Bias in medicine: a survey of medical students’ attitudes toward HIV-positive and marginalized patients in Russia, 2010

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Outline

- Background
  - Update on HIV/AIDS
  - HIV epidemic global perspectives and situation in Russia
  - HIV-related stigma and discrimination in healthcare settings
    - Medical students and stigma
- Study methods and objectives
- Results
  - Stratified analyses
  - Regression analyses
- Discussion and conclusions
Abbreviations

- CSW – commercial sex worker
- IDU – intravenous drug use
- MSM – men, who have sex with men
- HIV+ – HIV-positive
Update on HIV/AIDS

- HIV – human immunodeficiency virus is a causative agent of acquired immunodeficiency syndrome.¹
- It multiplies in a particular cell line of the human immune system causing gradual immune system decline and incompetence (AIDS).²
  - Without treatment AIDS develops in 5-8 years in the majority of individuals infected with HIV.
- Effective treatment has been available since mid-1990s.¹,²
  - Antiretroviral therapy

HIV transmission

- Three major routes:
  - Blood borne
    - Intravenous drug use, blood transmission, professional contact
    - Blood on compromised skin or intact mucous membranes
  - Sexual
    - Any kind of sexual intercourse
  - From mother to child
    - *In utero*, during labor, via breast milk
## Risk of HIV transmission

<table>
<thead>
<tr>
<th>Exposure route</th>
<th>Risk per 10 000 exposures to an infected source</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood transfusion</td>
<td>9 250</td>
<td>92.5</td>
</tr>
<tr>
<td>Mother-to-child transmission</td>
<td>1 500–3 000</td>
<td>15–30</td>
</tr>
<tr>
<td>Needle-sharing injecting drug use</td>
<td>80</td>
<td>0.80</td>
</tr>
<tr>
<td>Receptive anal intercourse</td>
<td>50</td>
<td>0.50</td>
</tr>
<tr>
<td>Percutaneous needle-stick</td>
<td>30</td>
<td>0.30</td>
</tr>
<tr>
<td>Mucosal membrane exposure</td>
<td>10</td>
<td>0.10</td>
</tr>
<tr>
<td>Receptive penile-vaginal intercourse</td>
<td>1–15</td>
<td>0.01–0.15</td>
</tr>
<tr>
<td>Insertive anal intercourse</td>
<td>6.5</td>
<td>0.065</td>
</tr>
<tr>
<td>Insertive penile–vaginal intercourse</td>
<td>1–15</td>
<td>0.01–0.15</td>
</tr>
<tr>
<td>Receptive oral intercourse</td>
<td>1</td>
<td>0.01</td>
</tr>
<tr>
<td>Insertive oral intercourse</td>
<td>0.5</td>
<td>0.005</td>
</tr>
</tbody>
</table>

HIV epidemic: global perspectives

- **33.3 million** – estimated number of people living with HIV/AIDS by the end of 2009

- **25 million** – estimated number of people who died of AIDS since the beginning of the epidemic

  - One of the deadliest epidemics for mankind
  - Immense social, economical, demographical and cultural consequences

- **Powerful global response**
  - Number of AIDS-related deaths declining (worldwide)
  - Number of new cases declines steadily (worldwide)

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Estimated HIV prevalence
UNAIDS, 2009
AIDS-related deaths in Eastern Europe and Central Asia

- The only region with substantial growth in number of people who died from AIDS

HIV epidemic in Russia

- HIV epidemic in Russia is not well controlled\textsuperscript{1}
- Largest regional increase in number of people living with HIV/AIDS\textsuperscript{1}
- Since the beginning predominately driven by IDU \textsuperscript{1,2}
  - Generalization of the epidemic is in progress \textsuperscript{2,3}
  - Public health system often fails to respond properly\textsuperscript{4,5}

HIV prevalence in Russian Federation

Per 100,000 population
Dec. 2009

Rep. of Tatarstan, HIV prevalence is 231.6 per 100,000 population

Stigma and discrimination

- Stigmatization – “devaluation of people either living with or associated with HIV/AIDS”\(^\text{1}\)
- Discrimination – “unfair and unjust treatment of an individual based on his or her real or perceived HIV status”\(^\text{1}\)
- Stigma and discrimination exist in many domains, healthcare being one of them\(^\text{2}\)
- Stigmatizing characteristics can be of very broad variety:
  - Race/ethnicity, sex, sexual orientation, age, place of origin…\(^\text{2}\)

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Consequences of stigma

- Lower quality of care (or refusal)\(^1\)
- Reduced accessibility of care\(^1\)
  - Lower treatment adherence\(^2\)
  - Reluctance to participate in prophylactic programs, including HIV testing and counselling\(^2,3\)
- Promotes further epidemic spread\(^4\)

Why HIV-related stigmatization exists?

- “Categorization” is a natural property of human thinking process
- HIV-positive patients often belong to marginalized groups
  - CSW, IDU, MSM
- Health care workers are at greater risk for many infectious disease
  - Though, actual risk of acquiring HIV if universal precautions are used is very low, it is often perceived as high

Can HIV-related stigma be reduced?

- Many targeted interventions to reduce HIV-related stigma in health care settings proved to be effective\(^1,^2\)
- Primary targets, suggested by Nyblade et al.\(^2\):
  - Knowledge about HIV transmission, risks in healthcare settings and ways to reduce them
  - Knowledge of what stigma is, its appearances and harmful consequences
  - Moral judgments linking people with HIV to “improper” or “immoral” behavior

Medical students and stigma

- Medical students express stigmatizing attitudes\(^1,2\)
  - And further "transfer" them to their practice

- Unique opportunity to learn non-stigmatizing ways of practicing\(^1\)
  - Students express willingness to learn more\(^3\)

- Additional "source" of stigmatization – faculty at medical school\(^4,5\)

Stigmatization expressed by medical students...

- Is described phenomenon in many countries:
  - US¹, UK², EU³ China⁴, Iran⁵, Barbados⁶ etc…
- Varies from country to country¹-⁶
- Has never been described in Russia
  - There is evidence of high levels of stigmatization of HIV-positive individuals in general population and in medical establishment in Russia⁷

Study objectives

- Assess prevalence of biased attitudes among medical students toward HIV+ and marginalized patients
- Evaluate distributions of these attitudes among different student subgroups
  - By gender and year of study
- Compare levels of stigmatization expressed by medical students toward patients from different subgroups
  - HIV-positive and HIV-negative CSW, IDU, MSM
Study methods

- Secondary data analysis from the in-house survey of medical students from Kazan State Medical University
- Main tool: five point Likert-type scale
- Nine virtual patients:
  - HIV-negative: MD (comparison), CSW, IDU, MSM
  - HIV-positive: MD, CSW, IDU, MSM, due to blood transfusion
Outcome

- Study outcome: reluctance to provide medical care
- Survey question: if you had a choice, how likely will it be for you to volunteer to care for the following patients:

<table>
<thead>
<tr>
<th>Patient</th>
<th>Very likely to volunteer</th>
<th>Likely to volunteer</th>
<th>Would neither volunteer nor not volunteer</th>
<th>Would not volunteer</th>
<th>Would very strongly chose not to volunteer</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>2. HIV negative IDU</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. HIV positive IDU</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
Exposures

- Year of study – categorized as preclinical vs clinical
  - Year 1-3 – preclinical; year 4-6 – clinical
- Student’s gender
- Additional exposure/potential confounder: concern about acquiring HIV in health care settings (HCS)
  - 4 levels: a lot, some, a little, none
  - Answers “Don’t know” were also included into analysis
Statistical analyses

- Initial cleaning and assessment of the dataset
  - 64 observations were removed due to missing either outcome or major exposure information (year/gender), or due to questionable validity

- Bivariate and stratified analyses
  - Fisher’s exact test for between-group comparison
  - Two-sample t-test for comparing age distribution

- Multivariate analyses – log-binomial regression solved using generalized estimating equations
  - $\alpha = 0.05$, all p-values are two-sided
Results
Sample characteristics

- 436 surveys were eligible for analysis
  - 308 (70.6%) – female
  - 241 (55.3%) – in clinical years
  - Gender distribution approximately equal among preclinical and clinical groups (p=0.55)
- Mean age 20.4 years
  - Range 17-28, SD=2.3
  - Age distribution was approximately equal among male and female participants (p=0.22)
Example of exposure categorization

<table>
<thead>
<tr>
<th>Year of study</th>
<th>Outcome</th>
<th>Exposure non-dichotomized</th>
<th>Exposure dichotomized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Preclinical</td>
<td>1</td>
<td>29</td>
<td>24.79</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6</td>
<td>14.29</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>25</td>
<td>34.25</td>
</tr>
<tr>
<td>Clinical</td>
<td>4</td>
<td>34</td>
<td>44.16</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>12</td>
<td>30.00</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>38</td>
<td>51.35</td>
</tr>
</tbody>
</table>

- Patient – HIV-positive intravenous drug user
- Other outcomes had similar results
Prevalence of reluctance to treat – responses from clinical female students. HIV-negative patients.

Patient category

Prevalence of reluctance to provide care, %

Clinical Female

HIV-
Prevalence of reluctance to treat – responses from clinical female students

Prevalence of reluctance to treat HIV-negative patients (darker field)

Prevalence of reluctance to treat HIV-positive patients (lighter field)

Student category

Clinical Female

HIV+

HIV-
Prevalence of reluctance to treat HIV-negative patients

- Reluctance to treat HIV-negative physician was infrequent
  - 3.6%-7.5%
- Negative attitudes towards HIV-negative marginalized patients were more common
  - 21.8%-55.2%
Prevalence of reluctance to treat HIV-positive patients

Unwillingness to treat was higher for HIV+ marginalized patients

- 26.4%-71.9%
Clinical students show more negative attitudes

In general, unwillingness to treat was more prevalent among clinical students.
Difference between preclinical and clinical male students

- Important differences in prevalence of reluctance to treat between clinical and preclinical male students:
  - HIV+ CSW: 12.6% (p>0.05)
  - HIV- IDU: 10.5% (p>0.05)
  - HIV+ IDU: 28.2% (p<0.01)
Important differences in prevalence of reluctance to treat between clinical and preclinical female students:

- HIV- CSW: 26.2%*
- HIV+ CSW: 35.2%*
- HIV- IDU: 21.0%*
- HIV+ IDU: 32.3%*
- HIV- MSM: 7.1%
- HIV+ MSM: 22.1%*

* p<0.01
Female students show more negative attitudes

In general, unwillingness to treat was more prevalent among female students.
Difference between female and male students in preclinical years

Reluctance to treat is more prominent if a patient belong to a marginalized subgroup of the same gender

Important differences:
- HIV- CSW: 7.1% (p>0.05)
- HIV+ CSW: 3.8% (p>0.05)
- HIV- MSM: -16.6% (p=0.01)
- HIV+ MSM: -13% (p=0.056)
Difference between female and male students in clinical years

Reluctance to treat is more prominent if a patient belong to a marginalized subgroup of the same gender

Important differences:
- HIV- CSW: 34.3% (p<0.001)
- HIV+ CSW: 26.4% (p<0.001)
- HIV- IDU: 15.8 (p=0.054)
- HIV+ IDU: 13.1 (p=0.1)
- HIV- MSM: -4.4% (p>0.05)
- HIV+ MSM: 9.3% (p>0.05)
Regression analysis results
Regression analysis – model building

<table>
<thead>
<tr>
<th>Variable</th>
<th>Interpretation</th>
<th>Full</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year*</td>
<td>Student’s year of study</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Gender*</td>
<td>Student’s gender</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>HIV</td>
<td>Hypothetical patient is HIV+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Blood</td>
<td>Patient is HIV+ due to blood transfusion</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>CSW*</td>
<td>Patient is a commercial sex worker</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>IDU*</td>
<td>Patient is an intravenous drug user</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>MSM*</td>
<td>Patient is a man who have sex with man</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Year_gender</td>
<td>Interaction between year and gender</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>HIV_CSW</td>
<td>Interaction between HIV-status and CSW</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>HIV_IDU</td>
<td>Interaction between HIV-status and IDU</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>HIV_MSKM</td>
<td>Interaction between HIV-status and MSM</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Concern</td>
<td>Level of concern about acquiring HIV due to caring for a patient</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

*Variables involved in interactive terms, mind specific interpretation of betas
Ratio measures were estimated in log-binomial regression model, solved using GEE. Ratio measures agree with descriptive statistics.
Limitations

- Outcome should be interpreted as reluctance to provide care, i.e. “stigma” in its broader meaning, but not as an intent to discriminate or discrimination
  - Reasons for reluctance were not explored

- Convenience sampling
  - Self-selection bias may be present
    - Classrooms were sampled and response proportion is estimated to be greater than 70%
    - Prevalence estimates may be biased, however PR are less vulnerable to bias
  - Probabilistic meaning of the p-values and confidence intervals is incorrect
    - CIs provide insight into precision

- Results from one medical school
  - Generalizability is restricted
    - Knowing the prevalence of the HIV-related stigma in the society, it may be expected that in other schools results will be close to observed in Kazan
Discussion

- High prevalence of stigmatizing attitudes was seen among medical students in the US in earlier years of the epidemic
  - Up to 78.4% for HIV+IDU
- High prevalence of stigma in medical students in Russia is not surprising knowing high level of stigmatizing attitudes in general population

Discussion (2)

- Hypothesized reasons for high prevalence of stigma:
  - Imperfect infection control in healthcare settings
    - Known that shortages in medical supplies exist in Russia
  - Problem of low income among medical establishment and existence of informal payment for medical care
    - Informal payment system exists in healthcare in Russia
  - Perception of marginalized patients as more difficult cases
  - Socially accepted moral judgment of “useless people”

Discussion (3)

- Studying in medical school should not increase negative attitudes\(^1,2\)
  - Observed increase of reluctance to treat HIV+ and marginalized patients during studying in medical school is a concerning finding
- Studies from earlier years of HIV epidemic show that professors in medical school may express stigmatizing attitudes\(^3,4\)
- Medical school curriculum is more focused on clinical features of HIV/AIDS

Conclusions

- The majority of medical students in Russia may have negative attitudes towards HIV-positive patients and marginalized patients.
- Reluctance to treat appears more prevalent in students of clinical years of study.
- Reluctance to treat appears more prevalent among female students.
- These findings suggest that more attention to the issue is needed, including additional research.
  - Hypothesized reasons are multifactorial.
  - Qualitative study is suggested.
Thank you!

Acknowledgements:
Dr. Louise-Anne Mc Nutt, PhD
Dr. Wayne Triner, MD, PhD
Kazan State Medical University Faculty
University at Albany Faculty
Fogarty Foundation Personnel
My friends and family
Concern and reluctance to provide care

- Considerable number of students reported concerns about acquiring HIV from a patient in a health care settings (n=316, 72.6% of students)
- Concern was strongly associated with year of study
  - 147 (61.3%) in preclinical years
  - 169 (86.7%) in clinical years
    - p<0.0001 for comparison with 5 levels of concern
- Concern was found to be NOT associated with level of negative attitudes after adjusting for year
Если бы у Вас была возможность выбирать, вызвались ли бы Вы добровольно лечить следующих пациентов:

<table>
<thead>
<tr>
<th>1. ВИЧ-положительный человек, зараженный при переливании крови</th>
<th>Да, конечно</th>
<th>Скорее всего</th>
<th>Возможно – да, возможно – нет</th>
<th>Скорее нет</th>
<th>Нет, постарался избежать</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. ВИЧ-отрицательная работница коммерческого секса</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. ВИЧ-положительная работница коммерческого секса</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. ВИЧ-отрицательный человек, употребляющий наркотики инъекционно</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. ВИЧ-положительный человек, употребляющий наркотики инъекционно</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. ВИЧ-положительный врач, инфицированный от пациента во время работы</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. ВИЧ-отрицательный врач</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. ВИЧ-положительный гей</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. ВИЧ-отрицательный гей</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

A reprint from actual survey page with a question about willingness to volunteer to provide medical care [in Russian]
Non-dichotomized outcome distribution

Patient – HIV-positive IDU

Likert-type scale outcome, ranging from 1 – “Very likely to volunteer” to 5 – “Would very strongly chose not to volunteer”
Effect of year of study on stigma (among male students)

<table>
<thead>
<tr>
<th>Patient category</th>
<th>Student n</th>
<th>%*</th>
<th>Male n</th>
<th>%*</th>
<th>p-value</th>
<th>% diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV- doctor (referent)</td>
<td>5</td>
<td>6.9</td>
<td>2</td>
<td>3.6</td>
<td>0.70</td>
<td>-3.3</td>
</tr>
<tr>
<td>HIV+ doctor</td>
<td>6</td>
<td>8.2</td>
<td>4</td>
<td>7.3</td>
<td>1.00</td>
<td>-0.9</td>
</tr>
<tr>
<td>HIV+ due to blood transfusion</td>
<td>10</td>
<td>13.9</td>
<td>11</td>
<td>20.0</td>
<td>0.47</td>
<td>6.1</td>
</tr>
<tr>
<td>HIV- commercial sex worker</td>
<td>16</td>
<td>21.9</td>
<td>12</td>
<td>21.8</td>
<td>0.58</td>
<td>-0.1</td>
</tr>
<tr>
<td>HIV+ commercial sex worker</td>
<td>24</td>
<td>32.9</td>
<td>25</td>
<td>45.5</td>
<td>0.20</td>
<td>12.6</td>
</tr>
<tr>
<td>HIV- IDU</td>
<td>16</td>
<td>22.2</td>
<td>18</td>
<td>32.7</td>
<td>0.23</td>
<td>10.5</td>
</tr>
<tr>
<td>HIV+ IDU</td>
<td>19</td>
<td>26.4</td>
<td>30</td>
<td>54.6</td>
<td>&lt;0.001</td>
<td>28.2</td>
</tr>
<tr>
<td>HIV- MSM</td>
<td>29</td>
<td>39.7</td>
<td>19</td>
<td>34.6</td>
<td>0.58</td>
<td>-5.1</td>
</tr>
<tr>
<td>HIV+ MSM</td>
<td>32</td>
<td>43.8</td>
<td>24</td>
<td>43.6</td>
<td>1.00</td>
<td>-0.2</td>
</tr>
</tbody>
</table>

- Students in clinical years are generally less willing to volunteer to provide medical care.
Effect of year of study on stigma (among female students)

<table>
<thead>
<tr>
<th>Patient category</th>
<th>Student</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>HIV- doctor (referent)</td>
<td>12</td>
<td>7.5</td>
</tr>
<tr>
<td>HIV+ doctor</td>
<td>22</td>
<td>13.5</td>
</tr>
<tr>
<td>HIV+ due to blood transfusion</td>
<td>28</td>
<td>16.9</td>
</tr>
<tr>
<td>HIV- commercial sex worker</td>
<td>47</td>
<td>29.0</td>
</tr>
<tr>
<td>HIV+ commercial sex worker</td>
<td>59</td>
<td>36.7</td>
</tr>
<tr>
<td>HIV- IDU</td>
<td>44</td>
<td>27.5</td>
</tr>
<tr>
<td>HIV+ IDU</td>
<td>57</td>
<td>35.4</td>
</tr>
<tr>
<td>HIV- MSM</td>
<td>37</td>
<td>23.1</td>
</tr>
<tr>
<td>HIV+ MSM</td>
<td>49</td>
<td>30.8</td>
</tr>
</tbody>
</table>

- Students in clinical years are generally less willing to volunteer to provide medical care
Effect of gender on stigma (among preclinical students)

<table>
<thead>
<tr>
<th>Patient category</th>
<th>Student n</th>
<th>%*</th>
<th>Preclinical n</th>
<th>%*</th>
<th>p-value</th>
<th>% diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV- doctor (referent)</td>
<td>5</td>
<td>6.9</td>
<td>12</td>
<td>7.5</td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td>HIV+ doctor</td>
<td>6</td>
<td>8.2</td>
<td>22</td>
<td>13.5</td>
<td>0.28</td>
<td>5.3</td>
</tr>
<tr>
<td>HIV+ due to blood transfusion</td>
<td>10</td>
<td>13.9</td>
<td>28</td>
<td>16.9</td>
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<td>HIV- commercial sex worker</td>
<td>16</td>
<td>21.9</td>
<td>47</td>
<td>29.0</td>
<td>0.27</td>
<td>7.1</td>
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<tr>
<td>HIV+ commercial sex worker</td>
<td>24</td>
<td>32.9</td>
<td>59</td>
<td>36.7</td>
<td>0.66</td>
<td>3.8</td>
</tr>
<tr>
<td>HIV- IDU</td>
<td>16</td>
<td>22.2</td>
<td>44</td>
<td>27.5</td>
<td>0.42</td>
<td>5.3</td>
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<tr>
<td>HIV+ IDU</td>
<td>19</td>
<td>26.4</td>
<td>57</td>
<td>35.4</td>
<td>0.23</td>
<td>9</td>
</tr>
<tr>
<td>HIV- MSM</td>
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<td>39.7</td>
<td>37</td>
<td>23.1</td>
<td>0.01</td>
<td>-16.6</td>
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<td>HIV+ MSM</td>
<td>32</td>
<td>43.8</td>
<td>49</td>
<td>30.8</td>
<td>0.056</td>
<td>-13</td>
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</tbody>
</table>

Marginalized patients of the same gender are subject for higher stigma.
Effect of gender on stigma (among clinical students)

<table>
<thead>
<tr>
<th>Patient category</th>
<th>Student n</th>
<th>%*</th>
<th>Clinical n</th>
<th>%*</th>
<th>p-value % dif</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV- doctor (referent)</td>
<td>2</td>
<td>3.6</td>
<td>9</td>
<td>6.5</td>
<td>0.73</td>
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<tr>
<td>HIV+ doctor</td>
<td>4</td>
<td>7.3</td>
<td>23</td>
<td>16.8</td>
<td>0.11</td>
</tr>
<tr>
<td>HIV+ due to blood transfusion</td>
<td>11</td>
<td>20.0</td>
<td>43</td>
<td>31.6</td>
<td>0.11</td>
</tr>
<tr>
<td>HIV- commercial sex worker</td>
<td>12</td>
<td>21.8</td>
<td>75</td>
<td>55.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HIV+ commercial sex worker</td>
<td>25</td>
<td>45.5</td>
<td>97</td>
<td>71.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HIV- IDU</td>
<td>18</td>
<td>32.7</td>
<td>66</td>
<td>48.5</td>
<td>0.054</td>
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<tr>
<td>HIV+ IDU</td>
<td>30</td>
<td>54.6</td>
<td>92</td>
<td>67.7</td>
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<td>HIV- MSM</td>
<td>19</td>
<td>34.6</td>
<td>41</td>
<td>30.2</td>
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<tr>
<td>HIV+ MSM</td>
<td>24</td>
<td>43.6</td>
<td>72</td>
<td>52.9</td>
<td>0.26</td>
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Marginalized patients of the same gender are subject for higher stigma
**Regression analysis results**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>95% Confidence Limits</th>
<th>Z</th>
<th>Pr &gt;</th>
<th>Z</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.9197</td>
<td>0.2257</td>
<td>-3.3620</td>
<td>-12.94</td>
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<tr>
<td>hiv</td>
<td>0.6549</td>
<td>0.1568</td>
<td>0.3476</td>
<td>4.18</td>
<td>&lt;0.001</td>
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<tr>
<td>blood</td>
<td>0.5199</td>
<td>0.1062</td>
<td>0.3117</td>
<td>4.89</td>
<td>&lt;0.001</td>
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<tr>
<td>idu</td>
<td>1.6129</td>
<td>0.1711</td>
<td>1.2774</td>
<td>9.42</td>
<td>&lt;0.001</td>
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<tr>
<td>csw</td>
<td>1.6632</td>
<td>0.1697</td>
<td>1.3306</td>
<td>9.80</td>
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<tr>
<td>msm</td>
<td>1.4483</td>
<td>0.1631</td>
<td>1.1286</td>
<td>8.88</td>
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<td>0.2080</td>
<td>-0.5829</td>
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<td>-0.1432</td>
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<td>gender_year</td>
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<td>hiv_idu</td>
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<tr>
<td>hiv_csw</td>
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</tbody>
</table>

HIV-indicator variable for patient’s HIV status; blood – patient HIV+ due to blood transfusion; IDU – intravenous drug user; CSW – commercial sex worker; MSM – men, who have sex with men; gender – participant’s gender; year – participant’s year of study; gender_year, hiv_idu, hiv_csw, hiv_msm – interactive terms
Reluctance in at least one patient category

- 250 students (57.3%) expressed reluctance to provide care to at least one patient category
  - 113 (46.9%) among preclinical
  - 137 (70.3%) among clinical
  - 72 (56.3%) among male
  - 188 (57.8%) among female