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Addressing health workforce inequities in the Mindanao regions of the Philippines: Tracer study of graduates from a socially-accountable, community-engaged medical school and graduates from a conventional medical school

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ABSTRACT

Developing and retaining a high-quality medical workforce in low-resource countries is a worldwide challenge. The Filipino Ateneo de Zamboanga University–School of Medicine (ADZU-SOM) has adopted a strong focus on socially accountable health professional education (SAHPE) in order to address the shortage of physicians across rural and urban communities in the Western Mindanao region. A cross-sectional survey of graduates from two Philippines medical schools: ADZU-SOM in the Mindanao region and a medical school with a more conventional curriculum, found ADZU-SOM graduates were more likely to have joined the medical profession due to a desire to help others ($p=0.002$), came from lower socioeconomic strata ($p=0.001$) and had significantly ($p<0.05$) more positive attitudes to community service. ADZU graduates were also more likely to currently work in Government Rural Health Units ($p<0.001$) or be generalist Medical Officers ($p<0.001$) or Rural/Municipal Health Officers ($p=0.003$). ADZU graduates were also less likely to work in private or specialist Government hospitals ($p=0.033$ and $p=0.040$, respectively) and be surgical or medical specialists ($p=0.010$ and $p<0.001$, respectively). The findings suggest ADZU-SOM's SAHPE philosophy manifests in the practice choices of its graduates and that the ADZU-SOM can meet the rural and urban health workforce needs of the Western Mindanao region.

Introduction

In the mid-1990s, the predominantly rural region of Western Mindanao was one of the most disadvantaged regions in the Philippines with respect to socioeconomic and health indicators; with high birth, infant and child mortality rates, a high prevalence of infectious diseases and malnutrition and extremely limited health resources (<http://www.ucalgary.ca/ghealth/node/120>; Flavier et al. 1990); in particular, medical workforce. For example, there were only 250 doctors in an administrative region of 4.5 million people, with 200 of these working in the largest city Zamboanga; thus, over 80% of rural municipalities were without doctors (Cristobal & Worley 2012). Sufficient quality and quantity of doctors is essential for regional health systems to function effectively (Wilson et al. 2009).

Recruitment and retention of medical graduates to rural areas – often the areas of greatest need – is a problem worldwide (Rabinowitz & Paynter 2000; Dussault & Franceschini 2006). For Western Mindanao in the 1990s, not having a medical school in the region was its biggest problem in maintaining an adequate rural medical workforce. Without a local medical school, those who wanted to pursue medicine had to relocate to other parts of the Philippines, and typically did not return after graduation; either remaining in the bigger cities or migrating overseas. This led to the establishment in 1994, of the Zamboanga

Practice points

- Medical schools that implement a socially accountable curriculum and community-engaged rural clinical placements are more likely to produce graduates who have positive attitudes to servicing the health needs of the community and to health equity.
- Medical schools which select students from lower socioeconomic strata and provide them with return-of-service scholarships are more likely to produce graduates who stay longer in their first medical position and work as rural or municipal health officers.
- The Ateneo de Zamboanga University, School of Medicine is meeting the local rural and urban health workforce needs of the Western Mindanao region by producing graduates who choose careers as Rural or Municipal Health Officers, or as generalist Medical Officers in government hospitals.

Medical School Foundation Inc. (ZMSFI) a product of an intersectoral community participation efforts of local doctors, civic leaders and academicians, of which 10 years later was absorbed into the Ateneo de Zamboanga University (ADZU) to become the ADZU School of Medicine (ADZU-

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SOM). ADZU-SOM is still Western Mindanao's only medical school.

Over time, ADZU-SOM has adopted a strong focus on social accountability in order to fully address the shortage of physicians across Western Mindanao. Social accountability has been defined (Boelen & Heck 1995) as: "The social obligation to direct education, research and service activities towards addressing the priority health concerns of the community, region, and/or nation the school has a mandate to serve. The priority health concerns are to be identified jointly by governments, health care organizations, health professionals and the public." Recent studies have highlighted the importance of addressing the shortage and maldistribution of health workers to reduce health inequities within and between countries, largely by reforming health professional education to include a greater emphasis on social accountability (Neusy & Palsdottir 2008; Frenk et al. 2010; Larkins et al. 2013; Ross et al. 2014).

Twelve medical schools worldwide which have an explicit 'social accountability' mandate are members of a consortium called the Training for Health Equity Network (THEnet) (Palsdottir et al. 2008). A recent study involving five of these schools in different countries showed having a socially accountable curriculum contributed to their graduates having strong intentions to work with underserved populations (Larkins et al. 2014). However, there is limited published evidence of "socially accountable" medical school graduates contributing to any significant impact on local health workforce and local health needs (Reeve et al. 2016).

Therefore, this study seeks to identify evidence of local health workforce outcomes in the Zamboanga Peninsula region from graduates of the socially-accountable ADZU-SOM, and also from graduates of another Philippines medical school which has a more "conventionally" orientated curriculum. Specifically, the study describes the differences between graduates of a socially-accountable, community-engaged Philippines medical school, with graduates of a conventional Philippines medical school, in regards to practice location, motivation toward community-based service, training in population health and community development and the treatment and prevention of local priority health issues.

This study is part of a series of multi-institutional collaborative research supported by THEnet and its institutional partners to gather evidence on the outcomes and impact of socially accountable health professional education (SAHPE), using the THEnet's Framework for Socially Accountable Health Workforce Education (<http://thenet-community.org/social-accountability-framework/>; Palsdottir et al. 2008; Larkins et al. 2013; Ross et al. 2014) as a logic model.

Methodology

Study design and protocol

The practice locations of a decade of medical graduates (2003–2012) were collated from the socially-accountable, community-engaged ADZU-SOM based on the Zamboanga Peninsula. Graduate practice locations were also collated from another medical school in the Philippines which has a more conventional curriculum. Graduates included in the study were those who had been employed for six (6) or

Table 1. Strategies used by the medical schools for contacting their graduates, showing the number of surveys collected via each method.

Collection method	ADZU-SOM	Conventional SCHOOL
Hard copy via physical distribution & retrieval	41	31
Google Internet forms	154	60
Survey Monkey	28	28
Total	223	119

more months. Ethical approval for the study was obtained from the Ateneo de Zamboanga School of Medicine Ethics Review Committee and the Flinders University Human Research Ethics Committee (number 7042). Ethical approval for inclusion of the conventional school graduates was granted via the ADZU-SOM review board, with the proviso all respondents must complete an informed consent form.

Graduates of both schools were identified from graduate records, personal contact, alumni networking through other graduates, social media, and the Department of Health of the Philippines physician placement data. A variety of methods were then used to send out surveys due to geographical and technological barriers; for example, some surveys were administered face-to-face in paper-based format, while some surveys were sent electronically via SurveyMonkey™ and Google internet forms (Table 1).

An information sheet was always provided, which included the sentence they were free to decline participation if they wished, with the paper-based method also asking participants to sign a consent form. Similarly, follow up and survey collection was provided by phone call, return post and personal visits.

Survey questions

This survey sought information on the graduates': background (age, gender, gross family income), undergraduate demographics, financial support during medical school, motivation for medicine, motivation for studying at the respective school, intentions at time of graduation (career, rural practice), and graduate aspects (attitude to community service, current practice discipline, current practice location, current practice facility and specializations). A complete list of the variables as they were considered for statistical analysis is given in Tables 2, 3 and 4.

Data analysis

A coding template was developed in Microsoft Excel, and all survey data were entered in uniform format using a coding guide. For the bivariate analysis, these data were later imported into the computerized statistical package SPSS, release 19 (Chicago, IL). Bivariate relationships between the dependent variable ("medical graduate" – conventional school/ADZU-SOM school) were assessed using two-tailed Student's *t*-tests, Pearson χ^2 tests and χ^2 tests for trend, as appropriate. Throughout the study, a statistical test was considered significant with a *p* value < 0.05.

Results

For ADZU-SOM, a total of 223 out of a possible 232 graduates completed the graduate survey; an overall response

Table 2. Undergraduate comparisons of graduates from two Philippines medical schools.

Variable	n	Conventional graduates	n	ADZU-SOM graduates	p Value ^a
Age in years	117	32.6 ± 3.5	217	32.1 ± 26.0	0.240
Female gender	119	59%	221	56%	0.630
Financial support					
Parents or relatives	107	47%	192	42%	0.448
Scholarship	-	53%	-	58%	-
Won a scholarship to attend	119	49%	223	46%	0.653
Gross family income					
<Php 100,000	119	18%	219	27%	0.001
100,001–200,000	-	18%	-	24%	-
200,001–300,000	-	22%	-	19%	-
300,001–400,000	-	12%	-	12%	-
400,001–500,000	-	7%	-	8%	-
>Php 500,000	-	24%	-	10%	-
Motivated to undertake a MD course because of family	119	44 (37%)	215	102 (48%)	0.060
Motivated to undertake a MD course because of it is a prestigious profession	119	43 (36%)	215	84 (39%)	0.597
Motivated to undertake a MD course because of a desire to help others	119	0 (0%)	215	16 (7%)	0.002
Motivated to undertake a MD course because of a desire for community service	119	60 (50%)	215	126 (56%)	0.149
Motivated to choose their medical school because of parents or relatives	119	33 (28%)	215	79 (37%)	0.095
Motivated to choose their medical school because of curriculum	119	29 (24%)	215	92 (43%)	0.001
Motivated to choose their medical school because of its prestige/International standard	119	37 (31%)	215	39 (18%)	0.007
Motivated to choose their medical school because there was little option	119	4 (3%)	215	32 (15%)	0.001
Discipline practice intention was Family Medicine/GP	115	42 (36%)	220	107 (49%)	0.034
Discipline practice intention was Surgery	115	18 (16%)	220	16 (7%)	0.016
Discipline practice intention was Pediatrics	115	12 (10%)	220	29 (13%)	0.466
Discipline practice intention was Adult Internal Medicine (AIM)	115	20 (17%)	220	24 (11%)	0.095
Discipline practice intention was a Medicine specialty (not AIM)	115	17 (15%)	220	25 (11%)	0.370
Discipline practice intention was Obstetrics & Gynecology	115	7 (6%)	220	11 (5%)	0.682
Discipline practice intention was Psychiatry	115	1 (1%)	220	4 (2%)	0.497
Discipline practice intention was Public Health	115	0 (0%)	220	2 (1%)	0.305

^aChi-square test, Chi-square test for trend or *t*-test, as appropriate.
p values in bold highlight significant results.

Table 3. Postgraduate comparisons of graduates from two Philippines medical schools.

Variables	n	Conventional graduates	n	ADZU-SOM graduates	p Value ^a
Pursued advanced studies	119	85 (71%)	106	62 (59%)	0.042
Current specialization is Family Medicine/General Practice	100	26 (26%)	60	3 (5%)	0.001
Current specialization is Surgery	100	13 (13%)	60	7 (12%)	0.805
Current specialization is Pediatrics	100	12 (12%)	60	16 (27%)	0.018
Current specialization is Anesthetics	100	7 (7%)	60	8 (13%)	0.183
Current specialization is Adult Internal Medicine	100	21 (21%)	60	12 (20%)	0.880
"Strongly agree" that community physicians should cater holistically to the needs of the community	119	41 (34%)	215	116 (54%)	0.007
"Strongly agree" that community healthcare entails partnership with other stakeholders	119	46 (39%)	215	129 (60%)	<0.001
"Strongly agree" that community service is both a duty and an obligation for HP	119	64 (54%)	215	135 (63%)	0.177
"Strongly agree" that healthcare requires prioritizing community health needs	119	68 (57%)	215	157 (73%)	0.008
"Strongly agree" that community healthcare should promote health equity	119	71 (60%)	215	157 (73%)	0.029
"Strongly agree" that working in the community can make an impact on population health outcomes	119	77 (65%)	215	162 (75%)	0.039
First position was a Rural/Municipal Health Officer	73	0 (0%)	78	12 (15%)	0.001
Currently working in a Government Rural Health Unit	160	3 (2%)	94	16 (17%)	<0.001
Currently working in a Private Primary Hospital	160	27 (17%)	94	7 (7%)	0.033
Currently working in a Government Tertiary Hospital	160	117 (73%)	94	66 (70%)	0.618
Currently working in a Government Specialist Hospital	160	7 (4%)	94	0 (0%)	0.040
Current position is generalist Medical Officer (MO/Resident/Consultant levels)	124	64 (52%)	213	153 (72%)	<0.001
Current position is a Surgical specialist	124	7 (6%)	213	2 (1%)	0.010
Current position is a Non-Surgical (Medical) specialist	124	37 (30%)	213	21 (10%)	<0.001
Current position is a Rural/Municipal Health Officer	124	2 (2%)	213	22 (10%)	0.003
Current position is Family Medicine/GP	124	10 (8%)	213	9 (4%)	0.141

^aChi-square test, Chi-square test for trend or *t*-test, as appropriate.
p values in bold highlight significant results.

Table 4. Postgraduate comparisons of graduates from two Philippines medical schools with regards responses to questions on current attitude toward community practice (Likert scale questions used from "strongly disagree" (SD) to "strongly agree" (SA)).

Variable	Conventional graduates (n = 119)					ADZU-SOM graduates (n = 223)					* <i>p</i> Value
	SD	D	N	A	SA	SD	D	N	A	SA	
"Community physicians should cater holistically to the needs of the community"	-	4	14	60	41	-	4	15	80	116	0.001
"Community healthcare entails partnership with other stakeholders"	-	1	20	52	46	-	3	11	72	129	<0.001
"Community service is both a duty and an obligation for health professionals"	-	-	10	45	64	-	2	12	66	135	0.129
"Healthcare requires prioritizing community health needs"	-	-	8	43	68	-	1	8	49	157	0.006
"Community healthcare should promote health equity"	-	-	3	45	71	-	1	7	50	157	0.050
"Working in the community can make an impact on population health outcomes"	-	-	9	33	77	-	2	8	43	162	0.042

*Chi-square test for trend.
p values in bold highlight significant results.

Table 5. Graduate respondents classified by year of graduation.

Year of graduation	ADZU-SOM	Conventional school
2003	12	8
2004	12	18
2005	31	12
2006	12	12
2007	21	24
2008	20	10
2009	22	17
2010	20	6
2011	24	6
2012	39	6
Graduating year not reported	10	–
Total	223	119

rate of 96%. For ADZU-SOM's comparator conventional medical school, a total of 119 out of a possible 464 graduates completed the graduate survey; an overall response rate of 26%. A complete list of the graduate respondents classified by year of graduation is given in [Table 5](#).

Demographic aspects

ADZU-SOM medical graduates had significantly lower gross family incomes ($p=0.001$) as opposed to the conventional school graduates.

Medical profession selection aspects

Compared to conventional school graduates, ADZU-SOM medical graduates were more likely to be motivated to join the medical profession due to desire to help others ($p=0.002$) and to have chosen their medical school due to its community-orientated curriculum ($p=0.001$) and because there was "little option" in the region, its prestige/international standard ($p<0.001$), while graduates from the conventional school were more likely to have chosen their medical school due to its prestige/international standard ($p=0.007$).

Health workforce intentions at graduation

Compared to conventional school graduates, ADZU-SOM medical graduates were more likely to intend having a career in Family Medicine ($p=0.034$) disciplines at graduation, while graduates from the conventional school were more likely to intend pursuing a Surgical career ($p=0.016$).

Postgraduate career and location

Significantly more comparator school graduates were found to have pursued advanced studies than ADZU-SOM medical graduates ($p=0.042$). Overall, ADZU-SOM medical graduates were more likely to be currently practising in pediatrics ($p=0.018$), while comparator school graduates were more likely to be practising in family medicine/GP ($p=0.001$).

ADZU-SOM medical graduates were more likely to work in their first position as a Rural/Municipal Health Officer than were comparator school graduates ($p=0.001$). ADZU-SOM medical graduates were also more likely to be working in a Government tertiary hospital in their current position as a generalist Medical Officer/Resident/Consultant

($p<0.001$) or working in a Rural Health Unit ($p<0.001$) as Municipal Health Officers ($p=0.003$), while comparator school graduates were more likely to currently working in private hospitals ($p=0.033$) or Government specialist hospitals ($p=0.040$), often as surgical ($p=0.010$) or nonsurgical/medical specialists ($p<0.001$).

Attitudes to community service

Compared to conventional school graduates, ADZU-SOM medical graduates were more likely to "strongly agree" that: community physicians should cater holistically to the needs of the community ($p=0.001$); community healthcare entails partnership with other stakeholders ($p<0.001$); healthcare requires prioritizing community health needs ($p=0.006$); community healthcare should promote health equity ($p=0.050$); and, working in the community can make an impact on population health outcomes ($p=0.042$).

Discussion

Study findings show notable differences in the outcomes of ADZU-SOM graduates with those of the more conventional medical school. Demographically, the conventional medical school graduates generally belong to higher income families compared to ADZU-SOM graduates. Due to its geographical location on the tip of the Zamboanga Peninsula, the ADZU-SOM attracts students mostly from the Peninsula and Sulu archipelago; these regions include some of the poorest provinces in the Philippines. In contrast, the conventional school is more accessible to the major islands groups of the Philippines, which have more affluent populations.

Selecting local applicants from lower socioeconomic strata is used specifically by ADZU-SOM as a means for achieving equity in access to medical education in the Western Mindanao region. There is evidence in the literature suggesting this strategy of selecting local applicants, especially those from lower socioeconomic groups, increases later practice intentions and practice behaviors with regards working in underserved and/or rural areas of Western Mindanao. For example, Hispanic medical students from lower socioeconomic strata were more likely to choose to later practice in communities of similar ethnic and economic status (Fryer et al. 2001), while an international study of "socially accountable" medical schools found a selection process aimed at recruiting students from under-served communities produced strong intentions to later work with underserved populations (Iputo 2008; Strasser & Neusy 2010; Larkins et al. 2014).

Indeed, this study also found the ADZU-SOM graduates had more positive attitudes towards community service and health equity than the conventional medical graduates. ADZU-SOM graduates were more likely to "strongly agree" that community physicians should: provide more holistic patient care, partner with other stakeholders for good population health outcomes, prioritize community health needs and promote health equity. Providing more holistic patient care, partnering with other community stakeholders and promoting health equity all improve community health outcomes (WHO 2010; Strasser et al. 2015; Corbin et al. 2016).

This more positive mindset toward holistic and equitable healthcare may be attributed to ADZU-SOM's philosophy of socially accountable, community-engaged education. Through this philosophy, ADZU-SOM students are taught in the classroom and on community placement about the social and economic factors which determines an individual's or a community's health status, and students also practice developing holistic health action plans in collaboration with community stakeholders, based on actual community health needs and real life situations.

Overall, conventional school alumni are more likely to pursue advanced studies than ADZU-SOM graduates, which is likely reflection of that school being located in an area with easier access to training hospitals and universities. This study also found that while ADZU-SOM students had a strong inclination to practice in Family Medicine or General Practice (GP) at time of graduation, significantly more so than the conventional medical students (who were more likely to intend to practicing Surgery), it was the conventional medical school graduates who were more likely to practice Family Medicine or GP after graduation, while ADZU-SOM graduates were more likely to practice in Paediatrics. The majority of the burden of illness in the Western Mindanao region is in the pediatric age group; therefore, there is a strong need in the field for Paediatrics training. In response to this need, the Zamboanga City Medical Center (ZCMC) has developed and maintained a strong Paediatrics Department for many years, which now attracts many ADZU graduates as well as graduates from other medical schools. In contrast, the Zamboanga Peninsula has historically had a less strong Family Medicine and GP training pathway, which appears to be restricting ADZU-SOM graduates' entry into these professions.

Graduates of both schools were mostly (>70%) working in Government tertiary hospitals, with >50% working in generalist positions as a Medical Officers, Residents or Consultants. However, ADZU-SOM medical graduates were significantly more likely than comparator school graduates to be currently working in a Government Rural Health Unit (17% versus 2%), often as Municipal Health Officers (10% vs. 2%). The ADZU-SOM student scholarship program may be promoting the number of graduates who later choose to work in Rural Health Units, as students who avail of these scholarships are required to serve rurally for 4 years after graduation. In fact, additional analysis of the survey database shows ADZU-SOM scholarship holders stay significantly longer in their first medical position than non-scholarship holders (mean of 3.4 years versus mean of 2.0 years; $p < 0.001$) and work as a Rural/Municipal Health Officer in both their first medical position ($p = 0.029$) and in their current medical position ($p = 0.013$).

In contrast, comparator school graduates were significantly more likely than ADZU-SOM graduates to be working as surgical or medical specialists (36% vs. 11%), often in private hospitals (17% vs. 7%) or Government specialist hospitals (4% vs. 0%). There is growing support in the literature for producing greater numbers of generalist doctors over specialist doctors (Hegde 2005; Starfield et al. 2005; Duns 2013); in particular, to help prevent and manage the growing burden of chronic disease in low-cost community settings. Hegde further states newly qualified Western doctors are often incapable of solo-practising medicine at the

community level due to their undergraduate training, which lacks exposure to minor illness syndromes in the community and creates a dependence on hi-tech gadgets for diagnosis. Hegde goes on to recommend medical schools change their curricula to be more patient-centered and community based from the first day and have a strong public health focus – similar to that of the ADZU-SOM. There is also strong evidence (Starfield et al. 2005) that health systems with a generalist orientation consistently achieve better outcomes at lower costs, and are also associated with a more equitable distribution of health across the population. Thus, these findings suggest the ADZU-SOM's graduate profile of more generalists than specialists, and many being Municipal/Public Health Officers, may be more appropriate for the Philippines context.

Limitations

The major limitation of this study is that it compares the ADZU-SOM to the graduate outcomes of only one other medical school. However, the conventional school was deliberately chosen as both schools have been granted level 1 accreditation status, and both have achieved consistently high scores in the national licensure examinations over recent years. In addition, the study is retrospective, with many of the responding doctors having graduated more than 5 years before completing the survey. Thus, recall bias may be a factor for questions on respondent's initial motivation to undertake a medical degree, why they chose their medical school, and what was their discipline practice intention at time of graduation.

The alumni tracking and networking process of the ADZU-SOM allowed a high proportion (96%) of graduate locations to be identified; however, the response rate for graduates of the conventional medical school was much lower at 26%, most probably because those graduates had weaker connection to the named ADZU-SOM researchers on the project, thus introducing the potential for respondent bias for this particular school.

Since 1993, the Philippine government has also financed the "Doctors to the Barrios" (DTTB) program (<http://www.doh.gov.ph/node/1091>) to keep physicians in poorer and more remote communities through healthy financial benefits. This external DTTB program would attract both ADZU-SOM and conventional school graduates to community practice in addition to internal scholarship programs, but due to the demonstrated different financial backgrounds of the two schools (with ADZU-SOM graduates being significantly more likely to come from a lower income family than conventional school graduates), it may be that ADZU-SOM have dis-proportionally taken up these financial benefits to practice in rural areas.

Conclusions

Study findings suggest ADZU-SOM's philosophy of socially accountable, community-engaged medical education manifests in the practice choices of its graduates. Graduates of ADZU-SOM, predominantly recruited from Zamboanga Peninsula and the Sulu archipelago, were more likely to come from lower socio-economic backgrounds, have more positive attitudes to community service and promoting

health equity, and upon graduation work in rural health units or as generalists in government hospitals. Findings show that ADZU-SOM is able to meet the local rural and urban health workforce needs of the Western Mindanao region, and suggests SAHPE institutions can produce graduates with the ability, desire and commitment to work in areas that are medically underserved.

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