|  | Quantitative (N=92) | Qualitative (N=40) | Mixed Methods (N=85) | NA (N=1) | Overall (N=218) |
| --- | --- | --- | --- | --- | --- |
| **Fraud (e.g., fabricated or falsified results)** |  |  |  |  |  |
| Frequently | 9 (9.8%) | 2 (5.0%) | 5 (5.9%) | 0 (0%) | 16 (7.3%) |
| Occasionally | 18 (19.6%) | 6 (15.0%) | 22 (25.9%) | 0 (0%) | 46 (21.1%) |
| Rarely | 52 (56.5%) | 22 (55.0%) | 46 (54.1%) | 1 (100%) | 121 (55.5%) |
| Never | 11 (12.0%) | 6 (15.0%) | 5 (5.9%) | 0 (0%) | 22 (10.1%) |
| Missing | 2 (2.2%) | 4 (10.0%) | 7 (8.2%) | 0 (0%) | 13 (6.0%) |
| **Pressure to publish for career advancement** |  |  |  |  |  |
| Frequently | 30 (32.6%) | 9 (22.5%) | 26 (30.6%) | 0 (0%) | 65 (29.8%) |
| Occasionally | 42 (45.7%) | 10 (25.0%) | 38 (44.7%) | 1 (100%) | 91 (41.7%) |
| Rarely | 14 (15.2%) | 14 (35.0%) | 14 (16.5%) | 0 (0%) | 42 (19.3%) |
| Never | 4 (4.3%) | 3 (7.5%) | 2 (2.4%) | 0 (0%) | 9 (4.1%) |
| Missing | 2 (2.2%) | 4 (10.0%) | 5 (5.9%) | 0 (0%) | 11 (5.0%) |
| **Insufficient oversight or mentoring** |  |  |  |  |  |
| Frequently | 31 (33.7%) | 5 (12.5%) | 23 (27.1%) | 0 (0%) | 59 (27.1%) |
| Occasionally | 45 (48.9%) | 11 (27.5%) | 40 (47.1%) | 0 (0%) | 96 (44.0%) |
| Rarely | 11 (12.0%) | 17 (42.5%) | 15 (17.6%) | 1 (100%) | 44 (20.2%) |
| Never | 3 (3.3%) | 3 (7.5%) | 0 (0%) | 0 (0%) | 6 (2.8%) |
| Missing | 2 (2.2%) | 4 (10.0%) | 7 (8.2%) | 0 (0%) | 13 (6.0%) |
| **Lack of publishing raw data** |  |  |  |  |  |
| Frequently | 48 (52.2%) | 7 (17.5%) | 28 (32.9%) | 0 (0%) | 83 (38.1%) |
| Occasionally | 30 (32.6%) | 10 (25.0%) | 41 (48.2%) | 0 (0%) | 81 (37.2%) |
| Rarely | 9 (9.8%) | 12 (30.0%) | 9 (10.6%) | 1 (100%) | 31 (14.2%) |
| Never | 4 (4.3%) | 5 (12.5%) | 1 (1.2%) | 0 (0%) | 10 (4.6%) |
| Missing | 1 (1.1%) | 6 (15.0%) | 6 (7.1%) | 0 (0%) | 13 (6.0%) |
| **Lack of publishing research protocols or computer code** |  |  |  |  |  |
| Frequently | 41 (44.6%) | 9 (22.5%) | 29 (34.1%) | 0 (0%) | 79 (36.2%) |
| Occasionally | 39 (42.4%) | 6 (15.0%) | 31 (36.5%) | 0 (0%) | 76 (34.9%) |
| Rarely | 7 (7.6%) | 14 (35.0%) | 16 (18.8%) | 1 (100%) | 38 (17.4%) |
| Never | 4 (4.3%) | 5 (12.5%) | 1 (1.2%) | 0 (0%) | 10 (4.6%) |
| Missing | 1 (1.1%) | 6 (15.0%) | 8 (9.4%) | 0 (0%) | 15 (6.9%) |
| **Lack of publishing full results** |  |  |  |  |  |
| Frequently | 36 (39.1%) | 5 (12.5%) | 28 (32.9%) | 0 (0%) | 69 (31.7%) |
| Occasionally | 36 (39.1%) | 10 (25.0%) | 34 (40.0%) | 0 (0%) | 80 (36.7%) |
| Rarely | 18 (19.6%) | 13 (32.5%) | 15 (17.6%) | 1 (100%) | 47 (21.6%) |
| Never | 1 (1.1%) | 5 (12.5%) | 2 (2.4%) | 0 (0%) | 8 (3.7%) |
| Missing | 1 (1.1%) | 7 (17.5%) | 6 (7.1%) | 0 (0%) | 14 (6.4%) |
| **Differences in the software processing environment** |  |  |  |  |  |
| Frequently | 19 (20.7%) | 4 (10.0%) | 14 (16.5%) | 0 (0%) | 37 (17.0%) |
| Occasionally | 39 (42.4%) | 6 (15.0%) | 29 (34.1%) | 0 (0%) | 74 (33.9%) |
| Rarely | 30 (32.6%) | 14 (35.0%) | 28 (32.9%) | 1 (100%) | 73 (33.5%) |
| Never | 2 (2.2%) | 9 (22.5%) | 5 (5.9%) | 0 (0%) | 16 (7.3%) |
| Missing | 2 (2.2%) | 7 (17.5%) | 9 (10.6%) | 0 (0%) | 18 (8.3%) |
| **Use of proprietary data or software** |  |  |  |  |  |
| Frequently | 25 (27.2%) | 7 (17.5%) | 21 (24.7%) | 0 (0%) | 53 (24.3%) |
| Occasionally | 40 (43.5%) | 6 (15.0%) | 27 (31.8%) | 0 (0%) | 73 (33.5%) |
| Rarely | 21 (22.8%) | 13 (32.5%) | 24 (28.2%) | 1 (100%) | 59 (27.1%) |
| Never | 4 (4.3%) | 7 (17.5%) | 3 (3.5%) | 0 (0%) | 14 (6.4%) |
| Missing | 2 (2.2%) | 7 (17.5%) | 10 (11.8%) | 0 (0%) | 19 (8.7%) |
| **Complexity and variability of geographic systems** |  |  |  |  |  |
| Frequently | 39 (42.4%) | 14 (35.0%) | 38 (44.7%) | 0 (0%) | 91 (41.7%) |
| Occasionally | 34 (37.0%) | 6 (15.0%) | 25 (29.4%) | 0 (0%) | 65 (29.8%) |
| Rarely | 15 (16.3%) | 8 (20.0%) | 12 (14.1%) | 1 (100%) | 36 (16.5%) |
| Never | 2 (2.2%) | 5 (12.5%) | 3 (3.5%) | 0 (0%) | 10 (4.6%) |
| Missing | 2 (2.2%) | 7 (17.5%) | 7 (8.2%) | 0 (0%) | 16 (7.3%) |
| **Random effects** |  |  |  |  |  |
| Frequently | 22 (23.9%) | 6 (15.0%) | 17 (20.0%) | 0 (0%) | 45 (20.6%) |
| Occasionally | 40 (43.5%) | 15 (37.5%) | 36 (42.4%) | 0 (0%) | 91 (41.7%) |
| Rarely | 22 (23.9%) | 7 (17.5%) | 24 (28.2%) | 1 (100%) | 54 (24.8%) |
| Never | 5 (5.4%) | 4 (10.0%) | 0 (0%) | 0 (0%) | 9 (4.1%) |
| Missing | 3 (3.3%) | 8 (20.0%) | 8 (9.4%) | 0 (0%) | 19 (8.7%) |
| **Insufficient documentation about study data (metadata)** |  |  |  |  |  |
| Frequently | 41 (44.6%) | 7 (17.5%) | 28 (32.9%) | 0 (0%) | 76 (34.9%) |
| Occasionally | 32 (34.8%) | 11 (27.5%) | 34 (40.0%) | 0 (0%) | 77 (35.3%) |
| Rarely | 16 (17.4%) | 11 (27.5%) | 16 (18.8%) | 1 (100%) | 44 (20.2%) |
| Never | 1 (1.1%) | 4 (10.0%) | 1 (1.2%) | 0 (0%) | 6 (2.8%) |
| Missing | 2 (2.2%) | 7 (17.5%) | 6 (7.1%) | 0 (0%) | 15 (6.9%) |
| **Researcher positionality** |  |  |  |  |  |
| Frequently | 12 (13.0%) | 19 (47.5%) | 23 (27.1%) | 0 (0%) | 54 (24.8%) |
| Occasionally | 40 (43.5%) | 13 (32.5%) | 33 (38.8%) | 0 (0%) | 86 (39.4%) |
| Rarely | 30 (32.6%) | 3 (7.5%) | 16 (18.8%) | 1 (100%) | 50 (22.9%) |
| Never | 5 (5.4%) | 0 (0%) | 4 (4.7%) | 0 (0%) | 9 (4.1%) |
| Missing | 5 (5.4%) | 5 (12.5%) | 9 (10.6%) | 0 (0%) | 19 (8.7%) |