

Policy interventions that attract nurses to rural areas: a multicountry discrete choice experiment

D Blaauw,^a E Erasmus,^a N Pagaiya,^b V Tangcharoensathein,^b K Mullei,^c S Mudhune,^c C Goodman,^c M English^c & M Lagarde^d

Objective To evaluate the relative effectiveness of different policies in attracting nurses to rural areas in Kenya, South Africa and Thailand using data from a discrete choice experiment (DCE).

Methods A labelled DCE was designed to model the relative effectiveness of both financial and non-financial strategies designed to attract nurses to rural areas. Data were collected from over 300 graduating nursing students in each country. Mixed logit models were used for analysis and to predict the uptake of rural posts under different incentive combinations.

Findings Nurses' preferences for different human resource policy interventions varied significantly between the three countries. In Kenya and South Africa, better educational opportunities or rural allowances would be most effective in increasing the uptake of rural posts, while in Thailand better health insurance coverage would have the greatest impact.

Conclusion DCEs can be designed to help policy-makers choose more effective interventions to address staff shortages in rural areas. Intervention packages tailored to local conditions are more likely to be effective than standardized global approaches.

Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

Introduction

The shortage of health workers in the areas where they are most needed is an important problem for health systems. Patients who have the greatest need for health care tend to live in remote and rural areas, but attracting skilled health workers to such areas and retaining them there has proved difficult.¹ Such an uneven distribution of health workers contributes directly to the global burden of ill health and inequity in health outcomes. Thus, it will not be possible to improve health outcomes globally unless more health professionals are attracted to work in rural and remote areas.²

The factors that often motivate health workers to stay in remote areas have been extensively studied.^{3–5} Several strategies have been proposed to address the problem, including changing student selection criteria; improving educational opportunities for workers; introducing financial incentives; creating more supportive working environments; and making it compulsory for health professionals to work in underserved areas.^{6,7} However, the potential impact of these policy interventions, either singly or in combination, remains undetermined. Recent systematic reviews have invariably concluded that few rigorous studies evaluating the impact of rural recruitment and retention strategies have been conducted.^{3,6–9} In the Cochrane review,⁶ for example, not a single controlled study met the inclusion criteria.

What is needed is more evidence, not more reviews, yet just how such new evidence will be generated remains unclear, particularly for low- and middle-income countries. Evaluating the effectiveness of human resource interventions is not the same as testing a drug for efficacy. Many human resource strategies require national policy changes and few are amenable to controlled studies.¹⁰ Governments and donors should be encouraged to introduce human resource interventions under more controlled conditions

that allow proper evaluation, but previous calls to strengthen the monitoring and evaluation of health reforms in low- and middle-income countries have had little impact.¹¹

In addition, statistically significant evidence of impact in well controlled trials may not be sufficient for informing practical policy decisions. The results of many human resource strategies are, in some measure, self-evident. Rural financial incentives are likely to improve rural recruitment and retention, but the critical questions are how much money is required to achieve a certain impact and how do financial strategies compare to other policy options, either individually or in combination. The answers to these questions will certainly vary between settings. What policy-makers actually need is information on the relative impact and cost-effectiveness of different packages of human resource interventions in a variety of contexts. Rigorous evaluation methods to answer such questions are not currently available.

In the meantime, more modelling studies could be carried out to determine the probable outcomes of different policy scenarios. Stated preference discrete choice experiments (DCEs) are a promising method for conducting human resource research in low- and middle-income countries.¹² They are a quantitative technique for evaluating the relative influence of different product attributes on consumer choices¹³ and have come to be used widely in health services research, primarily to assess patients' preferences and willingness to pay for different models of health service delivery.^{14–16} However, DCEs have been used in recent studies to assess the relative importance of different factors on health workers' job choices.^{17–19}

The objective of this study was to use data from a DCE to model the relative effectiveness of different policy interventions on the recruitment of nurses to rural areas in three different countries.

^a Centre for Health Policy, University of the Witwatersrand, Private Bag X3, Johannesburg, 2050, South Africa.

^b International Health Policy Program, Bangkok, Thailand.

^c Kenya Medical Research Institute/Wellcome Trust Programme, Nairobi, Kenya.

^d Health Policy Unit, London School of Hygiene and Tropical Medicine, London, England.

Correspondence to D Blaauw (e-mail: duane.blaauw@wits.ac.za).

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Methods

This study was conducted in Kenya, South Africa and Thailand, all three of which have documented shortages of professional health workers in rural areas. Kenya is typical of low-income countries with poor health outcomes, has limited financial and human resources for health, and is largely dependent on donors for new human resource policy interventions.²⁰ South Africa and Thailand are both middle-income countries with higher per capita health expenditure, sufficient numbers of skilled health workers, and demonstrated capacity to implement policies that make it attractive or compulsory for health professionals to work in rural areas,^{21,22} but they differ in terms of health outcomes. A comparison of key indicators in the three countries is shown in Table 1 (available at: <http://www.who.int/bulletin/volumes/88/5/09-072918>).

This DCE was part of baseline data collection for a larger longitudinal cohort study we are conducting with recent nursing graduates in the three countries. In accordance with the usual practice in DCE studies,^{13,17} we estimated that a minimum sample of 300 subjects was needed to allow for sub-group analysis. We used a multi-stage stratified cluster sampling strategy. Provinces were purposely selected from rural and urban strata, and nursing colleges were subsequently selected from each province until the required sample size was achieved. All students nearing the end of their training as professional nurses at the selected colleges were invited to participate in the cohort study. Data collection was completed during 2008.

For the DCE we used a labelled choice design with two choices in each choice set. In a labelled experiment the options presented have specific labels, in this case *rural job* and *urban job*, whereas in an unlabelled or generic design the options are simply labelled *job A* and *job B*. Unlabelled designs are used to determine the value of attributes that are assumed to be generic, while labelled designs produce alternative-specific valuations. Most of the DCE studies in the health economics literature have used generic designs. We had several reasons for using labelled choices. First, we suspected that particular job characteristics were not valued to the same degree in rural versus urban jobs (better housing, for instance, appears to be more highly valued when considering a rural posting rather than an urban one).

Second, labelled choices allowed us to design a model with different attribute levels for the two choices (for instance, the financial incentive applied only to rural jobs). Third, a labelled design allowed for more sophisticated modelling of the impact of policy interventions on nurses' choice of a rural posting.

In finalizing the DCE tool we followed the standard recommended steps for ensuring rigour.²⁴ We began by identifying the attributes and levels to be included in the study. Our explicit intention was to focus on job characteristics influencing rural choices that were amenable to policy intervention and to test their likely impact in different country contexts. To inform the selection of policy options to be included, we reviewed the international literature and conducted preparatory qualitative work in each country, as summarized in Table 2 (available at: <http://www.who.int/bulletin/volumes/88/5/09-072918>).

Next we completed several iterations of design development and consultation across the three countries to arrive at a similar design that allowed comparisons but also addressed local specificities. Pilot studies were then conducted in each country, and this resulted in further design refinements (Table 2). Table 3 summarizes the final design used in each country. The policy options we evaluated were:

- the introduction of a financial rural allowance, using relative salary increases to facilitate cross-country comparisons;
- the provision of better housing facilities;
- preferential opportunities for specialist training;
- faster rank promotion;
- the provision of a benefit package that differed in each country; and
- a change in workplace culture from hierarchical to relational management.

Facility type was also included in the design because it was identified as an important determinant of health workers' choices. The financial incentive had four levels to allow for the evaluation of nonlinear effects, while all the other attributes had two levels (Table 3). This specification resulted in a design with 8192 (i.e. $2^{11} \times 4^1$) possible combinations of attributes and levels. We used DCE macros for SAS (SAS, Cary, NC, United States of America) to select combinations for an orthogonal main effects design, and then to organize the selected profiles into

the most D-efficient choice design, given our design parameters.²⁵ The final design had 16 choice sets. The DCE tool was administered in English in Kenya and South Africa and in Thai in Thailand.

Baseline data collection was conducted with final year nursing students in a classroom setting. We explained the DCE questionnaire to the group, whose members then completed it on their own. Students also completed a second questionnaire with basic demographic information. In each college we also held a focus group discussion that included feedback on the DCE questionnaire (Table 2).

Data from the DCE were entered, cleaned and analysed using STATA v9.0 (Stata Corp., College Station, TX, USA) and Nlogit version 4.0 (Econometric Software, Inc., Plainview, NY, USA). The basic analysis was performed with a multinomial logit model. For the cross-country comparison we used both country-specific and pooled models. Analysis of pooled DCE data using a multinomial logit model is problematic because the model's coefficients are confounded with the scale parameter (λ), which is inversely proportional to the error variance of the model.^{13,26} This complicates comparisons between data sets, since observed differences in coefficients may be scale (variance) effects rather than real differences. The problem is well known for analyses that combine revealed and stated preference data²⁷ and requires more complex statistical modelling.²⁸ Following Rose et al.²⁹ we used an error components mixed logit model for the analysis and the Chow test to formally test differences between coefficients.³⁰ Odds ratios (ORs) and their confidence intervals (CIs) were used to compare the relative importance of attributes, while the preferences of different subgroups were evaluated by including interaction terms in the regression models. Finally, the results of the mixed logit models were used to predict the effect of different attribute (policy) changes on the proportion of nurses choosing a rural job.

National and international ethical standards were maintained throughout the research project. The research protocol was reviewed by the ethics committees of the academic institutions of the researchers in Kenya, South Africa, Thailand and the United Kingdom of Great Britain and Northern Ireland. Permission to conduct the research was also obtained from the relevant governmental and educational authorities in each country.

Results

Of the 1429 eligible nursing graduates in the selected colleges, 1064 (74.5%) agreed to participate in the study: 345 in Kenya, 377 in South Africa and 342 in Thailand. The response rates in the three countries were 65.2%, 87.9% and 74.7%, respectively. The demographic characteristics of the participants are shown in Table 4. The Thai nursing students were much younger and predominantly female, unmarried and childless, whereas the students from Kenya and South Africa were older, many were married and more than half had children. Kenya had the highest proportion of male students. Students of rural origin were in the majority in Kenya and Thailand but made up slightly less than half of the South African participants.

The results from the mixed logit model are represented diagrammatically in Fig. 1, which compares the impact of different policy interventions and individual characteristics on the odds of choosing a rural job in each country. For simplicity, the figure does not show the rural constant or urban attributes, but these were included in the model. The statistical model shown correctly predicted 60.0% of the responses from Kenya, 62.6% of the responses from South Africa and 75.2% of the responses from Thailand. All policy interventions shown in Fig. 1 yielded statistical significance as factors influencing the choice of a rural job (at the 0.05 level), except for better promo-

tion opportunities in Thailand and a change in management culture in South Africa. Of the individual characteristics, only rural origin showed statistical significance in all three countries.

Fig. 1 suggests that preferences for different human resource policy interventions vary between countries. Kenyan nurses were indifferent to the type of facility, whereas Thai respondents were 4.3 (95% CI: 3.3–5.6) times more likely to choose a job in a rural hospital than in a rural health centre, and the South Africans actually preferred rural clinics. In both Kenya and South Africa, the most effective policy interventions to attract nurses to a rural job were the introduction of a financial rural incentive and the provision of preferential access to specialist nursing training. For example, the availability of a 30% rural allowance made South African and Kenyan nurses 12.4 (95% CI: 9.6–15.9) and 7.7 (95% CI: 6.0–10.0) times more likely to choose the rural job, respectively. However, Thai nursing students were only 2.0 (95% CI: 1.5–2.7) times more likely to do so. In South Africa, allowing nurses in rural posts to specialize earlier increased the odds of rural uptake 6.7 times (95% CI: 5.5–8.1) and was a more effective measure than a 20% salary increase. For Thai respondents, improved housing and an expanded health benefit package were more important than a 30% salary increase. Overall, faster promotion and changes in management culture were the factors that least persuaded nurses to accept a rural posting.

In our models, age, gender, marital status and motherhood were not consistent predictors of the choice of a rural job. Thai graduates were too homogenous to allow us to test some of these factors. Whereas in South Africa students who were younger, single or had children were more likely to choose an urban posting, in Kenya these same groups preferred rural jobs. Female graduates were less likely to choose rural postings, but not significantly. However, in all three countries having been born in a rural area was significantly associated with the choice of a rural job, and the effect was comparable to that of a 10% salary increase. For example, graduates from rural areas in South Africa were more likely to choose a rural job than those from urban settings (OR: 2.7; 95% CI: 1.9–3.6).

The formal statistical testing for differences in model coefficients between countries is shown in Table 5. Most of the differences were highly significant. This confirms that nurses in the three countries valued the human resource policy interventions differently.

Table 6 presents the proportion of nurses who would choose a rural job when the mixed logit model was used to simulate the effect of different policy interventions alone or in combination. Thailand is clearly experiencing less difficulty recruiting nurses to work in rural areas than Kenya and South Africa. Even in the absence of any human resource policy intervention, 84.2% of recent Thai nursing graduates would choose a

Table 3. Attributes included in discrete choice experiment for assessing the effectiveness of policies to attract nurses to rural areas in Kenya, South Africa and Thailand, 2006

Attribute ^a	Kenya		South Africa		Thailand	
	Rural	Urban	Rural	Urban	Rural	Urban
Facility	Dispensary Hospital	Dispensary Hospital	Clinic Hospital	Clinic Hospital	Health centre Hospital	Health centre Hospital
Salary	Local entry level +10% +20% +30%	Local entry level	Local entry level +10% +20% +30%	Local entry level	Local entry level +10% +20% +30%	Local entry level
Training	No study leave 1 years' study leave after 4 years	No study leave 1 years' study leave after 4 years	6 years before study leave 2 years before study leave	6 years before study leave 2 years before study leave	2 weeks study leave per year 4 weeks per year	2 weeks study leave per year 4 weeks per year
Housing	Basic Superior	None Basic	Basic Superior	None Basic	Basic Superior	None Basic
Promotion	4 years before promotion 2 years before promotion	4 years before promotion 2 years before promotion	2 years before promotion 1 year before promotion	2 years before promotion 1 year before promotion	2 years before promotion 1 year before promotion	2 years before promotion 1 year before promotion
Additional benefit	Permanent contract Short-term contract	Permanent contract	None Car allowance	None	Basic cover Expanded cover	Basic cover
Workplace culture	Hierarchical Relational	Hierarchical Relational	Hierarchical Relational	Hierarchical Relational	Hierarchical Relational	Hierarchical Relational

^a The actual tools used contained more detailed descriptions of each attribute and level.

Table 4. Demographic characteristics of respondents in discrete choice experiment for assessing the effectiveness of policies to attract nurses to rural areas in Kenya, South Africa and Thailand, 2006

Variable	Kenya	South Africa	Thailand
<i>n</i>	345	377	342
Sex			
Males (%)	31.9	14.3	4.7
Females (%)	68.1	85.7	95.3
Mean age (years)	31.0	31.5	22.6
Marital status			
Single (%)	54.8	65.9	100.0
Married (%)	41.7	30.4	0.0
Divorced/Widowed (%)	3.5	3.7	0.0
Any children (%)	51.3	61.0	0.0
Born in rural area (%)	66.1	46.7	83.0

rural job, compared with only 43.4% of the nurses in Kenya and 36.0% of those in South Africa. Therefore, even the most effective single policy intervention in Thailand (an expanded health benefit package) would only increase rural uptake by 8.4 percentage points.

However, in South Africa and Kenya the proportion of nurses prepared to work in rural areas could increase dramatically if various human resource strategies were introduced. For example, the model predicts that a 30% rural incentive would increase the proportion of nurses choosing a rural job to 75.0% in South Africa and to 79.8% in Kenya. Preferential access to specialist training would also be particularly effective in Kenya and South Africa but would have no impact in Thailand.

The DCE model can also be used to predict the impact of any combination of policies. Three examples are shown in Table 6. Combining all the non-financial interventions is an effective policy package and would persuade a total of 86.3% of nurses in South Africa, 82.5% of those in Kenya and 98.1% of those in Thailand to opt for a rural position. If all the human resource strategies we included in our design were introduced, more than 95% of nursing students would choose to work in a rural area in all three countries. However, for low- and middle-income countries it may be more practical to introduce a 10% rural allowance combined with preferential training opportunities for nurses in rural areas, a strategy that would increase the rural uptake by 46.0 percentage points in South Africa and 34.0 percentage points in Kenya. In South Africa such a strategy would be more effective than a 30% rural allowance, while in Kenya the impact of the two strategies would be similar. In Thailand, however, the combination of an allowance and training would be relatively

ineffective, as it would only result in a 3.3 percentage points increase in the number of nurses choosing rural posts.

Discussion

We have used DCE data to quantify the degree to which nurses in Kenya, South Africa and Thailand are receptive to various incentives and to model the likely impact of different human resource strategies on rural recruitment in those countries. In the absence of data from rigorous evaluation studies, such analyses provide useful insights into the potential effectiveness of different human resource policy interventions. DCEs provide some of the only current evidence on the relative importance health workers attach to different incentives and human resource strategies.¹² Some have argued that packages of interventions are essential for improving the distribution of human resources,³ and DCEs are one of the few methods available for comparing such packages. In forthcoming publications we will also show how DCE data can be used to model the cost-effectiveness of different human resource strategies.

Our findings confirm that financial incentives are very important in persuading health workers to choose a rural posting, especially in poorer countries, but only if they are fairly large. In our study, a 10% salary increase was relatively ineffective in all three countries (Fig. 1). Non-financial strategies are just as important. Improved housing and accelerated promotion were moderately effective, but preferential access to training and career development opportunities were very powerful non-financial strategies. Similar results have been obtained in other human resource DCE-based studies in low- and middle-income countries.¹² For example, a recent study in

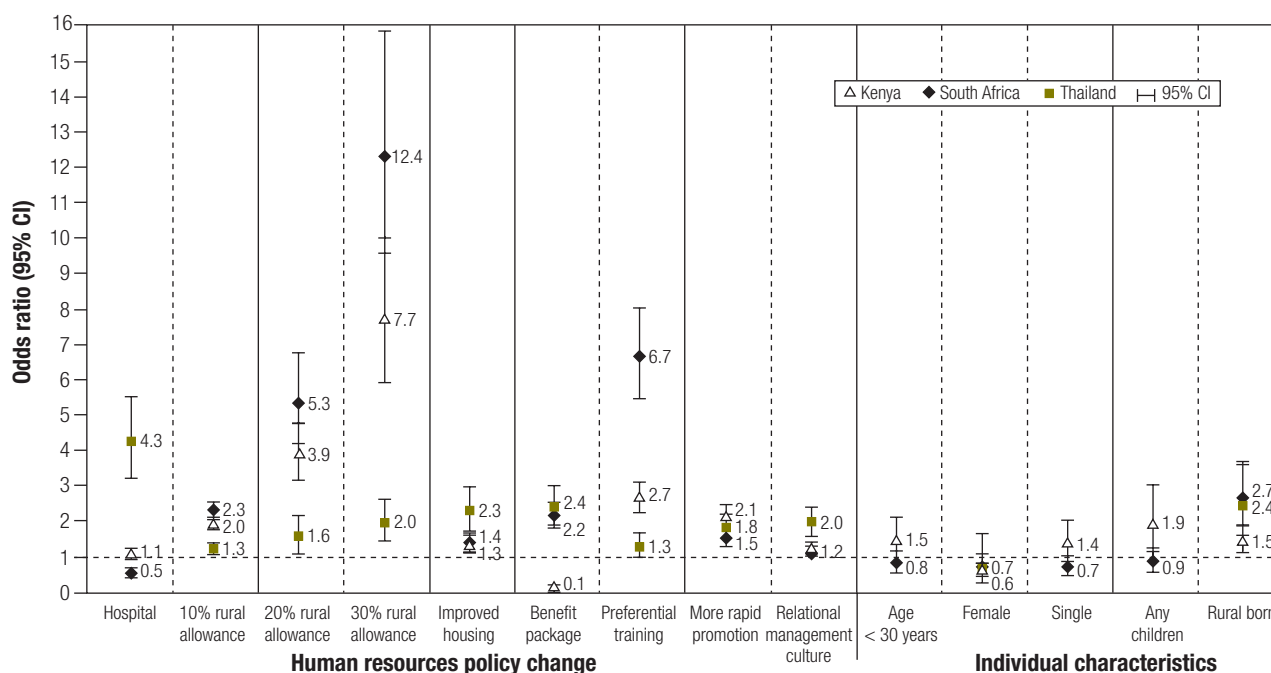
the United Republic of Tanzania showed that better educational opportunities and salary increases were the most influential policy levers to attract clinical officers to remote areas.³¹ We showed that changes in management culture are relatively unimportant in South Africa, contrary to what previous studies have shown.¹⁸ This is perhaps because young graduates have not developed clear preferences for different management styles. While many preferred more personal, supportive managers, others argued that formal, hierarchical management was needed to maintain discipline and manage resources properly.

Most non-financial strategies have budgetary implications. Thus, both financial and non-financial policy interventions will require a considerable amount of additional financial resources that are not currently available in most low- and middle-income countries.^{32,33} Preferential training opportunities are attractive to health workers because they also provide future economic returns. This was confirmed in our focus group discussions with nursing graduates. Interestingly, however, the impact of certain benefit packages, such as car allowances for rural nurses in South Africa, which are normally reserved for more senior staff, had double the impact expected from their equivalent financial value. The explanation may lie in the prestige attached to such allowances.

Of all the individual characteristics reported here, only rural origin was associated with a significant increase in the likelihood of choosing a rural job. This suggests, however, that preferential selection of rural students by training institutions can be an effective strategy, and it also lends support to claims that student selection policies are a key component of human resource intervention packages.⁷

The limitations of DCEs have been clearly acknowledged elsewhere:¹² they can only include a restricted set of attributes, which limits their range and realism; and they rely on stated preferences, not actual decisions, but the analysis of revealed preference data is not always straightforward.²⁴ Finally, the complexity of DCE design and analysis restricts widespread application, and failure to keep up with methodological developments can compromise study rigour and validity.^{34,35} Ours is the largest DCE-based study of human resources in low- and middle-income countries to date,¹² but producing nationally-representative data will require larger sample sizes, complex sampling strategies and more resources.

Fig. 1. Relative importance of different human resource policy interventions and individual characteristics in discrete choice experiment to study nurses' choice of rural postings in Kenya, South Africa and Thailand, 2006



CI, confidence interval.

This study, which is one of the first labelled DCE studies and the first multicountry DCE that we could identify in the health literature, has demonstrated the more advanced modelling that is possible with labelled DCEs. Labelled designs are of particular relevance to human resource questions but should become more widely used in health research.³⁶ Only very few multicountry studies exist in the entire DCE literature,²⁹ probably because they present significant challenges in design and analysis. Nevertheless, they could be used to investigate contextual differences in health worker preferences and responses, an area of research that is underdeveloped to date.

Indeed, much of the discourse and data on health workforce retention in

remote and rural areas does not pay sufficient attention to the diversity of individual preferences. It should not be the aim of human resource policy research to identify a proven set of standard strategies to be applied in any context. Our modelling study confirms that both financial and non-financial incentives are effective in motivating nurses to move to rural and remote areas, and that a package of interventions is more effective than a single strategy. However, it has also shown that different countries require completely different combinations of human resource policies. Furthermore, it is likely that nurses and doctors and other categories of health workers will respond differently to a particular set of incentives. In this study

we have demonstrated that different subgroups of nurses have different preferences, and in future studies we will compare the choices of different types of health workers. Packages of interventions are likely to be more effective than individual policies in attracting health workers to rural areas³ not only because individual policies have an additive effect, but because different subgroups of health workers respond differently to different components. DCEs provide an important tool to investigate such individual heterogeneity.

Conclusion

This study confirms that DCEs can be designed to assist policy-makers in

Table 5. Pairwise comparison of coefficients between countries in pooled results of discrete choice experiment for assessing the effectiveness of policies to attract nurses to rural areas in Kenya, South Africa and Thailand, 2006

Rural variable	South Africa–Thailand		South Africa–Kenya		Thailand–Kenya	
	Difference in coefficients	P-value ^a	Difference in coefficients	P-value ^a	Difference in coefficients	P-value ^a
Hospital	-1.95	<0.001	-0.59	<0.001	1.36	<0.001
Increase in salary	0.26	0.002	0.08	0.201	-0.18	0.022
Improved housing	-0.49	<0.001	-0.23	<0.001	-0.23	<0.001
Benefit package	-0.11	0.396	2.60	<0.001	2.71	<0.001
Preferential training	1.73	<0.001	0.74	<0.001	-1.00	<0.001
More rapid promotion	-0.54	<0.001	-0.59	<0.001	-0.59	<0.001
Relational management	-0.40	<0.001	0.02	0.851	0.42	<0.001

^a Chow test.

Table 6. Predicted impact of different policy interventions on nurses' uptake of rural postings in Kenya, South Africa and Thailand, 2006

Intervention	Kenya		South Africa		Thailand	
	Change (% points)	Total uptake (%)	Change (% points)	Total uptake (%)	Change (% points)	Total uptake (%)
Single interventions						
Base uptake	–	43.4	–	36.0	–	84.2
10% rural allowance	+15.2	58.6	+16.9	52.9	+3.3	87.5
20% rural allowance	+27.8	71.2	+30.5	66.5	+4.8	89.0
30% rural allowance	+36.4	79.8	+39.0	75.0	+5.8	90.0
Better rural housing	+6.5	49.9	+8.1	44.1	+5.4	89.6
Benefit package	–28.0	15.4	+15.8	51.8	+8.4	92.6
Preferential training opportunities	+21.9	65.3	+35.5	71.5	+1.2	85.4
More rapid promotion	+17.0	60.4	+8.6	44.6	+6.7	90.9
Relational management culture	+5.0	48.4	+3.1	39.1	+7.5	91.7
Intervention packages						
Housing + benefit ^a + training + promotion + relational management	+39.1	82.5	+50.3	86.3	+13.9	98.1
30% allowance + housing + benefit ^a + training + promotion + relational management	+51.7	95.1	+59.2	95.2	+14.5	98.7
10% allowance + training	+34.0	77.4	+46.0	82.0	+3.3	87.5

^a The benefit package was excluded in Kenya because it decreased rural uptake.

choosing more effective human resource policy interventions to address the shortage of health professionals in rural and remote areas. We have quantified the relative importance of different factors in nurses' career choices and shown that nurses' receptiveness to various human resource strategies differs substan-

tially between countries. This suggests that intervention packages tailored to local conditions are more likely to be effective than standardized global approaches. These insights should inform the future human resource research agenda in low- and middle-income countries. ■

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ملخص

التدخلات في السياسات لاجتذاب الممرضات إلى المناطق الريفية: تجربة حول اختيارات منعزلة متعددة البلدان

الموجودات اختلفت جوانب التفضيل لدى الممرضات بين الموارد المختلفة للتدخلات في السياسات اختلافاً يعتد به إحصائياً بين البلدان الثلاثة. ففي كينيا وفي جنوب أفريقيا كانت الفرص الأفضل في التعليم أو للتعويضات عن الخدمة في الأرياف هي الأكثر فعالية في زيادة الاجتذاب للوظائف في الأرياف، أما في تايلند فقد كان التغطية الأفضل بالضمان الصحي هي ذات التأثير الأعظم. النتيجة يمكن تصميم تجربة الاختيارات المنعزلة لمساعدة أصحاب القرار السياسي على اختيار التدخلات الفعالة في التصدي لنقص العاملين في المناطق الريفية. ويبدو أن مضمومات التدخلات المصممة لمواءمة الظروف المحلية ذات فعالية أكثر احتمالاً من الأساليب العالمية القياسية.

الهدف تقييم الفعالية النسبية للسياسات المختلفة التي تستهدف اجتذاب الممرضات إلى المناطق الريفية في كينيا، وجنوب أفريقيا، وتايلاند وذلك باستخدام معطيات مستمدة من نموذج تجربة اختيارات منعزلة متعددة البلدان. الطريقة صمم الباحثون تجربة حول اختيارات منعزلة ذات لصاقات توسيم لإعداد نموذج حول الفعالية النسبية لكل من الاستراتيجيات المالية وغير المالية المصممة لاجتذاب الممرضات إلى المناطق الريفية. وجمع الباحثون المعطيات من أكثر من 300 من الممرضات المتخرجات في كل بلد، واستخدموا نماذج لوغاريتمية مختلطة لتحليل شغل الوظائف في الأرياف وتوقع شغلها تحت توليفات مختلفة من الحوافز.

Résumé

Comment attirer le personnel infirmier dans les zones rurales? Résultats d'une expérience à choix discrets réalisée dans plusieurs pays.

Objectif Comparer l'efficacité de différentes politiques visant à attirer le personnel infirmier dans les zones rurales au Kenya, en Afrique du Sud et en Thaïlande, en utilisant les données d'une expérience à choix discrets.

Méthodes Une expérience à choix discrets a été conçue pour modéliser l'efficacité d'incitations financières et non financières visant à attirer le personnel infirmier dans les zones rurales. Dans chaque pays, des données ont été collectées auprès de 300 élèves infirmiers en fin d'études, puis analysées

avec des modèles logit mixtes afin de prédire l'acceptation de postes en milieu rural en fonction de différentes combinaisons de mesures incitatives.

Résultats Les préférences du personnel infirmier pour diverses interventions de réaffectation des ressources différaient significativement entre les trois pays. Au Kenya et en Afrique du Sud, des possibilités plus intéressantes sur le plan éducatif ou des primes de ruralité seraient les incitations les plus efficaces pour améliorer le recrutement de personnel

en milieu rural, tandis qu'en Thaïlande, c'est une meilleure couverture par l'assurance maladie qui aurait le plus d'impact.

Conclusion Des expériences à choix discrets peuvent être conçues pour aider les décideurs politiques à définir les interventions les plus efficaces

pour remédier aux pénuries de personnel dans les zones rurales. Des interventions adaptées aux conditions locales seront probablement plus efficaces que des approches standardisées, définies au niveau mondial.

Resumen

Intervenciones de política para atraer a las enfermeras a las zonas rurales: modelo de elección discreta multinacional

Objetivo Evaluar la eficacia relativa de diferentes políticas para atraer a las enfermeras a zonas rurales en Kenya, Sudáfrica y Tailandia utilizando los datos obtenidos mediante un modelo de elección discreta (MED).

Métodos Se diseñó un MED con etiquetas para modelizar la eficacia relativa de la aplicación de estrategias financieras y no financieras para atraer a las enfermeras a las zonas rurales. Se recogieron datos de más de 300 estudiantes de enfermería al término de la carrera en cada país, y se aplicaron modelos logit mixtos para analizar y predecir la ocupación de los puestos rurales en respuesta a distintas combinaciones de incentivos.

Resultados Las preferencias de las enfermeras ante diferentes intervenciones en materia de recursos humanos difirieron significativamente

entre los tres países. En Kenya y Sudáfrica, unas mejores oportunidades educativas o la instauración de subsidios rurales serían la fórmula más eficaz para aumentar la ocupación de los puestos rurales, mientras que en Tailandia se conseguiría el máximo impacto ampliando la cobertura del seguro de enfermedad.

Conclusión Es posible diseñar MED que ayuden a las autoridades a elegir las intervenciones más eficaces para hacer frente a la escasez de personal en las zonas rurales. Los paquetes de intervenciones adaptados a las condiciones locales tienen más probabilidades de ser eficaces que los enfoques mundiales normalizados.

References

- Dussault G, Franceschini MC. Not enough there, too many here: understanding geographical imbalances in the distribution of the health workforce. *Hum Resour Health* 2006;4:12. doi:10.1186/1478-4491-4-12 PMID:16729892
- Travis P, Bennett S, Haines A, Pang T, Bhutta Z, Hyder AA et al. Overcoming health-systems constraints to achieve the Millennium Development Goals. *Lancet* 2004;364:900–6. doi:10.1016/S0140-6736(04)16987-0 PMID:15351199
- Lehmann U, Dieleman M, Martineau T. Staffing remote rural areas in middle- and low-income countries: a literature review of attraction and retention. *BMC Health Serv Res* 2008;8:19. doi:10.1186/1472-6963-8-19 PMID:18215313
- Dolea C, Adams O. Motivation of health care workers – review of theories and empirical evidence. *Cah Sociol Demogr Med* 2005;45:135–61. PMID:15938446
- Willis-Shattuck M, Bidwell P, Thomas S, Wyness L, Blaauw D, Ditlopo P. Motivation and retention of health workers in developing countries: a systematic review. *BMC Health Serv Res* 2008;8:247. PMID:19055827
- Grobler L, Marais BJ, Mabunda SA, Marindi PN, Reuter H, Volmink J. Interventions for increasing the proportion of health professionals practising in rural and other underserved areas. *Cochrane Database Syst Rev* 2009;1:CD005314.
- Wilson NW, Couper ID, De Vries E, Reid S, Fish T, Marais BJ. A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. *Rural Remote Health* 2009;9:1060. PMID:19530891
- Chopra M, Munro S, Lavis JN, Vist G, Bennett S. Effects of policy options for human resources for health: an analysis of systematic reviews. *Lancet* 2008;371:668–74.
- Dolea C, Stormont L, Shaw D, Zurn P, Braichet JM. *Increasing access to health workers in remote and rural areas through improved retention*. Geneva: World Health Organization; 2009.
- Mills A, Gilson L, Hanson K, Palmer N, Lagarde M. What do we mean by rigorous health-systems research? *Lancet* 2008;372:1527–9. PMID:18984174
- Gilson L, Mills A. Health sector reforms in sub-Saharan Africa: lessons of the last 10 years. In: Berman P, ed. *Health sector reform in developing countries*. Boston: Harvard University Press; 1996.
- Lagarde M, Blaauw D. A review of the application and contribution of discrete choice experiments to inform human resources policy interventions. *Hum Resour Health* 2009;7:62. doi:10.1186/1478-4491-7-62. PMID:19630965
- Louviere JJ, Hensher DA, Swait JD. *Stated choice methods: analysis and applications*. Cambridge: Cambridge University Press; 2000.
- Ryan M, Farrar S. Using conjoint analysis to elicit preferences for health care. *BMJ* 2000;320:1530–3. doi:10.1136/bmj.320.7248.1530 PMID:10834905
- Ryan M, Bate A, Eastmond CJ, Ludbrook A. Use of discrete choice experiments to elicit preferences. *Qual Health Care* 2001;10(Suppl 1):i55–60. PMID:11533440
- Ryan M, Gerard K. Using discrete choice experiments to value health care programmes: current practice and future research reflections. *Appl Health Econ Health Policy* 2003;2:55–64. PMID:14619274
- Scott A. Eliciting GPs' preferences for pecuniary and non-pecuniary job characteristics. *J Health Econ* 2001;20:329–47. PMID:11373834
- Penn-Kekana L, Blaauw D, Tint KS, Monareng D, Chege J. *Nursing staff dynamics and implications for maternal health provision in public health facilities in the context of HIV/AIDS*. Johannesburg: Centre for Health Policy; 2005.
- Mangham LJ, Hanson K. Employment preferences of public sector nurses in Malawi: results from a discrete choice experiment. *Trop Med Int Health* 2008;13:1433–41. doi:10.1111/j.1365-3156.2008.02167.x PMID:18983274
- Adano U. The health worker recruitment and deployment process in Kenya: an emergency hiring program. *Hum Resour Health* 2008;6:19. PMID:18796157
- Reid SJ. Compulsory community service for doctors in South Africa – an evaluation of the first year. *S Afr Med J* 2001;91:329–36. PMID:11402906
- Wibulpolprasert S, Pengpaibon P. Integrated strategies to tackle the inequitable distribution of doctors in Thailand: four decades of experience. *Hum Resour Health* 2003;1:12. doi:10.1186/1478-4491-1-12 PMID:14641940
- World Health Organization. *World health statistics 2006*. Geneva: WHO; 2006.
- Hensher D, Rose JM, Greene WH. *Applied choice analysis: a primer*. New York: Cambridge University Press; 2005.
- Kuhfeld WF. *Marketing research methods in SAS. Experimental design, choice, conjoint and graphical techniques*. Cary: SAS Institute; 2009.
- Swait JD, Louviere JJ. The role of the scale parameter in the estimation and comparison of multinomial logit models. *J Mark Res* 1993;30:305–14.
- Hensher D, Louviere JJ, Swait JD. Combining sources of preference data. *J Econom* 1999;98:197–221.
- Hensher D. Empirical approaches to combining revealed and stated preference data: Some recent development with reference to urban mode choice. *Res Transp Econ* 2008;23:23–9. doi:10.1016/j.retrec.2008.10.003
- Rose JM, Hensher DA, Caussade S, de Dios Ortúzar J, Jou R. Identifying differences in willingness to pay due to dimensionality in stated choice experiments: a cross country analysis. *J Transp Geogr* 2009;17:21–9.
- Chow GC. Tests of equality between sets of coefficients in two linear regressions. *Econometrica* 1960;28:591–605. doi:10.2307/1910133
- Kolstad JR. *How can rural jobs be made more attractive to Tanzanian health workers? Results from a discrete choice experiment*. Bergen: Department of Economics, University of Bergen; 2008.
- World Health Organization. *World health report 2006: working together for health*. Geneva: WHO; 2006.
- Chen L, Evans T, Anand S, Boufford JI, Brown H, Chowdhury M et al. Human resources for health: overcoming the crisis. *Lancet* 2004;364:1984–90.
- Street D, Burgess L, Vinay R, Louviere J. Designing discrete choice experiment for health care. In: Ryan M, Gerard K, Maya-Amaya M, eds. *Using discrete choice experiments to value health and health care*. Dordrecht: Springer; 2008.
- Louviere J, Lancsar E. Choice experiments in health: the good, the bad, the ugly and toward a brighter future. *Health Econ Pol Law* 2009;4:527–46.
- Kruijshaar ME, Essink-Bot ML, Donkers B, Looman CW, Siersema PD, Steyerberg EW. A labelled discrete choice experiment adds realism to the choices presented: preferences for surveillance tests for Barrett esophagus. *BMC Med Res Methodol* 2009;9:31. doi:10.1186/1471-2288-9-31 PMID:19454022

Table 1. **Key indicators used in discrete choice experiment for assessing the effectiveness of policies to attract nurses to rural areas in Kenya, South Africa and Thailand, 2006**

Indicator	Kenya	South Africa	Thailand
National population × 10 ⁶	36.5	48.3	63.4
Population in rural areas (%)	79	40	67
GNP per capita (PPP\$)	1 470	8 900	7 440
Total expenditure on health (% of GDP)	4.6	8.6	3.5
Per capita expenditure on health (PPP\$)	105	869	346
No. of nurses	37 113	184 459	172 477
No. of nurses per 10 000 population	12	41	28
No. of doctors	4 506	34 829	22 435
No. of doctors per 10 000 population	1	8	4
Life expectancy at birth (years)	53	51	72
IMR (per 1 000 live births)	79	56	7
MMR (per 100 000 live births)	560	400	110
HIV infection prevalence (%)	6.1	16.6	11.4

GDP, gross domestic product; GNP, gross national product; HIV, human immunodeficiency virus; IMR, infant mortality rate; MMR, maternal mortality ratio; PPP\$, purchasing power parity dollar.

Data from the World Health Organization.²³

Table 2. **Methods for selecting attributes included in discrete choice experiment for assessing the effectiveness of policies to attract nurses to rural areas in Kenya, South Africa and Thailand, 2006**

Method	Objective(s)	Details
International literature review	<ul style="list-style-type: none"> Identify strategies that have been used to attract health workers to underserved areas in HICs and LMICs Review evidence on the effectiveness of existing strategies 	<ul style="list-style-type: none"> Systematic search and review of relevant literature
Review of the HR DCE literature	<ul style="list-style-type: none"> Identify attributes that have been used in previous HR DCEs Review relative importance of selected attributes 	<ul style="list-style-type: none"> Systematic search and review of relevant literature¹²
Review of ministry of health HR policy documents	<ul style="list-style-type: none"> Identify policy interventions that have been implemented or proposed in each country 	<ul style="list-style-type: none"> Systematic search and review of HR policy documents in each country
Key informant interviews with relevant policy-makers	<ul style="list-style-type: none"> Identify policy interventions implemented or proposed in each country. Identify planned policy strategies for the future Assess feasibility of strategies tried in other countries 	<ul style="list-style-type: none"> Semi-structured interviews with 3–5 senior policy-makers responsible for HR in ministry of health in each country
Focus group discussions with nursing students	<ul style="list-style-type: none"> Obtain student suggestions on important job characteristics and required policy interventions 	<ul style="list-style-type: none"> Focus group discussion in each country with 6–9 final year nursing students from nursing college not selected for final study Semi-structured discussion on factors considered in job choices and attitudes towards working in rural areas
Pilot study	<ul style="list-style-type: none"> Test understanding of DCE task and tool format Confirm understanding and relevance of DCE attributes and levels 	<ul style="list-style-type: none"> 10–20 nursing students in each country from different colleges completed draft tool Semi-structured discussion on responses to DCE tool and attributes DCE results analysed for consistency

DCE, discrete choice experiment; HIC, high-income country; HR, human resource; LMIC, low- and middle-income country.