1748-0361.2008.00181.x
- 32 Young L, Rego P, Peterson R. Clinical location and student learning: outcomes from the LCAP program in Queensland, Australia. *Teaching and learning in medicine* 2008;**20**:261–6. doi:10.1080/10401330802199583
- 33 Worley P, Strasser R, Prideaux D. Can medical students learn specialist disciplines based in rural practice: lessons from students' self reported experience and competence. *Rural and Remote Health* 2004;**4**. http://www.rrh.org.au/publishedarticles/article_print_338.pdf
- 34 Remmen R, Scherpbier A, van der Vleuten C, *et al.* Effectiveness of basic clinical skills training programmes: a cross-sectional comparison of four medical schools. *Medical education* 2001;**35**:121–8.

Figure 1. Differences in the relationship between the perceptions of clerkship experience and skills importance of obstetrical skills in rural doctors with negligible or negative correlations ($r = .0$ to $.3$ or -0 to $-.3$ or $r = -.3$ to $-.5$)



Differences in the relationship between the perceptions of clerkship experience and skills importance of obstetrical skills in rural doctors with negligible or negative correlations ($r = .0$ to $.3$ or -0 to $-.3$ or $r = -.3$ to $-.5$)

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Are recent graduates enough prepared to perform obstetric skills in their rural and compulsory year? A study from Ecuador

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Title page

Are recent graduates enough prepared to perform obstetric skills in their rural and compulsory year? A study from Ecuador

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Are recent graduates enough prepared to perform obstetric skills in their rural and compulsory year? A study from Ecuador

Abstract

Objectives: The aim of this study was to assess the possible mismatch of obstetrical skills between the training offered in Ecuadorian medical schools and the tasks required for compulsory rural service.

Setting: Primary care, rural health centers in Southern Ecuador.

Participants: A total of 92 recent graduated medical doctors during their compulsory rural year

Primary and secondary outcomes measures:

A web based survey was developed with twenty one obstetrical skills. The questionnaire was sent to all rural doctors who work in Loja province, Southern Ecuador, at the Ministry of Health (n=92).

We measured two categories: "importance of skills in rural practice" with a five point Likert-type scale (1= strongly disagree; 5= strongly agree); and "clerkship experience" using a nominal scale divided in five levels: level 1 (not seen, not performed) to level 5 (performed 10 times or more).

Spearman's rank correlation coefficient (r) was used to observe associations.

Results

A negative correlation was found in the skills: "episiotomy and repair", "umbilical vein catheterization", "speculum examination", "evaluation of cervical dilatation during active labor", "neonatal resuscitation" and "vacuum assisted vaginal delivery". For instance "Episiotomy and repair" is important (strongly agree and agree) to 100% of respondents, but in practice, only 38.9% of rural doctors performed the task three times and 8.3% only once during the internship, similar pattern is seen in the others.

Conclusion

In this study we have noted the gap between the medical needs of populations in rural areas and training provided during the clerkship experiences of physicians during their rural service year.

It is imperative to ensure that rural doctors are appropriately trained and skilled in the performance of routine obstetrical duties. This will help to decrease perinatal morbidity and mortality in rural Ecuador.

Strengths and limitations of this study

- This study is the first that assess the perception of obstetrical skills training in recent graduates doing a compulsory rural year in Ecuador.
- Possible effects of memory recall of the clerkships experience affects the results even the recent graduates are now facing the problems of doing rural service.

INTRODUCTION

Generally, it is assumed that physicians acquire relevant knowledge, skills and attitudes in medical school. After the undergraduate level, graduates must be prepared to work as trainees in a specialty. Some countries include compulsory programs of various lengths to perform medical services outside of the medical campus or hospitals.[1]

In Ecuador recent graduates are required to work for the public health system in order to help distribute the medical workforce to rural communities. The rural health facilities are located between 30 minutes to two hours from the capital of each province. They vary in size but the majorities are small. They are open 5 days a week and should serve as referral link to the hospitals.[2] The recent graduate *médico básico* serves one year in a rural health center to obtain the license to practice and to apply for further residency training.[3][4] This compulsory year exposes them to the realities of providing rural health services and should improve their skills.[5]

As in most other Latin American countries, in Ecuador, undergraduate medical training is provided in large cities by public and private universities.[6] Medical education is still based on Flexner's pedagogical principles where the hospitals are the foundation of medical teaching and learning during clinical training. This focus on hospital diseases often excludes the common health problems of the general population.[6][7]

The six-year undergraduate curriculum comprises of two years of mainly lecture-based basic science courses, and four years of clinical education, consisting of clerkship rotations, most in hospital settings, between one to three months of length. During their final year or internship, medical students practice in five rotations in training hospitals in the following areas: internal medicine, surgery, obstetrics and gynecology, pediatrics, and pre-rural.[8][9] The traditional teaching of procedural skills is described as "see one, do one, teach one". Tutors teach residents and students according to their own personal experiences.[10]

After graduation and the lottery for the rural year, all new rural doctors receive a five day course to prepare them for the rural service experience. In this training they learn the Ministry of Health administrative process and clinical guidelines.[11]

Recent data show that in these rural areas, the medical needs of the population are often unmet. For instance, in Ecuador the maternal mortality rate increased from 52.5 in 2007 to 92.6 maternal deaths per 100.000 live births in 2010. Postpartum hemorrhage remains the leading preventable cause of maternal death.[12][13] One explanation could be that young, rural doctors are not trained according to the tasks they must perform in those areas, and may pose a potential risk for their patients.[14][15]

This study was performed to examine if rural doctors are adequately prepared to perform well in rural settings. The purpose is to assess the possible mismatch of obstetrical skills between the training offered in Ecuadorian medical schools and the tasks required of rural service physicians.

METHODOLOGY

Instrument and Participants

A web based survey was developed using the procedures of two medical school’s curricula: *Universidad Técnica Particular de Loja – UTPL* and *Pontificia Universidad Católica del Ecuador – PUCE*. We focused on twenty one obstetrical skills divided into three groups: basic obstetrical skills, delivery skills and complication management skills. (Table 1) The questionnaire was sent to recent graduated medical doctors during their compulsory rural year listed at the Ministry of Health (n=92). They had been working in the rural placement at least five months in Loja province, in the Southern Ecuador. Two reminders in a period of two months were sent to non-responders. The results were anonymous, but IP addresses were checked to exclude possible redundancy.

Two categories were measured. Firstly, the “importance of skills in rural practice” was assessed on a five point Likert-type scale (1= strongly disagree; 5= strongly agree). Secondly, participants were asked to reflect on their former “clerkship experience” by using a nominal scale used in research by Peeraer G, et al. The scale is divided in five levels: level 1 (not seen, not performed), level 2

(demonstrated, but not performed), level 3 (performed one time), level 4 (performed approximately three times) and level 5 (performed 10 times or more). The questionnaire was pilot tested prior to administration for comprehensibility and clarity.

Data was collected using a free online survey tool (KwikSurveys, <http://www.kwiksurveys.com/>) that allowed checking submissions by IP address.

Ethical issues

The Universidad Técnica Particular de Loja and the research committee of Pontificia Universidad Católica de Ecuador approved the study protocol and the questionnaire. The Chief of the Dirección Provincial de Salud de Loja authorized sending the questionnaire to the rural doctors. In the survey an Informed Consent form was included to allow the participants to accept or decline participation.

Statistical Analysis

Descriptive statistics were performed using SPSS software (version 20.0.0). Spearman's rank correlation coefficient (r) was used to observe associations. The significance level was set at 0.05 for all items.

RESULTS

Ninety rural doctors completed the questionnaire (26 men, 64 women), two respondents did not answer. (Table 1)

Table 1 Rural doctors responses about previous clerkship experience and obstetrical skills importance during the compulsory year in Southern Ecuador.

	Clerkship experience (a)					Skills importance (b)				
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
Obstetrical skills										
Taking blood pressure				2 (2)	88 (98)				2 (2)	88 (98)
Taking blood simple			36 (40)		54 (60)		1 (1)		1 (1)	88 (98)
Cardiotocography interpretation			12 (13)	12 (13)	66 (73)				15 (17)	75 (83)
Perform speculum examination during pregnancy	1 (1)		22 (24)	8 (9)	59 (66)			2 (2)	2 (2)	86 (96)
Pregnancy ultrasound scans		2 (2)	14 (16)	36 (40)	38 (42)		2 (2)		26 (29)	62 (69)
Delivery skills										
Pudendal anesthesia	25 (28)	50 (56)	1 (1)	2 (2)	12 (13)		2 (2)	37 (41)	24 (27)	27 (30)

Perform normal delivery			2 (2)		88 (98)				4 (4)	86 (96)
Episiotomy and repair			8 (9)	35 (39)	47 (52)				35 (39)	55 (61)
Evaluation of cervical dilatation during active labor	5 (6)		2 (2)	5 (6)	78 (87)				13 (14)	77 (86)
Partogram interpretation			13 (14)		77 (86)			2 (2)		88 (98)
Obstetrical complications skills										
Neonatal resuscitation		2 (2)	14 (16)	50 (56)	24 (27)			1 (1)	1 (1)	88 (98)
Foley catheterization		13 (14)	13 (14)	1 (1)	63 (70)		1 (1)		45 (50)	44 (49)
Periferic line		14 (16)			76 (84)		1 (1)	1 (1)		88 (98)
Umbilical line	26 (28)	37 (41)	27 (30)					1 (1)	60 (67)	29 (32)
Manual placental removal	14 (16)	12 (13)	24 (27)		40 (44)			2 (2)	24 (63)	64 (71)
Postpartum Hemorrhage management			13 (14)	14 (16)	63 (70)			13 (14)	13 (14)	64 (71)
Forceps assisted vaginal delivery	28 (31)	15 (17)	35 (39)	12 (13)		2 (2)	13 (14)	36 (40)	35 (39)	4 (4)
Vacuum assisted vaginal delivery	1 (1)	39 (43)	25 (28)	5 (6)	20 (22)		25 (28)	37 (41)	25 (28)	3 (3)
Emergency C-section	13 (14)	28 (31)		13 (14)	36 (40)		2 (2)	25 (28)	36 (40)	27 (30)
External cephalic versión	37 (41)	15 (17)			38 (42)			13 (14)	36 (40)	41 (46)
Repair of Obstetric Perineal Lacerations			26 (28)	24 (26)	40 (44)			2 (2)	3 (3)	85 (94)

- (a) 1=not seen, not performed; 2=demonstrated, but not performed; 3=performed once; 4=performed 3 times; 5=performed + 10 times
- (b) 1=strongly disagree; 2=disagree; 3=Neither agree nor disagree; 4=agree; 5=strongly agree

The correlation of perceptions between skill importance in rural areas and clerkship experience of obstetrical skills are summarized in Table 2.

Table 2 Correlation between previous clerkship experience and obstetrical skills importance perceptions by rural doctors in Southern Ecuador.

	Clerkship experience		Skills importance		Spearman's Correlation	
	Median	Range (a)	Median	Range (b)	Rs	p
Obstetrical skills						
Taking blood pressure	5	1 (4-5)	5	1 (4-5)	-,016	,880
Taking blood simple	5	2 (3-5)	5	3 (2-5)	,188	,080
Cardiotocography interpretation	5	2 (3-5)	5	1 (4-5)	,630*	,000
Perform speculum examination during pregnancy	4	4 (1-5)	5	2 (3-5)	,211*	,048
Pregnancy ultrasound scans	4	3 (2-5)	5	3 (2-5)	,066	,540
Delivery skills						

Pudendal anesthesia	2	4 (1-5)	4	3 (2-5)	,553*	,000
Perform normal delivery	5	2 (3-5)	5	1 (4-5)	-0,020	0,852
Episiotomy and repair	5	1 (3-5)	5	1 (4-5)	-,308*	0,004
Evaluation of cervical dilatation during active labor	5	3 (1-5)	5	1 (4-5)	,284*	0,007
Partogram interpretation	5	2 (3-5)	5	2 (3-5)	-0,041	0,708
Obstetrical complications skills						
Neonatal resuscitation	4	3 (2-5)	5	2 (3-5)	,270*	,011
Foley catheterization	5	3 (2-5)	4	3 (2-5)	,527*	,000
Periferic line	5	3 (2-5)	5	3 (2-5)	,366*	,000
Umbilical line	2	2 (1-3)	4	2 (3-5)	-,338*	,001
Manual placental removal	3	4 (1-5)	5	2 (3-5)	,822*	,000
Postpartum Hemorrhage management	5	2 (3-5)	5	2 (3-5)	,931*	,000
Forceps assisted vaginal delivery	3	3 (1-4)	3	4 (1-5)	0,084	,441
Vacuum assisted vaginal delivery	2	2 (1-5)	3	3 (2-5)	,252*	,018
Emergency C-section	4	4 (1-5)	4	3 (2-5)	-0,016	,882
External cephalic versión	2	4 (1-5)	4	2 (3-5)	-0,109	,313
Repair of Obstetric Perineal Lacerations	4	2 (3-5)	5	2 (3-5)	-0,108	,315

(a) 1=not seen, not performed; 2=demonstrated, but not performed; 3=performed once; 4=performed 3 times; 5=performed + 10 times

(b) 1=strongly disagree; 2=disagree; 3=Neither agree nor disagree; 4=agree; 5=strongly agree

*correlation is significant

A positive correlation means if the perception of importance in the internship increases, the internship experience also increases. The data shows correlation levels between the perceptions. They can be divided into very high positive correlation ($r = .9$ to 1), high positive correlation ($r = .7$ to $.9$), moderate positive correlation ($r = .5$ to $.7$) and low positive correlation ($r = .3$ to $.5$). The negative correlation means that one variable increase as another decrease. We found only a level of low negative correlation ($r = -.3$ to $-.5$). The negligible correlation means that there is no relationship between the two variables. It can be positive or negative correlation ($r = .0$ to $.3$ or $.0$ to $-.3$).

We found six skills with negligible or negative correlation. In those, we show the differences in the associations between the skill importance and clerkship experience in figure 1.

As the data obtained shows the skill "Episiotomy and repair" is important (strongly agree and agree) to 100% of respondents. However in practice, only 38.9% of rural doctors performed the task three

times and 8.3% only once during the internship. For “umbilical vein catheterization” is important in 98.9% of respondents and 30.0% have practiced once, 41.1% have seen and 28.8% have not seen nor practice at all during the internship.

The skill “speculum examination during pregnancy” is important to 98.8 % of rural doctors; during the internship only 8.3% of rural doctors performed the task three times and 25% only once. The “evaluation of cervical dilatation during active labor” is important for 100 % of respondents, 86% have practiced the skills more than 10 times, 5.6% at least 3 times, 2.8% once and 5.6% had not seen nor performed during the clerkships. The “neonatal resuscitation” skill is important for 98.8% of respondents, 26.7% have performed more than 10 times, 55.6% three times and 15.5% have practiced once during the clerkships. The skill “vacuum assisted vaginal delivery” is important for 31.8% of rural doctors, 22% have practiced more than 10 times, 5,6% three times, 27.8% only once and 44.4% only seen nor practiced during the internship.

DISCUSSION

This study shows that six skills are appropriately practiced in the internships while six other skills may not have been adequately learned. Skills rated important for rural practice have not been seen nor practiced by 6 to 45% of respondents while others skills, between 8 to 14%, have been practiced only once during the internship. The results indicate lack of practice for several of the most frequent and important obstetrical skills in undergraduate curriculum in Ecuador.

We did not ask the rural doctors to reflect back on their responses, although this could diminish the subjectivity of the results. The variable perceptions could be determined by the experiences in different clerkships. This can be a reason why many respondents interpreted most of the skills as 'important'.^[16]

The data suggest the partial mismatch in Ecuadorian undergraduate curricula with the skills required of rural service physicians. Other studies have identified such mismatch.^{[17][18][19][20][21]} In Ecuador because of the use of young graduates in rural areas, these mismatches directly influence epidemiological data and may increase morbidity and even maternal or neonatal mortality.

Medical competence may be defined as the integration of knowledge, skills and attitudes to enable proper management of health problems.[22][23][24] However, of the skills included in this study, the minimum number of procedures that needs to be performed in the undergraduate curriculum to ensure competency and adequate performance in the subsequent rural year is unknown. We found that the basic doctors did not have the possibility of training during the undergraduate period.

Therefore they may be not entirely safe in their work.

Competency is influenced by learner's proficiency, learning capacity, number practice opportunities in the clerkship and the interest to perform a skill.[25][26] The skill "Episiotomy and repair" is frequently required in rural practice. However, 39% of survey respondents practiced it three times and 8% only once during their internship. These figures seem inappropriate to safely manage this obstetrical problem.

Some studies attribute the lack of opportunities to practice clinical skills during the internship due to factors such as: the increasing number of students posted in training hospitals, without a proportionate increase in the practice opportunities;[18] difficulty in training during internships; [17][27] and inadequate and inappropriate supervision, feedback and assessment.[22] These result in an inconsistent level of student exposure to the skills that they need to competently perform as practicing medical doctors[15].

Family medicine residency programs have been developed tiers of preparation for maternity care.[28] In Ecuador the recent graduates may have to face the three tiers proposed depending on the site assigned. The questions arise as Bridge proposes: 1) what do we want the new graduate to do? And, 2) how we want them to act in real life situations? [7]

Improvements in the training programs are required. Beyond faculty development more emphasis should be given to those obstetrical skills important for practice in rural areas. Skills Labs should be incorporated as a new learning strategy for their acquisition and practice.

Methodological considerations

This study is limited to rural doctors from one province in Southern Ecuador. The inherent bias of participant’s selection and the high response rate due to a pressure to fill the survey are acknowledged. Possible effects of memory recall of the clerkships experience in the obstetrical skills should be taken into account. In the other side rural doctors are facing the real needs of its population.

The study only accounted for subjective opinions of survey respondents, and the actual dexterity of performing the skills was not assessed. At the participating Universities, we have introduced skill lab training focusing on the perinatal skills. Therefore, future research on this topic can measure knowledge, skills and behaviors with objective structured clinical examinations (OSCE) prior and after the internship.

The present study only investigates the perceptions of the important skills in rural areas and clerkship experiences. Other aspects such as the way that perinatal care is taught in the medical schools remains not investigated. Despite recent reforms in higher education in Ecuador, the availability of well-trained faculty at medical schools remains unstable, and there are few mechanisms currently in place to ensure quality and supply of teaching staff.[6]

We are showing evidence among recent graduated medical doctors doing their rural service who are not in training but have an important duty in the Ecuadorian health system. The recent graduate medical doctor or basic doctor does not have the training as general practitioner or family doctor.

We used some literature in postgraduate training to face the limitations of these rural doctors. [29]

We did not analyze internship experiences in function of the University the students graduated from.

In Ecuador, the use of a standard medical curriculum is problematic. In 2008 a constitutional mandate began the evaluation of the higher education system. Those universities that did not improve and did not meet the minimum quality standards were closed in 2012. The governmental control agency continues monitoring and evaluating colleges and careers to improve higher education in Ecuador. The last assessment conducted was in 2013.[30]

Implications for Ecuadorian medical training

Although the effectiveness of self-assessment on identification of learner needs and learner activity may have limitations, the gap between the perceptions of skills needed and actual practice has been demonstrated. Extending the study using other sources of feedback and assessment could provide a more complete appraisal of competence in obstetrical skills required for the rural year.[31]

A collaborative approach between the faculty, the Ministry of Health and rural doctors is proposed with the objective to improve the undergraduate curriculum and better meet the needs of the recent graduates entering into rural service.[21][32][16] One option would be to offer more exposure to rural communities in the undergraduate curriculum.[33][34][35] This can be supplemented with virtual monitoring and materials for online or continuing medical education. The implementation of skills laboratory training can better prepare students for clerkships.[36]

These results also raise several questions regarding current training for the recent graduates and the improvement of rural medical care: Should all basic doctors be trained to perform a core set of obstetrical procedures, or should students be trained with a focus towards the location of the rural year? What skills are then really needed? Taking into account that after the rural year these doctors choose their specialty, not necessarily related to obstetrics, is it necessary to teach those skills? If in Ecuador we use recent graduates to cover the service: should we prepare the basic doctors in advance procedures in obstetrics and emergencies? Or, do we improve the rural placements for specialists in family medicine with these training? From the public health perspective, future work is needed to study the training of nurses and midwives and the collaboration with the rural doctors.

Conclusion

In this study we have noted the gap between the medical needs of populations in rural areas and training provided during the clerkship experiences of physicians during their rural service year.

The universities have to check their curriculum to meet the needs of rural doctors and improve their skills.

It is imperative to ensure that rural doctors are appropriately trained and skilled in the performance of routine obstetrical duties. This will help to decrease perinatal morbidity and mortality in rural Ecuador.

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BIBLIOGRAPHY

- 1 Frehywot S, Mullan F, Payne PW, *et al.* Compulsory service programmes for recruiting health
workers in remote and rural areas: do they work? *Bulletin of the World Health Organization*
2010;**88**:364–70. doi:10.2471/BLT.09.071605
- 2 Cavender A, Albán M. Compulsory medical service in Ecuador: the physician's perspective.
Social Science & Medicine 1998;**47**:1937–46. doi:10.1016/S0277-9536(98)00335-9
- 3 Ley Orgánica de Salud. *Registro Oficial* 2006;**Nro 423**.
- 4 Decreto Supremo No 44. Ecuador: 1970.
- 5 *Health systems profile. Ecuador. Monitoring and analysis health systems change/reform*. Third
edit. Washington, D.C.: : USAID, Pan American Health Organization 2008.
http://www2.paho.org/hq/dmdocuments/2010/Health_System_Profile-Ecuador_2008.pdf
- 6 Carrillo J, Delgado B, Kosik RO, *et al.* Medical education in Ecuador. *Medical teacher* 2013;;1–
6. doi:10.3109/0142159X.2013.826789
- 7 Borrell RM. La educación médica en América Latina: debates centrales sobre los paradigmas
científicos y epistemológicos. In: *Proceso de transformación Curricular: otro paradigma es*
posible. Rosario, Argentina: Universidad Nacional de Rosario 2005. 1–32.
- 8 Universidad Técnica Particular de Loja. Pensum Carrera de Medicina.
2010.<http://www.utpl.edu.ec/academia/pregrado/area-biologica>
- 9 Pontificia Universidad Católica del Ecuador. Malla Curricular de la carrera de Medicina. 2008.
<http://www.puce.edu.ec/documentos/mallas-curriculares/vigentes/PUCE-MED-Medicina.pdf>
- 10 Sanders CW, Edwards JC, Burdinski TK. A survey of basic technical skills of medical students.
Academic medicine : journal of the Association of American Medical Colleges 2004;**79**:873–
5.<http://www.ncbi.nlm.nih.gov/pubmed/15326014> (accessed 26 Apr2013).
- 11 Ministerio de Salud Pública. Año de Salud Rural. 2013.<http://www.salud.gob.ec/ano-de-salud-rural/>

1
2
3 12 Instituto Nacional de Estadísticas y Censos. Indicadores básicos de salud. Ecuador 2009. Quito:
4
5 2009. <http://new.paho.org/ecu/index.php>
6
7 13 Instituto Nacional de Estadísticas y Censos. Indicadores básicos de salud. Ecuador 2011. Quito:
8
9 2011.
10
11 14 Clack GB. Medical graduates evaluate the effectiveness of their education. *Medical Education*
12
13 1994;**28**:418–31. doi:10.1111/j.1365-2923.1994.tb02553.x
14
15 15 Remmen R, Denekens J, Scherpbier A, *et al.* An evaluation study of the didactic quality of
16
17 clerkships. *Medical education* 2000;**34**:460–4.
18
19 <http://www.ncbi.nlm.nih.gov/pubmed/10792687> (accessed 3 Oct 2013).
20
21 16 Wenrich M, Jackson MB, Scherpbier AJ, *et al.* Ready or not? Expectations of faculty and
22
23 medical students for clinical skills preparation for clerkships. *Medical education online*
24
25 2010;**15**:1–8. doi:10.3402/meo.v15i0.5295
26
27 17 Remmen R, Derese A, Scherpbier A, *et al.* Can medical schools rely on clerkships to train
28
29 students in basic clinical skills? *Medical Education* 1999;**33**:600–5. doi:10.1046/j.1365-
30
31 2923.1999.00467.x
32
33 18 Lai NM, Sivalingam N, Ramesh JC. Medical students in their final six months of training :
34
35 progress in self-perceived clinical competence , and relationship between experience and
36
37 confidence in practical skills. *Singapore Medical Journal* 2007;**48**:1018–27.
38
39 <http://smj.sma.org.sg/4811/4811a7.pdf>
40
41 19 Lyss-Lerman P, Teherani A, Aagaard E, *et al.* What training is needed in the fourth year of
42
43 medical school? Views of residency program directors. *Academic medicine : journal of the*
44
45 *Association of American Medical Colleges* 2009;**84**:823–9.
46
47 doi:10.1097/ACM.0b013e3181a82426
48
49 20 Galli A, Gregorio MJ de. Competencias adquiridas en la carrera de Medicina: Comparación
50
51 entre egresados de dos universidades, una pública y otra privada. *Educación Médica*
52
53 2006;**9**:21–6. doi:10.4321/S1575-18132006000100006
54
55
56
57
58
59
60

- 21 Moercke AM, Eika B. What are the clinical skills levels of newly graduated physicians? Self-assessment study of an intended curriculum identified by a Delphi process. *Medical education* 2002;**36**:472–8.
- 22 Daelmans HEM, Hoogenboom RJI, Donker a JM, *et al.* Effectiveness of clinical rotations as a learning environment for achieving competences. *Medical teacher* 2004;**26**:305–12.
doi:10.1080/01421590410001683195
- 23 Ireland J, Bryers H, van Teijlingen E, *et al.* Competencies and skills for remote and rural maternity care: a review of the literature. *Journal of advanced nursing* 2007;**58**:105–15.
doi:10.1111/j.1365-2648.2007.04246.x
- 24 Van der Vleuten CPM, Schuwirth LWT, Scheele F, *et al.* The assessment of professional competence: building blocks for theory development. *Best practice & research Clinical obstetrics & gynaecology* 2010;**24**:703–19. doi:10.1016/j.bpobgyn.2010.04.001
- 25 Kelly BF, Sicilia JM, Forman S, *et al.* Advanced procedural training in family medicine: a group consensus statement. *Family medicine* 2009;**41**:398–404.
<http://www.ncbi.nlm.nih.gov/pubmed/19492186>
- 26 Sicaja M, Romić D, Prka Z. Medical students' clinical skills do not match their teachers' expectations: survey at Zagreb University School of Medicine, Croatia. *Croatian medical journal* 2006;**47**:169–75.
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2080370&tool=pmcentrez&rendertype=abstract>
- 27 De Villiers MR, De Villiers PJT. The knowledge and skills gap of medical practitioners delivering district hospital services in the Western Cape , South Africa. *South African Family Practice* 2006;**48**:2–5.
- 28 Coonrod RA, Kelly BF, Ellert W, *et al.* Tiered maternity care training in family medicine. *Family medicine* 2011;**43**:631–7.<http://www.ncbi.nlm.nih.gov/pubmed/22002774>

29 Rodney WM, Martinez C, Collins M, et al. OB fellowship outcomes 1992-2010: where do they go, who stops delivering, and why? *Family medicine* 2010;**42**:712–6.

30 Consejo Nacional de Evaluación y Acreditación de Educación Superior del Ecuador. Mandato 14. Modelo de evaluación de desempeño institucional de las instituciones de educación superior. 2009.

http://www.ceaaces.gob.ec/images/stories/documentacion/mandato_14/informe_2009/2_modelo_evaluacion/Descripción_Modelo_Final.pdf

31 Colthart I, Bagnall G, Evans A, et al. The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. *Medical teacher* 2008;**30**:124–45. doi:10.1080/01421590701881699

32 Peeraer G, De Winter BY, Muijtjens a MM, et al. Evaluating the effectiveness of curriculum change. Is there a difference between graduating student outcomes from two different curricula? *Medical teacher* 2009;**31**:e64–8. doi:10.1080/01421590802512920

33 Zink T, Halaas GW, Finstad D, et al. The rural physician associate program: the value of immersion learning for third-year medical students. *The Journal of rural health : official journal of the American Rural Health Association and the National Rural Health Care Association* 2008;**24**:353–9. doi:10.1111/j.1748-0361.2008.00181.x

34 Young L, Rego P, Peterson R. Clinical location and student learning: outcomes from the LCAP program in Queensland, Australia. *Teaching and learning in medicine* 2008;**20**:261–6. doi:10.1080/10401330802199583

35 Worley P, Strasser R, Prideaux D. Can medical students learn specialist disciplines based in rural practice: lessons from students' self reported experience and competence. *Rural and Remote Health* 2004;**4**. http://www.rrh.org.au/publishedarticles/article_print_338.pdf

36 Remmen R, Scherpbier A, van der Vleuten C, et al. Effectiveness of basic clinical skills training programmes: a cross-sectional comparison of four medical schools. *Medical education* 2001;**35**:121–8.

Figure 1. Differences in the relationship between the perceptions of clerkship experience and skills importance of obstetrical skills in rural doctors with negligible or negative correlations ($r = .0$ to $.3$ or -0 to $-.3$ or $r = -.3$ to $-.5$)

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Cover letter

Ecuador is in the process of strengthening the universities starting with medicine career as well improving the primary care strategy in the health system. It is necessary to know the needs of the population to improve medical training, more even when there is a compulsory rural year to accomplish. There are conclusions from educational leaders to improve the medical education focus on the needs of the population to serve. There is no literature available about the match between the needs of population and the medical curriculum in Ecuador.

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Title page

Are recent graduates enough prepared to perform obstetric skills in their rural and compulsory year?

A study from Ecuador

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Are recent graduates enough prepared to perform obstetric skills in their rural and compulsory year?

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Abstract

Objectives: The aim of this study was to assess the possible mismatch of obstetrical skills between the training offered in Ecuadorian medical schools and the tasks required for compulsory rural service.

Setting: Primary care, rural health centers in Southern Ecuador.

Participants: A total of 92 recent graduated medical doctors during their compulsory rural year

Primary and secondary outcomes measures:

A web based survey was developed with twenty one obstetrical skills. The questionnaire was sent to all rural doctors who work in Loja province, Southern Ecuador, at the Ministry of Health (n=92).

We measured two categories: “importance of skills in rural practice” with a five point Likert-type scale (1= strongly disagree; 5= strongly agree); and “clerkship experience” using a nominal scale divided in five levels: level 1 (not seen, not performed) to level 5 (performed 10 times or more).

Spearman’s rank correlation coefficient (r) was used to observe associations.

Results

A negative correlation was found in the skills: “episiotomy and repair”, “umbilical vein catheterization”, “speculum examination”, “evaluation of cervical dilatation during active labor”, “neonatal resuscitation” and “vacuum assisted vaginal delivery”. For instance “Episiotomy and repair” is important (strongly agree and agree) to 100% of respondents, but in practice, only 38.9% of rural doctors performed the task three times and 8.3% only once during the internship, similar pattern is seen in the others.

Conclusion

In this study we have noted the gap between the medical needs of populations in rural areas and training provided during the clerkship experiences of physicians during their rural service year.

It is imperative to ensure that rural doctors are appropriately trained and skilled in the performance of routine obstetrical duties. This will help to decrease perinatal morbidity and mortality in rural Ecuador.

Strengths and limitations of this study

- This study is the first that assess the perception of obstetrical skills training in recent graduates doing a compulsory rural year in Ecuador.
- Possible effects of memory recall of the clerkships experience affects the results even the recent graduates are now facing the problems of doing rural service.

INTRODUCTION

Generally, it is assumed that physicians acquire relevant knowledge, skills and attitudes in medical school. After the undergraduate level, graduates must be prepared to work as trainees in a specialty. Some countries include compulsory programs of various lengths to perform medical services outside of the medical campus or hospitals.[1]

In Ecuador recent graduates are required to work for the public health system in order to help distribute the medical workforce to rural communities. The rural health facilities are located between 30 minutes to two hours from the capital of each province. They vary in size but the majorities are small. They are open 5 days a week and should serve as referral link to the hospitals.[2] The recent graduate *médico básico* serves one year in a rural health center to obtain the license to practice and to apply for further residency training.[3][4] This compulsory year exposes them to the realities of providing rural health services and should improve their skills.[5]

As in most other Latin American countries, in Ecuador, undergraduate medical training is provided in large cities by public and private universities.[6] Medical education is still based on Flexner's pedagogical principles where the hospitals are the foundation of medical teaching and learning during clinical training. This focus on hospital diseases often excludes the common health problems of the general population.[6][7]

The six-year undergraduate curriculum comprises of two years of mainly lecture-based basic science courses, and four years of clinical education, consisting of clerkship rotations, most in hospital settings, between one to three months of length. During their final year or internship, medical students practice in five rotations in training hospitals in the following areas: internal medicine, surgery, obstetrics and gynecology, pediatrics, and pre-rural.[8][9] The traditional teaching of procedural skills is described as “see one, do one, teach one”. Tutors teach residents and students according to their own personal experiences.[10]

After graduation and the lottery for the rural year, all new rural doctors receive a five day course to prepare them for the rural service experience. In this training they learn the Ministry of Health administrative process and clinical guidelines.[11]

Recent data show that in these rural areas, the medical needs of the population are often unmet. For instance, in Ecuador the maternal mortality rate increased from 52.5 in 2007 to 92.6 maternal deaths per 100.000 live births in 2010. Postpartum hemorrhage remains the leading preventable cause of maternal death.[12][13] One explanation could be that young, rural doctors are not trained according to the tasks they must perform in those areas, and may pose a potential risk for their patients.[14][15]

This study was performed to examine if rural doctors are adequately prepared to perform well in rural settings. The purpose is to assess the possible mismatch of obstetrical skills between the training offered in Ecuadorian medical schools and the tasks required of rural service physicians.

METHODOLOGY

Instrument and Participants

A web based survey was developed using the procedures of two medical school’s curricula: *Universidad Técnica Particular de Loja – UTPL* and *Pontificia Universidad Católica del Ecuador – PUCE*. We focused on twenty one obstetrical skills divided into three groups: basic obstetrical skills, delivery skills and complication management skills. (Table 1) The questionnaire was sent to recent graduated medical doctors during their compulsory rural year listed at the Ministry of Health (n=92). They had

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3 been working in the rural placement at least five months in Loja province, in the Southern Ecuador.

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5 Two reminders in a period of two months were sent to non-responders. The results were
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7 anonymous, but IP addresses were checked to exclude possible redundancy.

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9 Two categories were measured. Firstly, the “importance of skills in rural practice” was assessed on a
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11 five point Likert-type scale (1= strongly disagree; 5= strongly agree). Secondly, participants were
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13 asked to reflect on their former “clerkship experience” by using a nominal scale used in research by
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15 Peeraer G, et al. The scale is divided in five levels: level 1 (not seen, not performed), level 2
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17 (demonstrated, but not performed), level 3 (performed one time), level 4 (performed approximately
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19 three times) and level 5 (performed 10 times or more). The questionnaire was pilot tested prior to
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21 administration for comprehensibility and clarity.
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24 Data was collected using a free online survey tool (KwikSurveys, <http://www.kwksurveys.com/>) that
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26 allowed checking submissions by IP address.
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28 29 Ethical issues

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31 The Universidad Técnica Particular de Loja and the research committee of Pontificia Universidad
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33 Católica de Ecuador approved the study protocol and the questionnaire. The Chief of the Dirección
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35 Provincial de Salud de Loja authorized sending the questionnaire to the rural doctors. In the survey
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37 an Informed Consent form was included to allow the participants to accept or decline participation.
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39 40 Statistical Analysis

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42 Descriptive statistics were performed using SPSS software (version 20.0.0). Spearman’s rank
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44 correlation coefficient (r) was used to observe associations. The significance level was set at 0.05 for
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46 all items.
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48 49 RESULTS

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51 Ninety rural doctors completed the questionnaire (26 men, 64 women), two respondents did not
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53 answer. (Table 1)
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Table 1 Rural doctors responses about previous clerkship experience and obstetrical skills importance during the compulsory year in Southern Ecuador.

	Clerkship experience (a)					Skills importance (b)				
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
Obstetrical skills										
Taking blood pressure				2 (2)	88 (98)				2 (2)	88 (98)
Taking blood simple			36 (40)		54 (60)		1 (1)		1 (1)	88 (98)
Cardiotocography interpretation			12 (13)	12 (13)	66 (73)				15 (17)	75 (83)
Perform speculum examination during pregnancy	1 (1)		22 (24)	8 (9)	59 (66)			2 (2)	2 (2)	86 (96)
Pregnancy ultrasound scans		2 (2)	14 (16)	36 (40)	38 (42)		2 (2)		26 (29)	62 (69)
Delivery skills										
Pudendal anesthesia	25 (28)	50 (56)	1 (1)	2 (2)	12 (13)		2 (2)	37 (41)	24 (27)	27 (30)
Perform normal delivery			2 (2)		88 (98)				4 (4)	86 (96)
Episiotomy and repair			8 (9)	35 (39)	47 (52)				35 (39)	55 (61)
Evaluation of cervical dilatation during active labor	5 (6)		2 (2)	5 (6)	78 (87)				13 (14)	77 (86)
Partogram interpretation			13 (14)		77 (86)			2 (2)		88 (98)
Obstetrical complications skills										
Neonatal resuscitation		2 (2)	14 (16)	50 (56)	24 (27)			1 (1)	1 (1)	88 (98)
Foley catheterization		13 (14)	13 (14)	1 (1)	63 (70)		1 (1)		45 (50)	44 (49)
Periferic line		14 (16)			76 (84)		1 (1)	1 (1)		88 (98)
Umbilical line	26 (28)	37 (41)	27 (30)					1 (1)	60 (67)	29 (32)
Manual placental removal	14 (16)	12 (13)	24 (27)		40 (44)			2 (2)	24 (26)	64 (71)
Postpartum Hemorrhage management			13 (14)	14 (16)	63 (70)			13 (14)	13 (14)	64 (71)
Forceps assisted vaginal delivery	28 (31)	15 (17)	35 (39)	12 (13)		2 (2)	13 (14)	36 (40)	35 (39)	4 (4)
Vacuum assisted vaginal delivery	1 (1)	39 (43)	25 (28)	5 (6)	20 (22)		25 (28)	37 (41)	25 (28)	3 (3)
Emergency C-section	13 (14)	28 (31)		13 (14)	36 (40)		2 (2)	25 (28)	36 (40)	27 (30)
External cephalic versión	37 (41)	15 (17)			38 (42)			13 (14)	36 (40)	41 (46)
Repair of Obstetric Perineal Lacerations			26 (28)	24 (26)	40 (44)			2 (2)	3 (3)	85 (94)

(a) 1=not seen, not performed; 2=demonstrated, but not performed; 3=performed once; 4=performed 3 times; 5=performed + 10 times

(b) 1=strongly disagree; 2=disagree; 3=Neither agree nor disagree; 4=agree; 5=strongly agree

The correlation of perceptions between skill importance in rural areas and clerkship experience of obstetrical skills are summarized in Table 2.

Table 2 Correlation between previous clerkship experience and obstetrical skills importance perceptions by rural doctors in Southern Ecuador.

	Clerkship experience		Skills importance		Spearman's Correlation	
	Median	Range (a)	Median	Range (b)	Rs	p
Obstetrical skills						
Taking blood pressure	5	1 (4-5)	5	1 (4-5)	-,016	,880
Taking blood simple	5	2 (3-5)	5	3 (2-5)	,188	,080
Cardiotocography interpretation	5	2 (3-5)	5	1 (4-5)	,630*	,000
Perform speculum examination during pregnancy	4	4 (1-5)	5	2 (3-5)	,211*	,048
Pregnancy ultrasound scans	4	3 (2-5)	5	3 (2-5)	,066	,540
Delivery skills						
Pudendal anesthesia	2	4 (1-5)	4	3 (2-5)	,553*	,000
Perform normal delivery	5	2 (3-5)	5	1 (4-5)	-0,020	0,852
Episiotomy and repair	5	1 (3-5)	5	1 (4-5)	-,308*	0,004
Evaluation of cervical dilatation during active labor	5	3 (1-5)	5	1 (4-5)	,284*	0,007
Partogram interpretation	5	2 (3-5)	5	2 (3-5)	-0,041	0,708
Obstetrical complications skills						
Neonatal resuscitation	4	3 (2-5)	5	2 (3-5)	,270*	,011
Foley catheterization	5	3 (2-5)	4	3 (2-5)	,527*	,000
Periferic line	5	3 (2-5)	5	3 (2-5)	,366*	,000
Umbilical line	2	2 (1-3)	4	2 (3-5)	-,338*	,001
Manual placental removal	3	4 (1-5)	5	2 (3-5)	,822*	,000
Postpartum Hemorrhage management	5	2 (3-5)	5	2 (3-5)	,931*	,000
Forceps assisted vaginal delivery	3	3 (1-4)	3	4 (1-5)	0,084	,441
Vacuum assisted vaginal delivery	2	2 (1-5)	3	3 (2-5)	,252*	,018
Emergency C-section	4	4 (1-5)	4	3 (2-5)	-0,016	,882
External cephalic versión	2	4 (1-5)	4	2 (3-5)	-0,109	,313
Repair of Obstetric Perineal Lacerations	4	2 (3-5)	5	2 (3-5)	-0,108	,315

(a) 1=not seen, not performed; 2=demonstrated, but not performed; 3=performed once; 4=performed 3 times; 5=performed + 10 times

(b) 1=strongly disagree; 2=disagree; 3=Neither agree nor disagree; 4=agree; 5=strongly agree

*correlation is significant

A positive correlation means if the perception of importance in the internship increases, the

internship experience also increases. The data shows correlation levels between the perceptions.

They can be divided into very high positive correlation ($r = .9$ to 1), high positive correlation ($r = .7$ to $.9$), moderate positive correlation ($r = .5$ to $.7$) and low positive correlation ($r = .3$ to $.5$).

The negative correlation means that one variable increase as another decrease. We found only a level of low negative correlation ($r = -.3$ to $-.5$). The negligible correlation means that there is no relationship between the two variables. It can be positive or negative correlation ($r = .0$ to $.3$ or $.0$ to $-.3$) We found six skills with negligible or negative correlation. In those, we show the differences in the associations between the skill importance and clerkship experience in figure 1.

As the data obtained shows the skill “Episiotomy and repair” is important (strongly agree and agree) to 100% of respondents. However in practice, only 38.9% of rural doctors performed the task three times and 8.3% only once during the internship. For “umbilical vein catheterization” is important in 98.9% of respondents and 30.0% have practiced once, 41.1% have seen and 28.8% have not seen nor practice at all during the internship.

The skill “speculum examination during pregnancy” is important to 98.8 % of rural doctors; during the internship only 8.3% of rural doctors performed the task three times and 25% only once. The “evaluation of cervical dilatation during active labor” is important for 100 % of respondents, 86% have practiced the skills more than 10 times, 5.6% at least 3 times, 2.8% once and 5.6% had not seen nor performed during the clerkships. The “neonatal resuscitation” skill is important for 98.8% of respondents, 26.7% have performed more than 10 times, 55.6% three times and 15.5% have practiced once during the clerkships. The skill “vacuum assisted vaginal delivery” is important for 31.8% of rural doctors, 22% have practiced more than 10 times, 5,6% three times, 27.8% only once and 44.4% only seen nor practiced during the internship.

DISCUSSION

This study shows that six skills are appropriately practiced in the internships while six other skills may not have been adequately learned. Skills rated important for rural practice have not been seen nor practiced by 6 to 45% of respondents while others skills, between 8 to 14%, have been practiced only once during the internship. The results indicate lack of practice for several of the most frequent and important obstetrical skills in undergraduate curriculum in Ecuador.

We did not ask the rural doctors to reflect back on their responses, although this it could diminish the subjectivity of the results. The variable perceptions could be determined by the experiences in different clerkships. This can be a reason why many respondents interpreted most of the skills as 'important'.^[16]

The data suggest the partial mismatch in Ecuadorian undergraduate curricula with the skills required of rural service physicians. Other studies have identified such mismatch.^{[17][18][19][20][21]} In Ecuador because of the use of young graduates in rural areas, these mismatches directly influence epidemiological data and may increase morbidity and even maternal or neonatal mortality.

Medical competence may be defined as the integration of knowledge, skills and attitudes to enable proper management of health problems.^{[22][23][24]} However, of the skills included in this study, the minimum number of procedures that needs to be performed in the undergraduate curriculum to ensure competency and adequate performance in the subsequent rural year is unknown. We found that the basic doctors did not have the possibility of training during the undergraduate period. Therefore they may be not entirely safe in their work.

Competency is influenced by learner's proficiency, learning capacity, number practice opportunities in the clerkship and the interest to perform a skill.^{[25][26]} The skill "Episiotomy and repair" is frequently required in rural practice. However, 39% of survey respondents practiced it three times and 8% only once during their internship. These figures seem inappropriate to safely manage this obstetrical problem.

Some studies attribute the lack of opportunities to practice clinical skills during the internship due to factors such as: the increasing number of students posted in training hospitals, without a proportionate increase in the practice opportunities;^[18] difficulty in training during internships;^{[17][27]} and inadequate and inappropriate supervision, feedback and assessment.^[22] These result in an inconsistent level of student exposure to the skills that they need to competently perform as practicing medical doctors^[15].

Family medicine residency programs have been developed tiers of preparation for maternity care.^[28] In Ecuador the recent graduates may have to face the three tiers proposed depending on

the site assigned. The questions arise as Bridge proposes: 1) what do we want the new graduate to do? And, 2) how we want them to act in real life situations? [7]

Improvements in the training programs are required. Beyond faculty development more emphasis should be given to those obstetrical skills important for practice in rural areas. Skills Labs should be incorporated as a new learning strategy for their acquisition and practice.

Methodological considerations

This study is limited to rural doctors from one province in Southern Ecuador. The inherent bias of participant’s selection and the high response rate due to a pressure to fill the survey are acknowledged. Possible effects of memory recall of the clerkships experience in the obstetrical skills should be taken into account. In the other side rural doctors are facing the real needs of its population.

The study only accounted for subjective opinions of survey respondents, and the actual dexterity of performing the skills was not assessed. At the participating Universities, we have introduced skill lab training focusing on the perinatal skills. Therefore, future research on this topic can measure knowledge, skills and behaviors with objective structured clinical examinations (OSCE) prior and after the internship.

The present study only investigates the perceptions of the important skills in rural areas and clerkship experiences. Other aspects such as the way that perinatal care is taught in the medical schools remains not investigated. Despite recent reforms in higher education in Ecuador, the availability of well-trained faculty at medical schools remains unstable, and there are few mechanisms currently in place to ensure quality and supply of teaching staff.[6]

We are showing evidence among recent graduated medical doctors doing their rural service who are not in training but have an important duty in the Ecuadorian health system. The recent graduate medical doctor or basic doctor does not have the training as general practitioner or family doctor. We used some literature in postgraduate training to face the limitations of these rural doctors. [29]

We did not analyze internship experiences in function of the University the students graduated from. In Ecuador, the use of a standard medical curriculum is problematic. In 2008 a constitutional mandate began the evaluation of the higher education system. Those universities that did not improve and did not meet the minimum quality standards were closed in 2012. The governmental control agency continues monitoring and evaluating colleges and careers to improve higher education in Ecuador. The last assessment conducted was in 2013.[30]

Implications for Ecuadorian medical training

Although the effectiveness of self-assessment on identification of learner needs and learner activity may have limitations, the gap between the perceptions of skills needed and actual practice has been demonstrated. Extending the study using other sources of feedback and assessment could provide a more complete appraisal of competence in obstetrical skills required for the rural year.[31]

A collaborative approach between the faculty, the Ministry of Health and rural doctors is proposed with the objective to improve the undergraduate curriculum and better meet the needs of the recent graduates entering into rural service.[21][32][16] One option would be to offer more exposure to rural communities in the undergraduate curriculum.[33][34][35] This can be supplemented with virtual monitoring and materials for online or continuing medical education. The implementation of skills laboratory training can better prepare students for clerkships.[36]

These results also raise several questions regarding current training for the recent graduates **and the improvement of rural medical care**: Should all basic doctors be trained to perform a core set of obstetrical procedures, or should students be trained with a focus towards the location of the rural year? What skills are then really needed? Taking into account that after the rural year these doctors choose their specialty, not necessarily related to obstetrics, is it necessary to teach those skills? **If in Ecuador we use recent graduates to cover the service: should we prepare the basic doctors in advance procedures in obstetrics and emergencies? Or, do we improve the rural placements for specialists in family medicine with these training?** From the public health perspective, future work is needed to study the training of nurses and midwives and the collaboration with the rural doctors.

Conclusion

In this study we have noted the gap between the medical needs of populations in rural areas and training provided during the clerkship experiences of physicians during their rural service year. The universities have to check their curriculum to meet the needs of rural doctors and improve their skills. It is imperative to ensure that rural doctors are appropriately trained and skilled in the performance of routine obstetrical duties. This will help to decrease perinatal morbidity and mortality in rural Ecuador.

Contributors: GS conceptualized the study, developed the proposal and wrote the report. RR participated in the design of the study, coordinated the conduct of the project and assisted in writing the report. VV provided substantial contributions to analysis and interpretation of data and assisted in writing the report. PVR provided substantial contributions to conception and design of the proposal and revising the article critically for important intellectual content and final approval of the version to be published. KH participated in the design of the study, coordinated the conduct of the project and revising the article critically for important intellectual content and final approval of the version to be published.

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Data sharing: No additional data available

BIBLIOGRAPHY

- 1 Frehywot S, Mullan F, Payne PW, *et al.* Compulsory service programmes for recruiting health
workers in remote and rural areas: do they work? *Bulletin of the World Health Organization*
2010;**88**:364–70. doi:10.2471/BLT.09.071605
- 2 Cavender A, Albán M. Compulsory medical service in Ecuador: the physician's perspective.
Social Science & Medicine 1998;**47**:1937–46. doi:10.1016/S0277-9536(98)00335-9
- 3 Ley Orgánica de Salud. *Registro Oficial* 2006;**Nro 423**.
- 4 Decreto Supremo No 44. Ecuador: 1970.
- 5 *Health systems profile. Ecuador. Monitoring and analysis health systems change/reform*. Third
edit. Washington, D.C.: : USAID, Pan American Health Organization 2008.
http://www2.paho.org/hq/dmdocuments/2010/Health_System_Profile-Ecuador_2008.pdf
- 6 Carrillo J, Delgado B, Kosik RO, *et al.* Medical education in Ecuador. *Medical teacher* 2013;;1–
6. doi:10.3109/0142159X.2013.826789
- 7 Borrell RM. La educación médica en América Latina: debates centrales sobre los paradigmas
científicos y epistemológicos. In: *Proceso de transformación Curricular: otro paradigma es*
posible. Rosario, Argentina: Universidad Nacional de Rosario 2005. 1–32.
- 8 Universidad Técnica Particular de Loja. Pensum Carrera de Medicina.
2010.<http://www.utpl.edu.ec/academia/pregrado/area-biologica>
- 9 Pontificia Universidad Católica del Ecuador. Malla Curricular de la carrera de Medicina. 2008.
<http://www.puce.edu.ec/documentos/mallas-curriculares/vigentes/PUCE-MED-Medicina.pdf>
- 10 Sanders CW, Edwards JC, Burdinski TK. A survey of basic technical skills of medical students.
Academic medicine : journal of the Association of American Medical Colleges 2004;**79**:873–
5.<http://www.ncbi.nlm.nih.gov/pubmed/15326014> (accessed 26 Apr2013).
- 11 Ministerio de Salud Pública. Año de Salud Rural. 2013.<http://www.salud.gob.ec/ano-de-salud-rural/>

1
2
3 12 Instituto Nacional de Estadísticas y Censos. Indicadores básicos de salud. Ecuador 2009. Quito:
4
5 2009. <http://new.paho.org/ecu/index.php>
6
7 13 Instituto Nacional de Estadísticas y Censos. Indicadores básicos de salud. Ecuador 2011. Quito:
8
9 2011.
10
11 14 Clack GB. Medical graduates evaluate the effectiveness of their education. *Medical Education*
12 1994;**28**:418–31. doi:10.1111/j.1365-2923.1994.tb02553.x
13
14
15 15 Remmen R, Denekens J, Scherpbier A, *et al*. An evaluation study of the didactic quality of
16 clerkships. *Medical education* 2000;**34**:460–4.
17
18 <http://www.ncbi.nlm.nih.gov/pubmed/10792687> (accessed 3 Oct 2013).
19
20
21
22 16 Wenrich M, Jackson MB, Scherpbier AJ, *et al*. Ready or not? Expectations of faculty and
23 medical students for clinical skills preparation for clerkships. *Medical education online*
24 2010;**15**:1–8. doi:10.3402/meo.v15i0.5295
25
26
27
28 17 Remmen R, Derese A, Scherpbier A, *et al*. Can medical schools rely on clerkships to train
29 students in basic clinical skills? *Medical Education* 1999;**33**:600–5. doi:10.1046/j.1365-
30 2923.1999.00467.x
31
32
33
34 18 Lai NM, Sivalingam N, Ramesh JC. Medical students in their final six months of training :
35 progress in self-perceived clinical competence , and relationship between experience and
36 confidence in practical skills. *Singapore Medical Journal* 2007;**48**:1018–27.
37
38 <http://smj.sma.org.sg/4811/4811a7.pdf>
39
40
41
42 19 Lyss-Lerman P, Teherani A, Aagaard E, *et al*. What training is needed in the fourth year of
43 medical school? Views of residency program directors. *Academic medicine : journal of the*
44 *Association of American Medical Colleges* 2009;**84**:823–9.
45
46
47
48
49
50
51
52
53 20 Galli A, Gregorio MJ de. Competencias adquiridas en la carrera de Medicina: Comparación
54 entre egresados de dos universidades, una pública y otra privada. *Educación Médica*
55 2006;**9**:21–6. doi:10.4321/S1575-18132006000100006
56
57
58
59
60

- 21 Moercke AM, Eika B. What are the clinical skills levels of newly graduated physicians? Self-assessment study of an intended curriculum identified by a Delphi process. *Medical education* 2002;**36**:472–8.
- 22 Daelmans HEM, Hoogenboom RJI, Donker a JM, *et al.* Effectiveness of clinical rotations as a learning environment for achieving competences. *Medical teacher* 2004;**26**:305–12.
doi:10.1080/01421590410001683195
- 23 Ireland J, Bryers H, van Teijlingen E, *et al.* Competencies and skills for remote and rural maternity care: a review of the literature. *Journal of advanced nursing* 2007;**58**:105–15.
doi:10.1111/j.1365-2648.2007.04246.x
- 24 Van der Vleuten CPM, Schuwirth LWT, Scheele F, *et al.* The assessment of professional competence: building blocks for theory development. *Best practice & research Clinical obstetrics & gynaecology* 2010;**24**:703–19. doi:10.1016/j.bpobgyn.2010.04.001
- 25 Kelly BF, Sicilia JM, Forman S, *et al.* Advanced procedural training in family medicine: a group consensus statement. *Family medicine* 2009;**41**:398–404.
<http://www.ncbi.nlm.nih.gov/pubmed/19492186>
- 26 Sicaja M, Romić D, Prka Z. Medical students' clinical skills do not match their teachers' expectations: survey at Zagreb University School of Medicine, Croatia. *Croatian medical journal* 2006;**47**:169–75.
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2080370&tool=pmcentrez&rendertype=abstract>
- 27 De Villiers MR, De Villiers PJT. The knowledge and skills gap of medical practitioners delivering district hospital services in the Western Cape , South Africa. *South African Family Practice* 2006;**48**:2–5.
- 28 Coonrod RA, Kelly BF, Ellert W, *et al.* Tiered maternity care training in family medicine. *Family medicine* 2011;**43**:631–7.<http://www.ncbi.nlm.nih.gov/pubmed/22002774>

29 Rodney WM, Martinez C, Collins M, et al. OB fellowship outcomes 1992-2010: where do they go, who stops delivering, and why? *Family medicine* 2010;**42**:712–6.

30 Consejo Nacional de Evaluación y Acreditación de Educación Superior del Ecuador. Mandato 14. Modelo de evaluación de desempeño institucional de las instituciones de educación superior. 2009.

http://www.ceaaces.gob.ec/images/stories/documentacion/mandato_14/informe_2009/2_modelo_evaluacion/Descripción_Modelo_Final.pdf

31 Colthart I, Bagnall G, Evans A, et al. The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. *Medical teacher* 2008;**30**:124–45. doi:10.1080/01421590701881699

32 Peeraer G, De Winter BY, Muijtjens a MM, et al. Evaluating the effectiveness of curriculum change. Is there a difference between graduating student outcomes from two different curricula? *Medical teacher* 2009;**31**:e64–8. doi:10.1080/01421590802512920

33 Zink T, Halaas GW, Finstad D, et al. The rural physician associate program: the value of immersion learning for third-year medical students. *The Journal of rural health : official journal of the American Rural Health Association and the National Rural Health Care Association* 2008;**24**:353–9. doi:10.1111/j.1748-0361.2008.00181.x

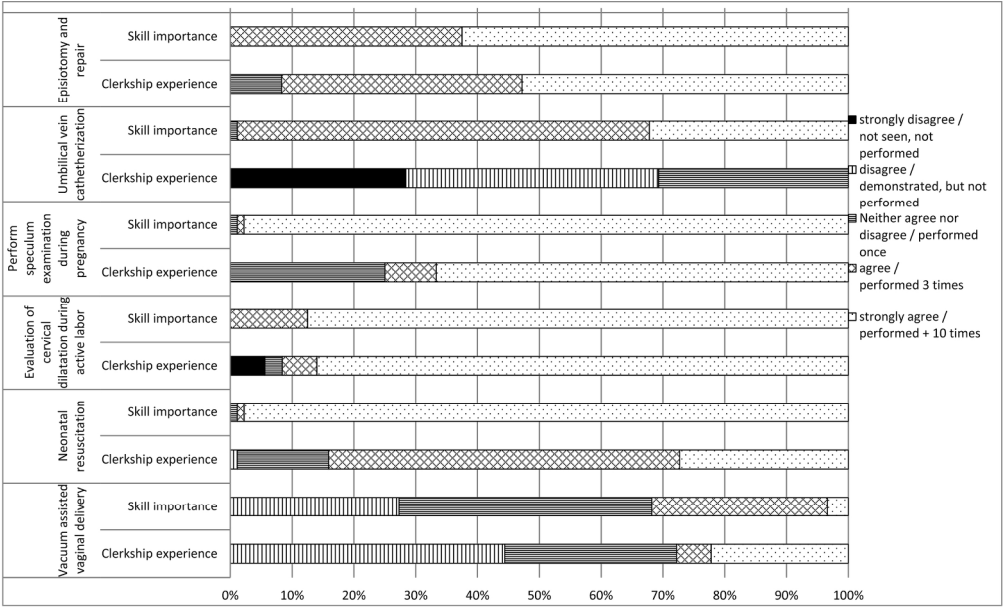
34 Young L, Rego P, Peterson R. Clinical location and student learning: outcomes from the LCAP program in Queensland, Australia. *Teaching and learning in medicine* 2008;**20**:261–6. doi:10.1080/10401330802199583

35 Worley P, Strasser R, Prideaux D. Can medical students learn specialist disciplines based in rural practice: lessons from students' self reported experience and competence. *Rural and Remote Health* 2004;**4**. http://www.rrh.org.au/publishedarticles/article_print_338.pdf

36 Remmen R, Scherpbier A, van der Vleuten C, et al. Effectiveness of basic clinical skills training programmes: a cross-sectional comparison of four medical schools. *Medical education* 2001;**35**:121–8.

Figure 1. Differences in the relationship between the perceptions of clerkship experience and skills importance of obstetrical skills in rural doctors with negligible or negative correlations ($r = .0$ to $.3$ or -0 to $-.3$ or $r = -.3$ to $-.5$)

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Differences in the relationship between the perceptions of clerkship experience and skills importance of obstetrical skills in rural doctors with negligible or negative correlations ($r = .0$ to $.3$ or -0 to $-.3$ or $r = -.3$ to $-.5$)

104x63mm (600 x 600 DPI)