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## Reply to Letter to the Editor, "Response to Medical Students' Attitudes Towards Female Sex Workers"

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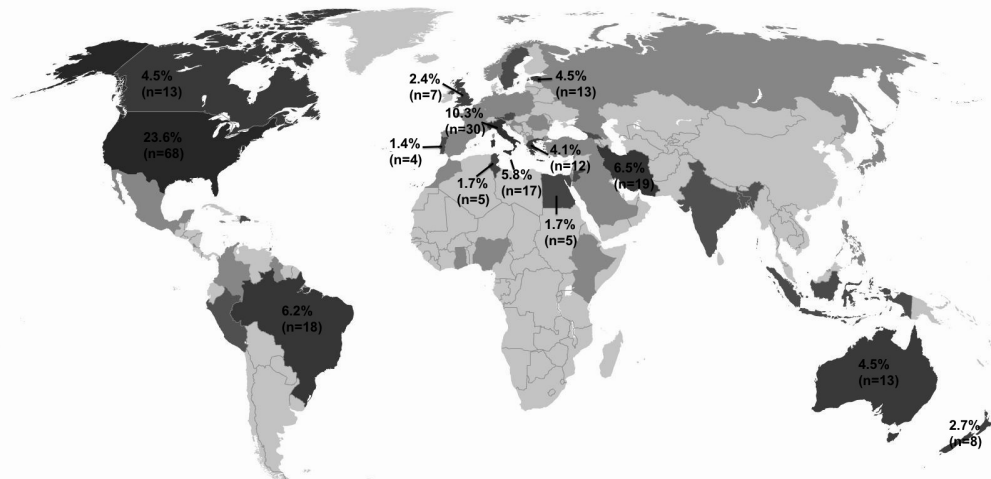
### To the Editor,

We would like to first extend our gratitude to the authors of the letter to the editor in the interest of our article, "Medical students' knowledge and attitudes toward female sex workers and their occupational risk factors".<sup>1,2</sup> By discussing the meaning of our study results and limitations, we raise the potential for future research to clarify medical student attitudes toward female sex workers and the factors that influence such attitudes. We agree with the letter-writers that this topic must be explored further, with special attention to the cultural and regional differences in the perception of sex work.

Considering the small sample size and the selection and participation biases, we agree that our study sample does not reflect the world's population of medical students. We want to thank the letter-writers for bringing to our attention the misrepresentation of student participation on the world map. On the map, the line that should have pointed to Malta (5.8% of the study sample, n=17) was extended to the island of Sicily in error. A revised version of this map is shown in **Figure 1**. Furthermore, additional information about each participating country's student demographics can be found in **Table 1**.

While we cannot generalize medical students' attitudes on a global scale, we believe our study did raise interesting questions about factors outside of formal education/training that influence attitudes. Although our student sample represented a variety of prior educational experiences and graduate degrees, stratification of student data based on educational background showed no statistically significant variations in attitude or knowledge scores. Exact results of the two-sample T-tests for differences in mean attitude and knowledge scores among different groups, as well as differences in their educational backgrounds, can be found in **Table 2** and **Table 3**. Other factors which could be more influential to medical student attitudes toward sex workers, such as socioeconomic, religious, and cultural determinants, remain to be explored.

**Figure 1.** Percentages of Participants from the Top 14 Most Represented Countries.



Legend: Other 42 participating countries contained three participants (1%) or less of the total study sample (n=292)

Following the suggestion to stratify students by country GDP per capita, we found GDP per capita was positively correlated with both country mean attitude scores ( $r=0.36$ ,  $p=0.007$ ) and mean knowledge scores ( $r=0.28$ ,  $p=0.04$ ) (Country GDP obtained from World Bank 2013 data: <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>, updated 2015; cited 2015 Mar 21). However, these are loose correlations for our limited study sample. To effectively explore the relationship between country economic status and attitudes toward sex workers, several factors may be taken into account, including but not limited to: the impact of economic status on investments in education, medical training and the health care system itself; the relationship between national economic growth and public access to health care; and the influence of economic status on the size of the informal job sector (World Health Organization. The World Health Report 2000: Health Systems, Improving Performance. 2000. Available at: [http://apps.who.int/iris/bitstream/10665/42281/1/WHO\\_2000.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/42281/1/WHO_2000.pdf?ua=1), cited 2015 Mar 21).<sup>3-6</sup>

In agreement with the letter-writers' opinion, different religions undoubtedly guide different attitudes toward sex work. We chose not to ask students with which religion they identify in particular in order to survey demographics more broadly. Now seeing a potential relationship between "religiousness" and attitudes toward sex workers, it is important to explore in detail what students mean when they self-identify as religious or not religious and what influence different religious teachings might have on attitudes toward sex workers.

It is true that many countries have ill-defined and unregulated laws controlling the sex industry. Sources such as the U.S. Department of State Country Reports on Human Rights Practices, which provides data to the Joint United Nations Programme on HIV/AIDS (UNAIDS) and other international agencies, reveal inconsistencies between the legality of prostitution and regulation of its context. In the UK, for example, prostitution is legal, but the organization of brothels for prostitution is illegal. In Iran, prostitution is illegal, but occurs under the legal allowance of *sigheh*, a temporary marriage (2009 Country Reports on Human Rights Practices. Available at: <http://www.state.gov/j/drl/rls/hrrpt/2009/index.htm>, cited 2015 Mar 21). In addition to vague laws and different forms of sex

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**Table 1.** Participating Countries' Demographics, Mean Attitude Scores, and Mean Knowledge Scores.<sup>†</sup>

Home country (No. participating students)	Mean age <sup>‡</sup>	Mean No. completed terms in medical school <sup>‡</sup>	Previous education/ training in occupational health/social determinants of health (%)	Sex		Self-identified religiosity		Prostitution in country of intended practice		Mean attitude score	Mean knowledge score (% correct responses)
				Male (%)	Female (%)	Religious (%)	Non-religious (%)	Legal (%)	Illegal (%)		
Australia (n=13)	23	4	46.2	53.8	46.2	7.7	76.9	100.0	0.0	34.7	96.2
Austria (n=3)	25	8	33.3	100.0	0.0	0.0	100.0	100.0	0.0	35.7	97.9
Bahrain (n=1) <sup>†</sup>	22	10	100.0	100.0	0.0	100.0	0.0	0.0	100.0	34.0	78.6
Bangladesh (n=2)	24	3	100.0	50.0	50.0	100.0	0.0	0.0	50.0	26.0	91.2
Belgium (n=1) <sup>†</sup>	23	4	100.0	0.0	100.0	0.0	100.0	100.0	0.0	34.0	94.1
Brazil (n=18)	23	4	66.7	38.9	61.1	61.1	33.3	94.4	5.6	29.8	87.7
Canada (n=13)	24	4	61.5	46.2	53.8	23.1	76.9	84.6	15.4	32.6	99.1
Colombia (n=1) <sup>†</sup>	24	10	100.0	0.0	100.0	100.0	0.0	100.0	0.0	33.0	93.8
Croatia (n=1) <sup>†</sup>	24	12	0.0	100.0	0.0	0.0	100.0	0.0	100.0	29.0	93.3
Czech Republic (n=1) <sup>†</sup>	22	6	0.0	0.0	100.0	0.0	100.0	100.0	0.0	30.0	94.1
Dominican Republic (n=3)	26	12	33.3	33.3	66.7	100.0	0.0	66.7	33.3	29.0	84.1
Egypt (n=5)	22	6	80.0	60.0	40.0	60.0	0.0	0.0	80.0	27.0	87.2
Estonia (n=13)	21	4	23.1	7.7	92.3	0.0	100.0	92.3	0.0	31.9	89.4
Ethiopia (n=1) <sup>†</sup>	21	9	100.0	0.0	100.0	0.0	100.0	100.0	0.0	27.0	100.0
France (n=1) <sup>†</sup>	20	6	0.0	0.0	100.0	0.0	100.0	100.0	0.0	†	93.3
Georgia (n=3)	23	2	0.0	33.3	66.7	100.0	0.0	66.7	33.3	25.3	86.8
Germany (n=1) <sup>†</sup>	27	9	0.0	0.0	100.0	0.0	100.0	100.0	0.0	33.0	100.0
Ghana (n=1) <sup>†</sup>	21	6	0.0	100.0	0.0	100.0	0.0	0.0	100.0	31.0	100.0
Greece (n=12)	23	4	33.3	41.7	50.0	16.7	83.3	91.7	0.0	31.3	88.3
Grenada (n=2)	20	3	50.0	50.0	50.0	50.0	50.0	0.0	100.0	29.0	96.9
Guyana (n=1) <sup>†</sup>	25	10	100.0	0.0	100.0	100.0	0.0	0.0	100.0	23.0	100.0
India (n=2)	24	11	0.0	50.0	50.0	50.0	0.0	100.0	0.0	35.5	96.7
Indonesia (n=3)	21	8	66.7	33.3	33.3	100.0	0.0	33.3	66.7	25.0	94.1
Iran (n=19)	24	8	21.1	52.6	47.4	63.2	31.6	0.0	100.0	29.1	88.0
Iraq (n=1) <sup>†</sup>	21	0	0.0	0.0	100.0	100.0	0.0	0.0	100.0	25.0	92.9
Israel (n=1) <sup>†</sup>	34	4	0.0	0.0	100.0	0.0	100.0	100.0	0.0	28.0	100.0
Italy (n=30)	22	5	65.0	30.0	70.0	53.3	40.0	90.0	0.0	30.5	87.4
Jamaica (n=1) <sup>†</sup>	25	9	100.0	0.0	100.0	100.0	0.0	0.0	100.0	33.0	88.2
Japan (n=1) <sup>†</sup>	21	5	0.0	0.0	100.0	0.0	100.0	0.0	100.0	26.0	91.7
Jordan (n=3)	21	8	33.3	100.0	0.0	0.0	66.7	0.0	100.0	23.7	97.8
Kenya (n=1) <sup>†</sup>	21	2	0.0	100.0	0.0	0.0	100.0	0.0	100.0	32.0	93.3
Lebanon (n=1) <sup>†</sup>	25	16	100.0	100.0	0.0	100.0	0.0	0.0	100.0	37.0	94.1
Macedonia (n=1) <sup>†</sup>	29	16	100.0	0.0	100.0	0.0	100.0	100.0	0.0	29.0	100.0
Malta (n=17)	20	4	11.8	35.3	64.7	64.7	29.4	5.9	88.2	29.2	96.7
Mexico (n=1) <sup>†</sup>	23	10	0.0	100.0	0.0	100.0	0.0	100.0	0.0	34.0	76.5
Morocco (n=1) <sup>†</sup>	21	8	0.0	0.0	100.0	100.0	0.0	0.0	100.0	31.0	88.9
Netherlands (n=1) <sup>†</sup>	23	3	100.0	0.0	100.0	0.0	100.0	100.0	0.0	39.0	93.3
New Zealand (n=8)	22	5	50.0	25.0	75.0	37.5	62.5	100.0	0.0	33.3	99.2
Nigeria (n=1) <sup>†</sup>	25	0	0.0	0.0	100.0	100.0	0.0	0.0	100.0	31.0	100.0
Norway (n=1) <sup>†</sup>	23	7	0.0	0.0	100.0	0.0	100.0	100.0	0.0	33.0	100.0
Peru (n=2)	20	7	50.0	50.0	50.0	100.0	0.0	100.0	0.0	32.5	89.0
Philippines (n=1) <sup>†</sup>	24	7	100.0	100.0	0.0	100.0	0.0	0.0	100.0	32.0	100.0
Poland (n=1) <sup>†</sup>	23	8	0.0	100.0	0.0	0.0	100.0	0.0	0.0	33.0	93.3
Portugal (n=4)	22	8	25.0	25.0	75.0	25.0	75.0	75.0	0.0	33.0	97.1
Romania (n=1) <sup>†</sup>	23	9	0.0	0.0	100.0	100.0	0.0	0.0	100.0	30.0	82.4

Legend: <sup>†</sup> Countries with single-student participation. <sup>‡</sup> Mean ages and completed terms rounded down to the nearest whole number. † Data unavailable due to survey incompleteness.

Continue in next page...

**Table 1** (Continued) Participating Countries' Demographics, Mean Attitude Scores, and Mean Knowledge Scores.<sup>†</sup>

Country (n)	Age	Completed	Attitude	Knowledge	Attitude	Knowledge	Attitude	Knowledge	Attitude	Knowledge	
Russian Federation (n=1) <sup>‡</sup>	30	12	0.0	100.0	0.0	100.0	0.0	0.0	100.0	30.0	88.2
Saudi Arabia (n=1) <sup>‡</sup>	24	12	0.0	100.0	0.0	100.0	0.0	100.0	0.0	21.0	85.7
Singapore (n=2)	23	3	0.0	50.0	50.0	100.0	0.0	100.0	0.0	30.5	100.0
Slovakia (n=1) <sup>‡</sup>	21	4	0.0	0.0	100.0	0.0	100.0	100.0	0.0	25.0	88.2
Spain (n=1) <sup>‡</sup>	32	13	0.0	100.0	0.0	0.0	100.0	100.0	0.0	34.0	93.8
Sweden (n=3)	24	4	66.7	0.0	100.0	66.7	33.3	100.0	0.0	35.0	100.0
Trinidad and Tobago (n=2)	21	4	0.0	0.0	100.0	100.0	0.0	50.0	50.0	25.0	96.4
Tunisia (n=5)	22	5	80.0	20.0	80.0	40.0	40.0	20.0	60.0	32.0	93.7
Turkey (n=1) <sup>‡</sup>	20	4	100.0	100.0	0.0	0.0	100.0	100.0	0.0	33.0	93.8
United Kingdom (n=7)	22	5	42.9	28.6	71.4	42.9	57.1	85.7	0.0	32.9	91.7
United States (n=68)	27	7	42.6	54.4	45.6	39.7	52.9	0.0	97.1	29.9	93.6
All countries	23	6	41.1	42.1	57.2	44.5	49.7	49.3	42.5	31.0	92.4

**Legend:** <sup>‡</sup> Countries with single-student participation. <sup>‡</sup> Mean ages and completed terms rounded down to the nearest whole number. <sup>†</sup> Data unavailable due to incomplete survey.

**Table 2.** Results of Two-sample T-Tests for Differences in Attitudes.<sup>\*</sup>

Characteristic	Mean Attitude Score	p-value
Self-identified religiousness		
Yes (n=128)	29.2	<0.001
No (n=143)	31.6	
Legality of prostitution in country of intended practice		
Legal (n=140)	31.5	<0.001
Illegal (n=133)	29.3	
Prior education in occupational health or social determinants of health <sup>†</sup>		
Yes (n=118)	30.9	0.19
No (n=135)	30.2	
Belief that prostitution is common in country of intended practice		
Yes (n=163)	30.7	0.51
No (n=60)	30.2	
Obtained/currently pursuing a graduate degree outside of medicine <sup>‡</sup>		
Yes (n=87)	30.2	0.35
No (n=197)	30.7	

**Table 3.** Results of Two-sample T-Tests for Differences in Knowledge.<sup>\*</sup>

Characteristic	Mean Attitude Score	p-value
Self-identified religiousness		
Yes (n=128)	93.0	0.28
No (n=143)	91.7	
Legality of prostitution in country of intended practice		
Legal (n=140)	92.1	0.61
Illegal (n=133)	92.7	
Prior education in occupational health or social determinants of health <sup>†</sup>		
Yes (n=118)	93.7	0.09
No (n=135)	91.5	
Belief that prostitution is common in country of intended practice		
Yes (n=163)	91.8	0.50
No (n=60)	92.9	
Obtained/currently pursuing a graduate degree outside of medicine <sup>‡</sup>		
Yes (n=88)	93.0	0.43
No (n=204)	92.1	

**Legend** (For Table 2 and 3): <sup>\*</sup> Data for participants who selected "uncertain" or "decline to answer" were excluded from analysis. <sup>†</sup> Of all participating students, 40.4% (n=118) had previous education in social determinants of health or occupational health, 46.2% (n=135) did not, and 9.2% (n=27) were uncertain. <sup>‡</sup> Of all participating students, 30.1% (n=88) had completed or were pursuing a graduate degree other than medicine at the time of completing the survey. Additional degrees included Public Health (43.2% of those with additional degrees, n=38), the Biological and Life Sciences (30.7%, n=27), Business or Public Relations (5.7%, n=5), Education (5.7%, n=5), and others. Mean ages and completed terms were rounded down to the nearest whole number.

work,<sup>7</sup> factors to consider may also include: presence of protective rather than solely punitive laws; variability in circumstances, such as human trafficking or sexual abuse; and, of course, the media by which the legal environment is conveyed to the public to shape attitudes and opinions.<sup>8-10</sup> The variability in specific laws, regulation, enforcement, and influence on public attitudes means any relationship between the legal environment and medical student attitudes must be explored locally.

Despite the limitations of this study in making generalizations about medical students worldwide, an interesting outcome is the lack of association between educational background and attitudes toward female sex workers. Therefore, perhaps our focus should shift to spheres of influence outside formal education/training. Because of the vast regional differences in how socioeconomic status, religion, and legal frameworks shape knowledge and attitudes, localized studies, rather than large, global studies, may be more effective in understanding how attitudes are created and perpetuated in society. The authors want to thank the writers of the letter to the editor once again for facilitating this ongoing discussion. We also invite future collaboration to further explore how medical student attitudes toward sex workers are shaped and, therefore, how interventions can be targeted regionally to improve care and public health outcomes.

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