Table 1: Nurse characteristics by IMAI training status

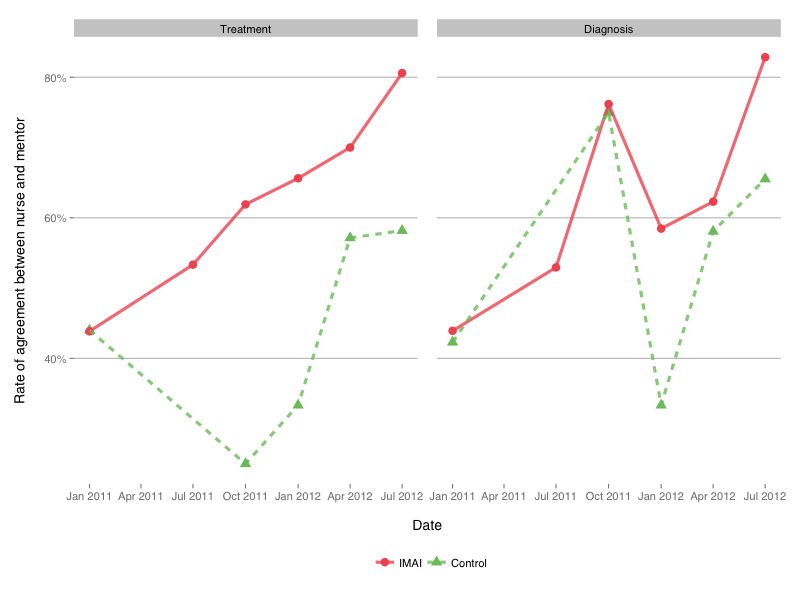
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Control** | **IMAI trained** |  |
| **Variable** | **Level** | **(n = 26)** | **(n = 18)** | **P-value** |
| Education Level | A1 | 1 (4%) | 4 (22%) | 0.14 |
|  | A2 | 24 (96%) | 14 (78%) |  |
| OPD Experience (years), mean ± SD |  | 4.6 ± 2.6 | 6.7 ± 8.6 | 0.26 |
| Number of observations, mean ± SD |  | 7.6 ± 5.8 | 15.7 ± 10.0 | 0.001 |
| Health Center | Cyarubare | 2 (8%) | 2 (11%) | 0.86 |
|  | Kabarondo | 2 (8%) | 3 (17%) |  |
|  | Karama | 5 (19%) | 2 (11%) |  |
|  | Ndego | 1 (4%) | 1 (6%) |  |
|  | Nyamirama | 4 (15%) | 4 (22%) |  |
|  | Ruramira | 5 (19%) | 2 (11%) |  |
|  | Rutare | 4 (15%) | 1 (6%) |  |
|  | Rwinkwavu | 3 (12%) | 3 (17%) |  |
| **Note:** P-values for categorical variables are from Fisher’s exact test for equality of proportions; P-values for continuous variables are from two-sided t test of equality of means.  IMAI, Integrated Management of Adult Illnesses | | | | |

Table 2: Summary statistics for all variables by intervention period and IMAI training status

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Pre-intervention** | | | |  | **Post-intervention** | | | |  |  |  |
|  |  | **IMAI** | **Control** |  |  |  | **IMAI** | **Control** |  |  |  |  |  |
| **Variable** | **Level** | **(n = 130)** | **(n = 149)** | **ΔTC** | **P-value** |  | **(n = 416)** | **(n = 289)** | **ΔTC** | **P-value** |  | **Δ2TC** | **P-value** |
| ***Outcomes*** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Treatment Agree | *Yes* | 41 (36.9%) | 46 (47.9%) | -0.10 | 0.058 |  | 242 (66.1%) | 94 (47.2%) | 0.19\*\*\* | 0.002 |  | 0.29\*\*\* | <0.001 |
| Diagnosis Agree | *Yes* | 40 (35.7%) | 39 (40.6%) | -0.05 | 0.6 |  | 240 (63.8%) | 109 (52.9%) | 0.11\* | 0.031 |  | 0.16 | 0.15 |
| ***Patient Indicators*** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Patient Sex | *Female* | 88 (67.7%) | 108 (72.5%) | -0.05 | 0.29 |  | 270 (64.9%) | 198 (68.5%) | -0.04 | 0.52 |  | 0.01 | 0.88 |
| Patient Age (years), mean ± SD |  | 34.1 ± 14.5 | 36.2 ± 14.8 | -2.10 | 0.28 |  | 35.8 ± 16.3 | 35.8 ± 16.9 | 0.03 | 0.99 |  | 2.13 | 0.42 |
| ***Nurse Indicators*** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Education Level | *A2* | 130 (100.0%) | 148 (100.0%) | 0 | 1 |  | 379 (91.3%) | 281 (98.6%) | -0.073 | 0.27 |  | -0.073 | 0.27 |
| OPD Experience (years), mean ± SD |  | 9.6 ± 5.7 | 3.4 ± 1.9 | 6.18 | 0.083 |  | 5.9 ± 7.7 | 4.3 ± 2.4 | 1.54 | 0.34 |  | -4.65 | 0.11 |
| Number of times observed, mean ± SD |  | 19.9 ± 15.5 | 9.0 ± 6.5 | 10.89\* | 0.028 |  | 23.1 ± 20.0 | 12.9 ± 11.3 | 10.23 | 0.064 |  | -0.67 | 0.91 |
| ***Quality of Care Indicators*** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Duration (min), mean ± SD |  | 6.7 ± 9.3 | 9.3 ± 11.3 | -2.61\* | 0.026 |  | 14.2 ± 12.2 | 3.6 ± 61.7 | 10.60\*\* | 0.010 |  | 13.20\*\* | 0.004 |
| Vitals Signs | *Yes* | 130 (100.0%) | 143 (96.0%) | 0.04 | 0.33 |  | 408 (98.1%) | 281 (97.2%) | 0.01 | 0.57 |  | -0.03 | 0.16 |
| Emergency Signs | *Yes* | 1 (0.8%) | 3 (2.1%) | -0.01 | 0.3 |  | 239 (61.9%) | 37 (13.5%) | 0.48\*\*\* | <0.001 |  | 0.50\*\*\* | <0.001 |
| Pulse | *Yes* | 0 (0.0%) | 0 (0.0%) | 0 | 1.00 |  | 247 (59.3%) | 37 (12.8%) | 0.47\*\*\* | <0.001 |  | 0.47\*\*\* | <0.001 |
| Blood Pressure | *Yes* | 48 (36.9%) | 35 (23.5%) | 0.13 | 0.20 |  | 265 (63.7%) | 64 (22.1%) | 0.42\*\*\* | <0.001 |  | 0.28\* | 0.03 |
| Weight | *Yes* | 101 (77.7%) | 87 (58.4%) | 0.19 | 0.33 |  | 351 (84.4%) | 211 (73.0%) | 0.11 | 0.32 |  | -0.08 | 0.67 |
| Height | *Yes* | 0 (0.0%) | 0 (0.0%) | -0.00 | 1.00 |  | 65 (15.6%) | 0 (0.0%) | 0.16\*\*\* | <0.001 |  | 0.16\*\*\* | <0.001 |
| Temperature | *Yes* | 74 (56.9%) | 32 (21.5%) | 0.35\* | 0.041 |  | 287 (69.0%) | 98 (33.9%) | 0.35\*\* | 0.002 |  | -0.00 | 0.98 |
| ***Patient Screening Indicators*** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Cough or difficulty breathing | *Yes* | 13 (10.2%) | 20 (13.6%) | -0.03 | 0.54 |  | 253 (62.8%) | 56 (20.0%) | 0.43\*\*\* | <0.001 |  | 0.46\*\*\* | <0.001 |
| Involuntary Weightloss | *Yes* | 0 (0.0%) | 0 (0.0%) | 0.00 | 1.00 |  | 204 (50.1%) | 2 (0.7%) | 0.49\*\*\* | <0.001 |  | 0.49\*\*\* | <0.001 |
| GU lesions | *Yes* | 5 (3.9%) | 6 (4.1%) | -0.00 | 0.97 |  | 212 (52.5%) | 24 (8.5%) | 0.44\*\*\* | <0.001 |  | 0.44\*\*\* | <0.001 |
| Urethral Discharge (Male) | *Yes* | 5 (12.5%) | 3 (6.8%) | 0.06 | 0.58 |  | 78 (48.4%) | 13 (12.3%) | 0.36\*\*\* | <0.001 |  | 0.31\* | 0.041 |
| Scrotal swelling or pain | *Yes* | 0 (0.0%) | 0 (0.0%) | 0.00 | 1.00 |  | 72 (51.8%) | 10 (11.7%) | 0.40\*\*\* | <0.001 |  | 0.40\*\*\* | <0.001 |
| Mosquito net use | *Yes* | 2 (1.4%) | 0 (0.0%) | -0.01 | 0.12 |  | 224 (54.8%) | 6 (2.2%) | 0.53\*\*\* | <0.001 |  | 0.54\*\*\* | <0.001 |
| Smoking | *Yes* | 2 (1.4%) | 0 (0.0%) | -0.01 | 0.29 |  | 215 (51.6%) | 4 (1.4%) | 0.50\*\*\* | <0.001 |  | 0.55\*\*\* | <0.001 |
| Pallor | *Yes* | 2 (1.6%) | 5 (3.4%) | -0.02 | 0.38 |  | 202 (49.8%) | 17 (6.0%) | 0.44\*\*\* | <0.001 |  | 0.46\*\*\* | <0.001 |
| Alcohol use | *Yes* | 1 (0.8%) | 1 (0.7%) | 0.00 | 0.89 |  | 214 (52.3%) | 5 (1.8%) | 0.51\*\*\* | <0.001 |  | 0.57\*\* | 0.005 |
| Sexual activity | *Yes* | 20 (15.9%) | 8 (5.5%) | 0.10\* | 0.002 |  | 181 (44.7%) | 8 (2.9%) | 0.42\*\*\* | <0.001 |  | 0.58\*\*\* | 0.001 |
| Pregnancy history | *Yes* | 24 (27.3%) | 23 (21.3%) | 0.06 | 0.54 |  | 144 (57.8%) | 51 (27.7%) | 0.30\*\* | 0.002 |  | 0.24 | 0.067 |
| Contraceptive use | *Yes* | 2 (1.6%) | 5 (3.5%) | -0.02 | 0.26 |  | 36 (17.7%) | 11 (6.5%) | 0.11 | 0.084 |  | 0.13\* | 0.048 |
| HIV status | *Yes* | 2 (1.6%) | 1 (0.7%) | 0.01 | 0.65 |  | 153 (52.8%) | 30 (15.5%) | 0.37\*\* | 0.001 |  | 0.36\*\*\* | 0.002 |
| **Note:** Observations are recorded at the level of presenting complaint. Each patient could specify up to 3 primary complaints at the time of patient visit. Percentages are presented after removing missing values.  \* p<0.05 \*\* p<0.01 \*\*\* p<0.01 | | | | | | | | | | | | | |

Table 3. Regression estimates of the impact of IMAI training on the probability of nurse-mentor agreement

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Diagnosis** | |  | **Treatment** | | |
|  | **Crude**  **β (CI)** | **Adjusteda**  **β (CI)** |  | **Crude**  **β (CI)** | **Adjusteda**  **β (CI)** |
| IMAI trained | -0.06 (-0.26, 0.14) | -0.13 (-0.33, 0.07) |  | -0.10 (-0.23, 0.03) | -0.13 (-0.32, 0.07) | |
| Post intervention | 0.10\* (0.01, 0.19) | 0.10\* (0.01, 0.19) |  | 0.01 (-0.10, 0.11) | 0.03 (-0.08, 0.14) | |
| IMAI trained • Post intervention | 0.17 (-0.05, 0.40) | 0.22\* (0.01, 0.43) |  | 0.27\*\*\* (0.10, 0.43) | 0.24\* (0.01, 0.46) | |
| Constant | 0.43\*\*\*(0.35, 0.50) | 0.64\*\*(0.50, 0.79) |  | 0.48\*\*\*(0.40, 0.57) | 0.77\*\*\*(0.55, 1.00) | |
| Observations | 792 | 781 |  | 772 | 764 | |
| Groups (Nurses) | 42 | 42 |  | 42 | 42 | |
| ICC (ρ) | 0.030 | 0.017 |  | 0.051 | 0.036 | |
| **Note:** Generalized linear probability models (GLS) of nurse-mentor agreement with nurse random intercepts and robust standard errors. Coefficient values represent the percentage point difference in agreement across covariate levels. Confidence intervals for the effect estimates are given in parentheses.  a Adjusted for patient age, patient sex, nurse OPD experience, nurse education level, the health center and the number of times the nurse was observed. | | | | | | |
| \* p<0.05 \*\* p<0.01 \*\*\* p<0.01 | | | | | | |

Figure 1: Trend in the overall rate of nurse-mentor agreement on diagnosis and treatment during the study period by training status.

**Supplement**

Table S1: Sensitivity of IMAI training effect estimates to missing data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **(1)** | |  | **(2)** | |
|  | **Diagnosis** | |  | **Treatment** | |
|  | **Coef (β)a** | **SE** |  | **Coef (β)a** | **SE** |
| IMAI trained | -0.12 | (0.10) |  | -0.12 | (0.07) |
| Post intervention | 0.11 | (0.06) |  | -0.01 | (0.06) |
| IMAI trained • Post intervention | 0.22\* | (0.11) |  | 0.27\*\* | (0.11) |
| Constant | 0.60\*\*\* | (0.09) |  | 0.73\*\*\* | (0.11) |
| Observations | 984 |  |  | 984 |  |
| Groups (Nurses) | 42 |  |  | 42 |  |
| ICC (ρ) |  |  |  |  |  |
| **Note:** Generalized linear probability models (GLS) with nurse random intercepts and robust standard errors. Missing data were imputed using multiple chained equations to generate 50 imputed data sets and the results are presented as pooled estimates. Standard errors are in parentheses. | | | | | |
| \* p<0.05 \*\* p<0.01 \*\*\* p<0.01  a Adjusted for patient age, patient sex, nurse OPD experience, nurse education level, the health center and the number of times the nurse was observed. | | | | | |

Table S2: Sensitivity of IMAI training effect estimates to model specification.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **(β) IMAI trained •**  **Post intervention** | **SE** | **z** | **P-value** |
| ***Diagnosis Models*** |  |  |  |  |
| LPM RE robust | 0.18 | 0.12 | 1.50 | 0.13 |
| LPM cluster | 0.16 | 0.11 | 1.47 | 0.14 |
| logit RE robust | 0.16 | 0.14 | 1.14 | 0.25 |
| logit cluster | 0.15 | 0.12 | 1.27 | 0.20 |
| probit RE robust | 0.15 | 0.10 | 1.50 | 0.13 |
| probit cluster | 0.16 | 0.11 | 1.47 | 0.14 |
| ***Treatment Models*** |  |  |  |  |
| LPM RE robust | 0.27\*\*\* | 0.08 | 3.38 | 0.00 |
| LPM cluster | 0.29\*\*\* | 0.07 | 4.48 | 0.00 |
| logit RE robust | 0.28\*\*\* | 0.08 | 3.52 | 0.00 |
| logit cluster | 0.30\*\*\* | 0.07 | 4.09 | 0.00 |
| probit RE robust | 0.28\*\*\* | 0.07 | 4.40 | 0.00 |
| probit cluster | 0.29\*\*\* | 0.07 | 4.49 | 0.00 |
| **Note:** The IMAI training effect estimate is the difference in probability of nurse-mentor agreement between the trained and untrained in the post-intervention period minus the difference between the trained and untrained in the pre-intervention period. For logit and probit results, the difference-in-difference estimates are derived using the method of Norton, Wang, and Ai (2004). Models were adjusted for clustering at the nurse-level by either adding random intercept term with robust standard errors (RE robust) or by adjusting the standard errors using the sandwich operator (cluster).  \* p<0.05 \*\* p<0.01 \*\*\* p<0.01 | | | | |

Table S3. Logistic regression estimates of the impact of IMAI training on the probability of nurse-mentor agreement

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Diagnosis** | |  | **Treatment** | | |
|  | **Crude**  **OR (CI)** | **Adjusteda**  **OR (CI)** |  | **Crude**  **OR (CI)** | **Adjusteda**  **OR (CI)** |
| IMAI trained | 0.85 (0.37, 1.97) | 0.59 (0.24, 1.48) |  | 0.66 (0.41, 1.07) | 0.53 (0.21, 1.31) | |
| Post intervention | 1.64\* (1.05, 2.56) | 1.64\*\* (1.13, 2.38) |  | 0.99 (0.64, 1.56) | 1.19 (0.72, 1.99) | |
| IMAI trained • Post intervention | 1.85 (0.70, 4.86) | 2.46 (0.98, 6.20) |  | 3.19\*\*\* (1.72, 5.90) | 3.33\* (1.15, 9.65) | |
| Constant | 0.69 (0.45, 1.03) | 1.83\* (1.00, 3.31) |  | 0.93 (0.66, 1.32) | 3.13\* (1.04, 9.46) | |
| Observations | 789 | 779 |  | 772 | 762 | |
| Groups (Nurses) | 42 | 42 |  | 42 | 42 | |
| ICC (ρ) | 0.001 | 0.001 |  | 0.03 | 0.02 | |
| **Note:** Logistic regression models of nurse-mentor agreement with nurse random intercepts and robust standard errors. Confidence intervals for the effect estimates are given in parentheses.  a Adjusted for patient age, patient sex, nurse OPD experience, nurse education level, the health center and the number of times the nurse was observed. | | | | | | |
| \* p<0.05 \*\* p<0.01 \*\*\* p<0.01 | | | | | | |

Table S4. Marginal predictions of probability of diagnosis and treatment by IMAI training status and intervention period.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Diagnosis** | | |  | **Treatment** | | |
|  | **Pre** | **Post** | **ATEa** |  | **Pre** | **Post** | **ATEa** |
| **P(Agree)** | **P(Agree)** | **P(Agree)** | **P(Agree)** |
| IMAI trained | 31% (0.17, 0.45) | 64% (0.58, 0.69) | +21pp (0.04, 0.37) |  | 33% (0.17, 0.48) | 65% (0.59, 0.71) | +27pp (0.10, 0.44) |
| Control | 43% (0.05, 0.94) | 55% (0.48, 0.62) |  |  | 47% (0.35, 0.60) | 52% (0.41, 0.62) |  |
| **Note:** Marginal probabilities of nurse-mentor agreement are predicted using logisitic regression models with nurse random intercepts and robust standard errors. Confidence intervals for the effect estimates are given in parentheses. Models are adjusted for patient age, patient sex, nurse OPD experience, nurse education level, the health center and the number of times the nurse was observed.  a Average Treatment Effect = [P(Agree | IMAI, Pre) - P(Agree | Control, Pre)] -[P(Agree | IMAI, Pre) - P(Agree | Control, Pre)] | | | | | | | |
|