Appendix.

A. Reflexivity Statement

Study conceptualization

- How does this study address local research and policy priorities?

Bangladesh has been one of the hot spots of organ trafficking in South Asia. There have been local-level interventions to prevent villagers from selling kidneys by communicating to the locals about the health consequence of selling kidneys as well as the illegality of organ sales. At the national level, living donor kidney transplants using kidneys from unrelated living donors have been prohibited since 1999. This, however, led to an unexpected consequence of promoting illegal transplants outside Bangladesh, particularly in India that also has a strict law against organ sales but is not enforcing the law to donor–recipient pairs arriving from foreign countries. The domestic transplant rate in Bangladesh plumped and this has been a national medical policy issue for the last two decades. Understanding the size of the problem has been one of the governmental efforts.

- How were local researchers involved in study design?

The local research team consists of MH, MR, and MA. MH and MR laid down the local foundation for the survey by communicating to local authorities, gaining support, and obtaining necessary approvals for the study including a pilot survey. After the pilot survey, MH and MR also participated in multiple discussions to improve survey questions so that the responses can capture necessary information effectively and efficiently. Due to the COVID-19 pandemic and prolonged travel ban in Bangladesh, MH and MR, who are located in Dhakka, were not able to go back to the survey location. Thus, MA who is a faculty member of a university closer to the survey location was entrusted with the final survey administration. The local research team (MH, MR, and MA) all worked to finalize the survey instruments and arranged appropriate set-ups for conducting surveys with minimum risks to both survey administrators and participants.

Research management

- How has funding been used to support the local research team(s)?

The funding (US$20,000) has been given by Korea Development Institute (KDI) to support developmental economics and other social science research led by institute’s alumni (AS and NK, PhD students in the US authors’ institution). Part of this funding was used to perform surveys led by the local research team.

- How are research staff who conducted data collection acknowledged?

All members of the local research team were included as authors. Each team member was designated and performed specific responsibilities during the project (see Contributorship Statement).

- How have members of the research partnership been provided with access to study data?

All members of the partnership have access to data.
• How were data used to develop analytical skills within the partnership?

All members of the local research team were qualitative researchers. Thus, no analytical (statistical) knowledge and skills were transferred. MH is an established qualitative researcher specialized in trafficking at a renowned university in Bangladesh. He was the lead qualitative researcher in the team, improving survey questions and providing local and subject-matter inputs to the US research team. While the study objective with quantitative components was shared and discussed, developing analytical skills in local partners was not pertinent in the current study.

Data interpretation

• How have research partners collaborated in interpreting study data?

Data interpretation, especially for the data obtained from the pilot study, was led by MH. His input was critical in improving the survey questions. MR also contributed to periodical team discussions and provided input to improve the survey design and questions. The US research members (ML, YY, AS, NL, EAH) also sought advice to local research members as questions arise in interpreting the survey responses.

• Drafting and revising for intellectual content

The local researchers (MH, MR and MA) did not participate in actual writing. Rather, they contributed critically to derive study findings that accurately reflect local situations and perception of kidney sales among the study participants and other local community members. These insights critically enriched the discussion section of the manuscript.

• How were research partners supported to develop writing skills?

The study objectives did not include the development of writing skills in local partners. The role of and responsibility of the local partners were to advise the US research team on developing sound survey design and questions, and deriving study findings that accurately reflect local facts and conditions.

• How will research products be shared to address local needs?

The local research team owns this study and publication together with the US research team. MH, a trafficking expert, will share the publication, which will be published as open access, to the local researchers as well as relevant policy makers and local communities who supported the study.

Authorship

• How is the leadership, contribution and ownership of this work by LMIC researchers recognized within the authorship?

As a member of the senior authorship team, MH will be recognized as joint last authors. MR, as a member of junior authorship contributing to the study design and pilot study, will be recognized as a joint first author. MA will be recognized as an author for administering the final survey, as well as polishing the survey questions, and adding clarifications to the final data.

• How have early career researchers across the partnership been included within the authorship team?
MR was included as a research assistant of MH, and he contributed to all phases of the survey-related components (questionnaire and instrument developments as well as the administration of the pilot) under the supervision of MH. In the US research team, two PhD (AS and NL) and one master level (YY) students were part of the multidisciplinary research team.

- How has gender balance been addressed within the authorship?

The lead (NK, the last author) researcher is female as well as a PhD student (NL) in the US team. The local researchers (MH, MR and MA) were all male partly because the topic (kidney trafficking) is on illegal activities. We were concerned about the situation where the survey is perceived as a crime investigation by the locals, which could, in turn, trigger the criminals (kidney brokers) to take tangible actions especially when local researchers were female.

**Training**

- How has the project contributed to training of LMIC researchers?

The junior members of the local researchers, MR, was exposed to interdisciplinary research and gained experience in structuring and conducting a mixed-method study and developing a manuscript for publication.

**Infrastructure**

- How has the project contributed to improvements in local infrastructure?

The project did not directly contribute to improvements in local infrastructure.

**Governance**

- What safeguarding procedures were used to protect local study participants and researchers?

The US and local research teams had an extensive discussion on safeguarding procedures to protect both local survey participants and researchers, particularly the junior research members. Our IRB document reflects a number of safeguarding procedures including: i) securing approvals as well as gaining endorsement/protection from multiple key local members; ii) making sure that study participants and other local community members understand that this is NOT a criminal investigation and the survey participation is voluntary; iii) making sure that the survey does not ask any questions used to identify kidney brokers or sellers; and vi) ensuring anonymity of the survey participants as well as the survey settings that protect privacy of the participants.
B. Survey Weights

The survey weights used to calibrate the logistic regression models were presented below.

1. \(N_p\): Number of people in the stratum in the population.
2. \(P_p\): Probability of the stratum in the population.
3. \(N_s\): Number of people in the stratum in the sample.
4. \(P_s\): Probability of the stratum in the sample.

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>(N_p)</th>
<th>(P_p)</th>
<th>(N_s)</th>
<th>(P_s)</th>
<th>(P_p/P_s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 29</td>
<td>Male</td>
<td>12288</td>
<td>0.134012</td>
<td>62</td>
<td>0.159794</td>
<td>0.838658</td>
</tr>
<tr>
<td>30-39</td>
<td>Male</td>
<td>12225</td>
<td>0.133325</td>
<td>52</td>
<td>0.134021</td>
<td>0.994812</td>
</tr>
<tr>
<td>40-49</td>
<td>Male</td>
<td>9111</td>
<td>0.099364</td>
<td>44</td>
<td>0.113402</td>
<td>0.876211</td>
</tr>
<tr>
<td>50-59</td>
<td>Male</td>
<td>5437</td>
<td>0.059296</td>
<td>32</td>
<td>0.082474</td>
<td>0.718960</td>
</tr>
<tr>
<td>&gt;= 60</td>
<td>Male</td>
<td>5512</td>
<td>0.060114</td>
<td>32</td>
<td>0.082474</td>
<td>0.728878</td>
</tr>
<tr>
<td>&lt;= 29</td>
<td>Female</td>
<td>16485</td>
<td>0.179785</td>
<td>53</td>
<td>0.136598</td>
<td>1.316160</td>
</tr>
<tr>
<td>30-39</td>
<td>Female</td>
<td>12563</td>
<td>0.137012</td>
<td>56</td>
<td>0.144330</td>
<td>0.949294</td>
</tr>
<tr>
<td>40-49</td>
<td>Female</td>
<td>8270</td>
<td>0.090192</td>
<td>37</td>
<td>0.095361</td>
<td>0.945800</td>
</tr>
<tr>
<td>50-59</td>
<td>Female</td>
<td>4921</td>
<td>0.053668</td>
<td>15</td>
<td>0.038660</td>
<td>1.388218</td>
</tr>
<tr>
<td>&gt;= 60</td>
<td>Female</td>
<td>4881</td>
<td>0.053232</td>
<td>5</td>
<td>0.012887</td>
<td>4.130802</td>
</tr>
</tbody>
</table>

C. Survey Questionnaires (English Version)

Hidden Population Detection Survey

Demographic Characteristics
1. Code:
2. How old are you? -------------------------- (answer in years)
3. Sex    (a) male    (b) female    (c) others
4. Education level -------------------------- (answer in class or degree)
5. Marital status    (a) married    (b) single    (c) others:--------------------------
6. How many children do you have? .............
7. How many people do you have in your household? ............

Financial/Professional Life
8. Which sentence describes your current situation the best?
   a) I am employed (1)
   b) I am unemployed but looking for a job (2) ---- skip to question 12
   c) I am not working, and I am not looking for a job (3) ---- skip to question 12
   d) If someone gives me an opportunity, I will work (4) ---- skip to question 12
   e) Other (5) (Please specify: ) ---- skip to question 12

8.1. Please choose the sentence describing your current situation the best. I am:
9. My main profession is a:
   a) self-employed (1)
   b) salary worker (2)
   c) unpaid worker (3)
   d) other (4)

9.1. The average salary is about 26,000 BDT per month in Bangladesh. Is your job pay higher or lower than the average salary?
   a) much lower (1)
   b) lower (2)
   c) similar (3)
   d) higher (4)
   e) much higher (5)

10. How many bighas/acres of land do your family own? ..................................................

11. Do your family raise any domestic animal?  (a) Yes  (b) No

Network Detection

12. How many people did you chat at work last week? ......................... number

13. How many people did you chat for leisure last week?  ......................... number

14. How many people do you normally share your personal worries?
   a) friends......................... number
   b) family ...................... number

15. Please list 3 friends with whom you share your personal worries and additional 3 friends with who you do NOT share personal worries. Please then identify if those friends know each other. Please just write their pseudonym instead of their real names.

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Age</th>
<th>Sex</th>
<th>Friend (A)</th>
<th>Friend (B)</th>
<th>Friend (C)</th>
<th>Friend (D)</th>
<th>Friend (E)</th>
<th>Friend (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friend (A)...........</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friend (B)...........</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Do your friends know each other?

- Yes
- No

Li M-H, et al. BMJ Glob Health 2023; 8:e012774. doi: 10.1136/bmjgh-2023-012774
Kidney Seller Information

16. Have you heard of anyone who sold kidney in your Union?
   a) No --- **skip to question 23**
   b) Yes

17. Do you know any of these kidney sellers in person? (Note: We are not interested in knowing who they are. Rather we would like to know about their profile and the reasons behind.)
   a) No --- **skip to question 18**
   b) Yes

17.1. How many kidney sellers do you know in person? ................ number

17.2. Can you write the age, sex, profession, and reasons for selling kidneys (if known to you) for these people? Just write as much you feel comfortable.

17.3. Also, please select one from the list below that best describe your relationship with each of the kidney seller.
   a) A close friend (with whom you share worries)
   b) Not so close friend
   c) Acquaintance

(Please do NOT write their names. The purpose of this survey is not to identify the sellers)

<table>
<thead>
<tr>
<th>Person 1</th>
<th>Sex (M/F) (1)</th>
<th>Age (2)</th>
<th>Profession (3)</th>
<th>Reason for selling kidney (4)</th>
<th>Had a broker/s? (5)</th>
<th>Your relationship with the seller (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Person 2</td>
<td></td>
<td></td>
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<tr>
<td>Person 3</td>
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<td></td>
</tr>
<tr>
<td>Person 4</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Questions 18-20 ask about the kidney sellers you have heard about, rather than those sellers you know in person.

18. Do you know why these people sold their kidneys?
   18.1. No --- skip to question 19
   18.2. Yes (select all it applies)
      a) Poverty
      b) Dowry
      c) Micro-credit
      d) To repay other loans
      e) Drug addiction
      f) Other reasons (Please specify:            )

19. You think most of these sellers are:
   19.1. Sex
      a) Male
      b) Female
      c) Don’t know
   19.2. Age
      a) Young
      b) Middle age
      c) Old
      d) Don’t know
   19.3. Income level
      a) Low
      b) Medium
      c) High
      d) Don’t know

20. Do you know if any of those sellers sold their kidney through brokers?
   a) Yes
   b) No
   c) Don’t know

Broker Information
21. Do you know any brokers of kidney sales?
   a) No --- skip to question 23
   b) Yes

22. Please write the age, sex, and profession of these brokers whom you know. Just write as much you feel comfortable. (Please do NOT write their name).

<table>
<thead>
<tr>
<th>Person 5</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sex (M/F) (1)</th>
<th>Age (2)</th>
<th>Profession (3)</th>
<th>Key features (respected?, know many people?, powerful?, rich?, etc.) (4)</th>
<th>Did the broker sell his/her own kidney too? (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statement</td>
<td>Strongly Agree (1)</td>
<td>Agree (2)</td>
<td>Neutral (3)</td>
<td>Disagree (4)</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>-----------</td>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>(a) Kidney sales should be illegal.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>(b) If someone has severe financial need, kidney sales is an acceptable option.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>(c) If I sold kidney, I would keep it as a secret.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>(d) I can trust anyone in this Union.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>(e) Practicing religion is important.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>(f) Police generally do right things.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>(g) Government generally does right things.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>(h) I am happy with my life.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>(i) I am healthy.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Thank you for your participation.
Appendix D. Receiver Operating Characteristics (ROC) Curve for the Logit Models

i) Indirect Connection (Heard of kidney seller)   ii) Direct Connection (Know kidney seller)

Appendix E. Supplement to Table 4

E.1 MCMC Diagnostics

For each model statistic below, the left-hand side trace plot shows the change of the statistic during the last iteration of the MCMC (Markov Chain Monte Carlo) estimation procedure. It illustrates the difference between the sample statistics and the observed network at each step of the simulation. On the other hand, the right-hand side density plot displays a histogram of the statistic values. Ideally, this histogram should have a bell-shaped distribution, centered at zero, indicating no difference from the observed network. All the plots show that our model converges properly.

E.1.1 Edges

E.1.2 Female homophily (female – female ties)
**E.2 Goodness-of-Fit Diagnostics**

Goodness-of-fit in ERGMs is assessed by simulating networks using the fitted parameters of the model. From these simulated networks, various network measures are computed and compared to the counts of graph statistics in the observed network.
The procedure works as follows:

1. The fitted parameters of the ERGM are used to generate a large number of simulated networks.
2. For each simulated network, a set of network measures is computed.
3. The distribution of these network measures is compared to the distribution of the corresponding graph statistics in the observed network.

Ideally, the mean of the simulated network measures should be close to the observed values. If the mean is significantly different, then the model is not a good fit for the observed network. The frequency plots can be used to visualize the distribution of the network measures. In these plots, the bold lines represent the values from the observed network, while the box plots show the values from the simulated networks. The plot below shows that our model is a good fit for the observed network.

### Appendix F. Supplement to Table 5

<table>
<thead>
<tr>
<th>Network size $\hat{M}$: Min/Max</th>
<th>A: $y_i = \text{Reported no. of known kidney sellers}$</th>
<th>B: $y_i = \text{A} - \text{no. of kidney sellers with a missing relation to the respondent}$</th>
<th>C: $y_i = \text{B} - \text{no. of known kidney sellers with no relation to the respondent}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>As Reported</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>9.70 (56.35, 88.45)</td>
<td>6.04 (50.75, 70.32)</td>
<td>4.32 (24.06, 38.17)</td>
</tr>
<tr>
<td>Max</td>
<td>6.91 (39.00, 61.35)</td>
<td>4.22 (35.19, 49.13)</td>
<td>3.01 (16.68, 26.62)</td>
</tr>
<tr>
<td>+5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>9.23 (53.67, 92.87)</td>
<td>5.75 (48.33, 73.83)</td>
<td>4.11 (22.91, 40.08)</td>
</tr>
<tr>
<td>Max</td>
<td>6.58 (37.14, 64.42)</td>
<td>4.02 (33.51, 46.79)</td>
<td>2.86 (15.89, 25.35)</td>
</tr>
<tr>
<td>+10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>8.81 (51.23, 97.29)</td>
<td>5.49 (46.13, 77.35)</td>
<td>3.92 (21.87, 41.99)</td>
</tr>
<tr>
<td>Max</td>
<td>6.28 (35.46, 67.48)</td>
<td>3.84 (31.99, 44.66)</td>
<td>2.73 (15.17, 24.20)</td>
</tr>
<tr>
<td>+15%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>8.43 (49.00, 101.71)</td>
<td>5.25 (44.13, 80.86)</td>
<td>3.75 (20.92, 43.90)</td>
</tr>
<tr>
<td>Max</td>
<td>6.01 (33.91, 70.55)</td>
<td>3.67 (30.60, 42.72)</td>
<td>2.61 (14.51, 23.14)</td>
</tr>
<tr>
<td>+20%</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>8.08 (46.96, 106.14)</td>
<td>5.03 (42.29, 84.38)</td>
<td>3.60 (20.05, 45.80)</td>
</tr>
<tr>
<td>Max</td>
<td>5.76 (32.50, 73.62)</td>
<td>3.52 (29.32, 40.94)</td>
<td>2.50 (13.90, 22.18)</td>
</tr>
</tbody>
</table>

Standard errors and confidence intervals were generated by 10000 bootstrapping samples.