

ORIGINAL RESEARCH

Factors affecting willingness to practice medicine in underserved areas: a survey of Argentine medical students

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ABSTRACT

Introduction: Previous research has explored the effect of motivations, incentives and working conditions on willingness to accept jobs in rural and remote areas. These studies demonstrated that difficult working conditions, low job satisfaction and remuneration, and poor security, predisposed new medical graduates to select cities instead of rural districts. Since Argentina has a critical shortage of health staff in rural and low-income marginal suburban settings, and limited qualitative and quantitative local research has been done to address this issue, the present study was developed to assess the factors associated with the willingness of medical students to work in low-resource underprivileged areas of the country after graduation.

Methods: A cross-sectional descriptive design was used with data collected from a self-administered questionnaire and using quantitative analysis methods. A total of 400 eligible second-year medical students were invited to participate in a survey focused on sociodemographic characteristics, incentives and working conditions expected in deprived areas, extrinsic and intrinsic motivations, university medical education and government promotion policies.

Results: Twenty-one per cent of medical students showed a strong willingness to work in a deprived area, 57.3% manifested weak willingness and 21.5% unwillingness to work in a low-resource setting. Being female, of older age, not having a university-trained professional parent, previous exposure or service in a poor area, choice of pediatrics as a specialty and strong altruistic motivations



were highly associated with the willingness to practice medicine in rural or underprivileged areas. Only 21.5% of respondents considered that medical schools encourage the practice of medicine in poor deprived regions. Likewise, only 6.2% of students considered that national public health authorities suitably stimulate physician distribution in poorer districts.

Conclusions: One-third of students expressed high altruistic motivations and should therefore be encouraged during their careers. Better remuneration and the assurance of a position at an urban hospital in the future may tip the choice in favor of underprivileged regions. Since most respondents said that neither government nor medical schools sufficiently encourage the practice of medicine in poor deprived regions, government policy-makers should recommend changes in resource allocation to better promote official proposals and opportunities to work.

Key words: Argentina, health workforce, medical students, motivation, underprivileged populations.

Introduction

Virtually all countries suffer from geographical imbalance of healthcare human resources, and local governments have often used a combination of incentives and compulsory service to improve uneven distribution of physicians¹. Recruitment and retention of primary healthcare practitioners in remote and underprivileged regions is essential to satisfy the fundamental health needs of these communities². Reform initiatives aimed at addressing issues of equity in health care and improving the health status of the poor are a current concern in developing countries. Despite an adequate physician/inhabitant ratio (one doctor per 317 inhabitants), Argentina has a well-known permanent geographical imbalance in the distribution of the physician workforce. Rural and remote areas, as well as poor and low-resource suburban and peripheral districts, are rarely chosen by young professionals to practice medicine. In the past, healthcare official policies tended to influence young physicians' altruistic motivations to cover the assistance of people in these deprived areas. Conversely, professional lifestyle and monetary incentives are factors that have been recently revealed by new physicians to influence choice of specialty and job positions^{3,4}. From this new viewpoint, more local research is needed to determine how health policy-makers can best engage the interests and motivations of healthcare professionals towards practice in low-resource areas.

Previous international research has looked at the effect of motivations, incentives and working conditions on the willingness to accept jobs in rural and remote areas. These studies demonstrated that difficult working conditions, low job satisfaction and salary and poor security predisposed new graduates to select cities instead of rural districts^{5,6}.

Since Argentina has a critical shortage of healthcare staff in these low-income marginal districts, and limited qualitative and quantitative research has been done to understand the problem, the present study was developed to assess the factors associated with the willingness of medical students to work in low-resource underprivileged areas of the country after graduation.

Methods

Between November 2013 and March 2014 a study was conducted in three schools of medicine proportionally distributed in one public and two private universities. A cross-sectional descriptive design was used, with data collected from a self-administered questionnaire and using quantitative analysis methods. A total of 400 eligible second-year medical students were invited to participate in the survey. The questionnaire focused on students' sociodemographic characteristics, incentives and extrinsic and intrinsic motivations, university medical education and government promotion policies. Extrinsic motivations



included income, lifestyle, social status, job security and opportunities to travel and research. Intrinsic motivations comprised wish to help others, interest in medicine as a subject matter, loss of a loved one, inspiration by a role model and interest in serving vulnerable populations. Students had to choose only three from a set of ten questions about motivation (five intrinsic and five extrinsic). Altruistic motivation was defined as weak if respondents selected none or only one intrinsic factor, mild altruistic motivation was selection of two out of three, and strong altruistic motivation was when all three factors preferred were intrinsic.

The survey instrument included Likert-scale structured questions and was developed by using previously explored topics such as altruistic and non-altruistic motivations, the influence of sociodemographic background and experience in the field. The questionnaire was administered in hard copy and data obtained were anonymously included and processed in a database. For the purpose of analysis, the main outcome was willingness to work in an underprivileged area after graduation. By using a four-point Likert scale, students were asked about the likelihood of working in a low-resource setting. The scale from 1 to 4 represented the following statements, respectively: 'I will definitely not work in a deprived area', 'I am unlikely to work in a deprived area', 'I am likely to work in a deprived area' and 'I will definitely work in a deprived area'. The data set was collapsed to obtain a trichotomous individual response of unwillingness (statements 1 or 2) versus weak willingness (statement 3) versus strong willingness (statement 4) to practice in low-resource settings. Demographic characteristics, previous exposure to deprived areas and extrinsic and intrinsic motivations were used as predictor variables. Finally, students were asked to judge government incentive policies to promote distribution in deprived areas and to point out the main conditions expected to accept job postings.

Statistical analysis

Categorical data were expressed as absolute frequencies and percentages. The Kolmogorov–Smirnov goodness-of-fit test was applied to demonstrate non-Gaussian distribution of age,

and expressed as median and 25–75% percentiles. The non-parametric Kruskal–Wallis test was used to compare age in the univariate analysis, and categorical data were compared using Pearson's χ^2 test. Additionally, the contingency coefficient C was calculated to measure the strength of association between two variables when the χ^2 test showed statistical significance. Since the dependent variable had three possible discrete outcomes, multinomial logistic regression instead of logistic regression analysis was used. Variables with $p < 0.10$ in the univariate analysis were included in the regression analysis. Statistical analysis was performed using the Statistical Package for the Social Sciences v17.0 (SPSS; <http://www.spss.com>).

Ethics approval

Participants were assured that the completed questionnaire would be anonymous and confidential. After being informed of the purpose of the study, respondents voluntarily participated of the survey and expressed their consent by completing the corresponding form. All personal identifiers were removed or disguised so that the students were not identifiable and could not be recognized through the details of the study. Heads of medical training institutions provided access to the student population after ethical approval of the protocol. Ethical clearance for this study was granted by the Ethics Committee of the School of Medicine, Business and Social Sciences University (UCES-2013-09).

Results

Among 400 eligible medical students, 354 (88.5%) completed the survey with no missing data. Table 1 shows the sociodemographic characteristics of respondents. The cohort of female respondents was proportional to the number of female medical students in Argentina. Most respondents had never lived in a deprived area, but they had served in low-resource districts during solidarity projects proposed through middle- or high-school initiatives.

Twenty-one per cent of medical students showed a strong willingness to work in a deprived area, 57.3% manifested



weak willingness and 21.5% unwillingness to work in a low-resource district. Table 2 shows the intrinsic and extrinsic motivations to study medicine. After collapsing data, 35.6% of respondents showed a strong altruistic motivation, 46.0% manifested a mild altruistic motivation and 18.4% a weak intrinsic motivation. Table 3 describes the univariate analysis of factors associated with willingness to practice medicine in a low-resource setting after graduation. The dependent variable was presented as strong and weak willingness or unwillingness to work. Only results with statistical significance were used to calculate the strength of association (contingency coefficient).

Multinomial logistic regression results of factors associated with the willingness to work in low-resource settings after graduation are shown in Table 4. Particularly, the model demonstrated that older age, choice of pediatrics as a specialty and previous service in a poor district were associated with strong willingness to practice in a deprived area. Moreover, a strong altruistic motivation was marginally associated in the multivariate analysis ($p=0.089$). Though not significantly, having a parent with a tertiary degree was inversely related with strong willingness to work in underprivileged areas.

Students' judgement about government and educational incentives to promote working in deprived areas revealed that only 21.5% of respondents considered that medical schools encourage the practice of medicine in poor underprivileged regions. Likewise, only 6.2% of students judged that national public health authorities suitably stimulate physician distribution in impoverished districts. Willingness to practice in a low-resource area during for 1 or 2 years with increased remuneration was accepted by 67.2% of students, and this proportion rose to 74.9% with the additional assurance of obtaining a position at an urban public hospital after completion of the period ($p=0.025$). Besides, 68.6% of students considered that working in a deprived area during a short period of time would have no negative influence in their future reinsertion in the urban work market. Finally, students were asked to express the main conditions expected to accept job postings in deprived areas. Table 5 shows the order of priorities chosen by respondents.

With the purpose of evaluating reproducibility of responses (consistency of respondents), the same questionnaire was repeated a week later in 10% of respondents ($n=38$), corresponding to the same group of students. Data loss was argued to ask students to repeat the survey in order to compare new with previous answers. A deviation of 3.5% was observed in the willingness to work in a deprived area, 6.3% in intrinsic and extrinsic motivations, and 11.2% in the views on the educational and official healthcare policies. Although the differences were not significant, they should be taken into account when interpreting the results of this study.

Discussion

Geographical uneven distribution of medical workforce between rural and urban areas is a current problem in both industrialized and developing countries, bearing a characteristic pattern of urban concentration. Managua, for example, houses one-fifth of Nicaragua's population but has nearly half of the available healthcare personnel⁷. In Bangladesh, one-third of physicians are located in four urban areas housing only 14.5% of the total population⁸. Moreover, some regions with a difficult geography, like Indonesia, have an extra challenge to place doctors in remote islands or forest locations with few amenities and poor communications with the rest of the country⁹.

Argentina is a South American developing country with a population of 40 million and an estimated per capita annual income of US\$8000. Despite the high number of physicians per inhabitant, the country suffers a serious imbalance with respect to its low-resource suburban and rural settings. This survey revealed that one out of five medical students was strongly interested in practicing medicine in a deprived area after graduation. Data collection in this study focused on previous research exploring several demographic variables and motivation factors associated with the interest of working in rural areas of underdeveloped regions^{10,11}. This survey demonstrated that female gender, older age, not having a university-trained professional parent, previous exposure or service in a deprived area, choice of pediatrics as a specialty and a strong altruistic motivation were highly associated with the willingness to practice medicine in low-resource areas of Argentina.



Table 1: Sociodemographic characteristics of respondents (N=354)

Variable	Frequency/median	Percentage/percentiles _{25,75}
Female sex	219	61.9
Age (median; percentiles _{25,75})	21	20,23
Birth area		
Urban	297	83.9
Suburban/rural	57	16.1
Marital status		
Married/in a relationship	21	5.9
Single/not in in a relationship	333	94.1
Parent with university degree	193	54.5
Medical school university		
Public	216	61.0
Private	138	39.0
Choice of medical specialty		
Internal medicine	86	24.3
Surgery	83	23.4
Pediatrics	26	7.3
Other	15	4.2
Not defined yet	144	40.7
Thinks of emigrating to practice medicine	142	40.1
Ever lived, worked or served in deprived area	181	51.1

Table 2: Intrinsic and extrinsic motivations to study medicine

Variable	Frequency	Percentage
Intrinsic or altruistic motivations		
Wish to help others	300	84.7
Interest in medicine as a subject matter	271	76.6
Interest in serving vulnerable people	92	26.0
Inspiration by a role model	62	17.5
Loss of a loved one	37	10.5
Extrinsic or non-altruistic motivations		
Opportunities to perform research	87	24.6
Income and social status of physicians	67	18.9
Interest in job opportunities and lifestyle	64	18.1
Ability to use new cutting edge technologies	37	10.5
Physicians in their own family	30	8.5

Since the intention to practice medicine in an underprivileged region may be thought to be more socially acceptable than the denial to do so, there may also be an element of social desirability bias in students' responses. For the same reason, intrinsic altruistic motivations could be more often selected than extrinsic non-altruistic ones. However, the univariate analysis demonstrated that a solid intrinsic motivation was associated with strong willingness to practice in a low-resource area and, conversely, a weak intrinsic motivation with poor willingness. This association lost statistical

significance in the multivariate approach, perhaps due to demographics, specialty choice and confounders relating to previous exposure to deprived areas. Recent research revealed that most Ghanaian medical students were motivated to study medicine by the desire to help others, but this did not translate into willingness to work in rural areas¹⁰. A complete review on the influence of intrinsic and extrinsic motivations in the recruitment and retention of healthcare professionals for rural and remote settings was recently exposed by Campbell et al¹².



Table 3: Univariate analysis of factors associated with the willingness to practice medicine in a low-resource setting after graduation

Variable	Willingness to work in a deprived area (n(%))			Pearson's χ^2 p value / contingency coefficient / (non-parametric Kruskal-Wallis test value)
	Strong (n=75)	Weak (n=203)	Unwilling (n=76)	
Sex				
Female	56 (25.6%)	133 (60.7%)	30 (13.7%)	<0.001
Male	19 (14.1%)	70 (51.9%)	46 (34.1%)	0.244
Age, median (percentiles _{25,75})	22 (21, 23)	21 (19, 23)	21 (20, 24)	(0.043)
Birth area				
Urban	63 (21.2%)	167 (56.2%)	67 (22.6%)	0.491
Suburban/rural	12 (21.1%)	36 (63.2%)	9 (15.8%)	
Marital status				
Married	2 (9.5%)	16 (76.2%)	3 (14.3%)	0.187
Single	73 (21.9%)	187 (56.2%)	73 (21.9%)	
Parent with tertiary degree				
Yes	33 (17.1%)	114 (59.1%)	46 (23.8%)	0.097
No	42 (26.1%)	89 (55.3%)	30 (18.6%)	
Medical school university				
Public	48 (22.2%)	117 (54.2%)	51 (23.6%)	0.295
Private	27 (19.6%)	86 (62.3%)	25 (18.1%)	
Choice of medical specialty				
Internal medicine	21 (24.4%)	45 (52.3%)	20 (23.3%)	0.038
Surgery	11 (13.3%)	56 (67.5%)	16 (19.3%)	0.210
Pediatrics	12 (46.2%)	12 (46.2%)	2 (7.7%)	
Other	3 (20.0%)	8 (53.3%)	4 (26.7%)	
Not defined yet	28 (19.4%)	82 (56.9%)	34 (23.6%)	
Thinks of emigrating				
Yes	32 (22.5%)	78 (54.9%)	32 (22.5%)	0.752
No	43 (20.3%)	125 (59.0%)	44 (20.8%)	
Ever served in a deprived area				
Yes	49 (27.1%)	107 (59.1%)	25 (13.8%)	<0.001
No	26 (15.0%)	96 (55.5%)	51 (29.5%)	0.210
Intrinsic motivation				
Strong	38 (30.2%)	72 (57.1%)	16 (12.7%)	<0.001
Mild	28 (17.2%)	101 (62.0%)	34 (20.9%)	0.255
Weak	9 (13.8%)	30 (46.2%)	26 (40.0%)	

Table 4: Multinomial logistic regression analysis of factors associated with the willingness to practice medicine in a low-resource setting after graduation

Variable	Odds ratio	95% confidence interval	p value
Female	1.24	0.66–2.33	0.503
Age (over median value) [†]	1.90	1.06–3.40	0.032
Parent without tertiary degree	1.46	0.82–2.58	0.199
Choice of pediatrics as a specialty	2.42	1.00–5.86	0.049
Served in a deprived area	1.82	1.02–3.25	0.042
Strong intrinsic motivation	1.64	0.93–2.90	0.089
Model fit: Likelihood ratio $\chi^2 = 58.5, p < 0.0001$			

[†]Age was dichotomized around the median value to obtain only one odds ratio



Table 5: Main conditions expected by students to accept jobs in deprived areas

Variable	Frequency	Percentage
Adequate infrastructure at workplace	186	52.5
Physical integrity and personal security at workplace	179	50.6
Access to high-complexity regional hospital to refer patients	169	47.7
Access to specialist referral network via telephone and web	147	41.5
Free-cost drug treatments for patients	123	34.7
High income and adequate accommodation facilities	122	34.5
Contact with medical technology	74	20.9
Accessible geographical area and transportation	25	7.1
Access to online information technology for bibliographic search	12	3.4

Female gender was also strongly associated with an increased interest in underprivileged areas; nevertheless, this result was not consistent with similar studies revealing that women are less likely to accept job postings in remote districts for diverse family reasons^{6,10}. With increasing representation of female healthcare professionals in Argentina, these results may be an interesting local finding to better engage them to practice medicine in deprived areas. Yet, this association lost statistical significance in the multivariate analysis. The importance of previous exposure or service in a deprived area to accept job postings may be explained by considering that an early contact with vulnerable people during youth would facilitate emotional communication and empathic engagement relating to future decisions. Middle-school programs aimed at encouraging students to poor deprived areas may be an adequate policy to predispose future medical students. A recent cross-sectional survey performed in Asia and Africa assessing medical and nursing students' intentions to work in rural areas showed that only 18% of respondents anticipated a rural career. This study also confirmed that time spent in rural settings before matriculation predicted the preference for a rural job¹³.

The request for personnel in low-resource settings can be considered as a demand for healthcare services based solely on population health needs. Price and the value of patient travel and waiting time, for example, are not relevant in a local healthcare service in underprivileged areas⁹. Nevertheless, other policies may contribute to impact on the demand for services when a government decides to introduce

or expand health insurance coverage for the deprived population. In the present study, respondents who chose pediatrics as a specialty had an increased predisposition to accept working in an underprivileged district. This finding may be explained by students' personal psychological characteristics acting as confounders. Nonetheless, since child health care is crucial, this favorable condition may be useful to cover a shortage of pediatricians in these areas. Lifestyle expectations may contribute to the inverse association found between those having a professional parent and the desire to practice in a low-resource setting. This inverse relationship and also the association between age and practice in deprived areas were also acknowledged by other researchers¹⁰.

Professional education is considered as a long-term investment in human capital. That is why better remuneration and higher earnings or rate of return are expected by young physicians willing to accept practice in underprivileged areas¹⁴. On the other hand, the choice to practice in a low-resource setting can be explained by sociopsychological factors such as satisfaction afforded by caring for poor people, social acceptance or family tradition⁹. Although only 21.2% of medical students showed a strong willingness to practice in a deprived area, this proportion increased to two-thirds of respondents when they were offered work for 1 or 2 years receiving an increased remuneration, and reached nearly 75% of medical students when adding the assurance of a position at an urban public hospital after completion of this period. One study in rural areas of Peru also recognized that, in general, young



physicians practice in rural settings only for an initial short period of time, before moving to an urban area¹⁵. Other research assessing rural practice preferences of medical students in Ghana also suggested that students may be willing to accept short-term placements of 2 years or less in rural areas after graduation⁵.

There is evidence that the combination of financial and non-financial incentives seems to have greater impact than isolated actions to promote work in underprivileged settings¹⁶. But, particularly in poor countries, remuneration seems to constitute the most basic influence on the retention of health professionals¹⁷⁻¹⁹. Thailand, for example, has successfully stopped migration of health professionals from rural to urban areas by offering strong financial incentives²⁰. In addition to a better salary, incentives to recruit staff for low-resource settings may include health insurance, holidays, flexible hours, part-time work status, promotion and training opportunities²¹⁻²⁴. In the present study, the main financial and non-financial incentives proposed by respondents included an adequate local infrastructure, personal security in dangerous or unstable districts and easy access to regional hospitals or specialists to refer complex patients. A primary reason cited by medical students for not practicing in rural Pakistan was lack of equipment, supplies and appropriate facilities²⁵. Other authors have found that a reduced distance to central cities and the presence of a hospital significantly increase the probability of having at least one physician in a deprived area²⁶.

Although lack of doctors in rural areas remains a serious problem in Latin America, few studies have analyzed this topic. Most studies have focused on the relationship between income inequality and health outcomes; however, advances in health geography have improved the understanding of the role played by geographic distribution of health services and workforce²⁷. A study in Costa Rica linking census data with health facilities analysed the impact of health reforms on the equal provision of healthcare services²⁸. A recent work from Ecuador demonstrated that there is a significant urban/rural gap in the provision of services in the country, which in turn affects people's use of services. The authors concluded that it

was necessary to strengthen the public healthcare delivery system, including distribution of healthcare professionals and national health information systems²⁹. In Peru, doctors are five times more likely to favor a job in urban areas over rural settings³⁰, and a similar scenario occurs in Brazil where the poorest states experience the highest shortage of health professionals and have the highest disparity in the distribution of physicians and nurses, especially at the rural–urban level³¹. On the other hand, Chile is updating the data on availability of physicians in order to improve the geographical distribution of its medical workforce³².

Some countries have developed strategies to attract and retain health workers in underprivileged areas, but there is only weak evidence on their success. Evaluation of these programs faces several challenges, including lack of baseline information and the need for multidisciplinary methods to monitor outcomes. Additionally, the social, political and economic context in which programs are implemented must be considered when evaluating these interventions³³.

Multiple approaches have been recommended by WHO to alleviate the critical shortage of health professionals in rural areas, such as regulatory interventions, financial incentives, professional support and educational strategies^{34,35}. Simply increasing student volume without considering students' intentions may threaten education quality in medical schools³⁶. Moreover, compulsory schemes to retain professionals in low-resource settings do not seem to work in the long term³⁷. Some data suggest that incorporating a rural work course during the career may be not enough, as short rural exposures would have minimal impact¹⁶. Targeted admission to medical schools of students with rural background, who were brought up in these areas, should be strongly recommended^{13,38}. From an educational point of view, WHO proposals include the revision of health curricula to include further rural topics in medical schools. The strongest WHO recommendations referred to personal and professional support of doctors in underprivileged areas, and those suited to Argentina are to invest in infrastructure and living conditions; ensure appropriate equipment, supplies and safety in the workplace environment; facilitate interaction



with urban health services; support exchange of knowledge; and adopt public recognition measures to raise the public profile of rural health workers¹³.

The limitations of the present research include the possibility of social desirability bias in responses about the likelihood of working in low-resource settings. Also, this study was conducted on second-year medical students; consequently, further research is needed to determine the value of these associated factors in real-life decision making, particularly at the end of their careers. Although half of the students had served in a deprived area, they had not experienced the rigors of practicing medicine in poorer areas, which may have affected their final decision. Finally, although the 400–medical students surveyed constituted a good sample, representing the medical schools of Buenos Aires, these findings do not extend to the whole country.

Conclusions

To recruit healthcare workers willing to practice medicine in deprived areas it is important to develop strategies influencing medical students' motivations. Since most respondents referred that neither government nor medical schools sufficiently encourage the practice of medicine in poor underprivileged regions, government policy-makers must recommend changes in resource allocation to better promote official proposals and opportunities to work. Based on this survey, the offer of better remuneration and the guarantee of a position at an urban hospital in the future may tip the choice in favor of deprived regions. Among the factors associated with the willingness to work in a deprived area, one-third of second-year students still expressed high altruistic motivations and, therefore, this must be encouraged during their careers. A promising target group to enroll future candidates will include female and older students, as well as those interested in pediatrics. Middle-school programs aimed at encouraging pupils into poor deprived areas may also be an adequate policy to predispose future medical students to accept these job postings.

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