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Assessment of Conflicts of Interest in Robotic Surgical Studies: Validating author's declarations with the Open Payments Database

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Structured Abstract

Background—Accurate conflict of interest (COI) statements are important, as a known COI may invalidate study results due to the potential risk of bias.

Objective—To determine the accuracy of self-declared COI statements in robotic studies and identify risk factors for undeclared payments.

Methods—Robotic surgery studies were identified through EMBASE and MEDLINE and included if published in 2015 and had at least one American author. Undeclared COI were determined by comparing the author's declared COI with industry reported payments found in the "Open Payments" database for 2013 and 2014. Undeclared payments and discrepancies in the COI statement were determined. Risk factors were assessed for an association with undeclared payments at the author and study level.

Results—458 studies (2,253 authors) were included. 240 (52%) studies had one or more author receive undeclared payments and included 183 where "no conflict of interest" was explicitly declared, and 57 with no declaration statement present. 21% of studies and 18% of authors with a COI declared it so in a COI statement. Studies that had undeclared payments from Intuitive were more likely to recommend robotic surgery compared with those that declared funding (OR 4.29, 95% CI 2.55 – 7.21).

Conclusions—We found that it was common for payments from Intuitive to be undeclared in robotic surgery papers. Mechanisms for accountability in COI reporting need to be put into place by journals to achieve appropriate transparency to those reading the journal article.

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Background

Industry funding of research activities has been commonplace for many years. It has become a standard requirement for authors to declare any financial conflicts of interest (COI) when publishing in peer reviewed journals. These declarations are largely by an honors system under guidance from professional bodies (1, 2).

Accurate COI statements are important for readers of journal articles, as a known COI may temper the enthusiasm for data regarding a new drug or device due to the risk of bias on the part of the investigator. A number of studies have attempted to assess the effect of industry sponsorship on study results and conclusions. A large Cochrane Review (3) which included 48 papers was published in 2012. The authors found that industry sponsored studies, compared to non-industry sponsored studies, were more likely to have favorable efficacy results (RR 1.32, 95%CI 1.21 – 1.44), were more likely to have favorable conclusions (RR 1.31, 95%CI 1.20 – 1.44), and were less likely to have concordant study results and conclusions (RR 0.84, 95%CI 0.70 – 1.01).

Although COI statements are present in many journal articles, the accuracy of these statements has largely been untested by the editors. Furthermore, few studies have attempted to validate the COI statements. Studies that have assessed the accuracy of these statements have found poor concordance between declared funding and actual funding (4, 5).

Until recently, it has been difficult to identify the precise amount of industry funding for any particular physician; as a result, few studies have been published assessing the accuracy of COI statements. Recent legislation governing the transparency of industry payments to physicians has provided a new opportunity to validate COI statements. The “Sunshine Act” has now allowed for an easily accessible source of information regarding the financial relationships between American physicians and industry. The Sunshine Act requires the Centers for Medicare & Medicaid Services (CMMS) to “collect information from manufacturers and group purchasing organizations (GPOs) in order to report information on their financial relationships with physicians and hospitals.” (6)

The objective of this study is to assess the concordance of declaration statements in published, academic reports of the Da Vinci Robotic Surgery system, manufactured by Intuitive Surgical, Inc (Intuitive) and financial relationships reported to the CMMS. This device and company was selected as they are the sole manufacturer and distributor of this platform, which is virtually the only commercially available robotic platform for minimally invasive surgery and the only surgical device produced by Intuitive. As such, payments made by Intuitive can be assumed to be related to their robotic platform. Furthermore, authors could not have received payments from another company with a commercially available robotic platform, as no such entity exists.

Methods

This is a review of the accuracy of the disclosure of Intuitive Inc. payments in COI statements for robotic surgery studies, as confirmed by the “Open Payments” database. (6) Payments from companies other than Intuitive Inc. were not considered in our analysis. We

looked at studies published in 2015. This year was selected, as at the time of our study design, we had complete payment details for 2013 and 2014. This would ensure that author payments would precede final publication of the study results.

Study Selection and Search

We included studies published in 2015 which assessed or discussed robotic surgery using the Da Vinci Platform in a clinical setting, were either comparative (observational studies, randomized controlled studies or meta-analyses/systematic reviews) or non-comparative studies (case series, technique description or editorials/comments) and included at least one American author. We included any surgical discipline.

The electronic search was completed in EMBASE and MEDLINE (both on January 5, 2016). Search terms for EMBASE were as follows: “robotic assisted surgery”, limited to “yr=2015”. Search terms for MEDLINE were as follows: “Robotics or Robotic Surgical Procedures”, limited to “yr=2015”.

Payment Data

Payments to authors were identified using the “Open Payments” database (6). This database documents industry payments to American physicians, and is reported annually. Payments are submitted by the industry and are mandated by law. The first period for reporting was for the last 5 months of 2013, and has included the full calendar year for subsequent reporting periods. For each American author, the total amount of payments (in USD) and number of payments by Intuitive was recorded. The time period (i.e. 2013 or 2014) was also recorded. We included any payment that was categorized as a “General Payment”. These types of payments include Consulting fees, Travel and Lodging, Honoraria, Speaking or Educational Fees, Gifts, Food and Beverage, and Royalties or Licensing. This data was extracted in duplicate.

Study & Author Data

Study information was extracted, in duplicate, using a standardized protocol sheet. We included the Journal name, publication date, the presence or absence of a declaration statement, the presence or absence of declared funding from Intuitive, the number of authors, the study type and the specialty of the study (i.e. general surgery, obstetrics and gynecology, urology, etc.). Author data was also extracted in duplicate, using a standardized protocol sheet. We recorded the author order (1st author, last author, middle author), and the presence or absence of declared funding for each individual author.

Outcomes

A COI was determined for both the study (accounting for all authors), as well as at an individual author level. This was determined by searching the “Open Payments” database for each American author. If the author received payments from Intuitive in either 2013 or 2014, then we considered this to be a COI for the author and the paper, regardless of the value of the payment or number of payments. We also considered a COI to exist if the authors declared it so, in the declaration statement. Payments from industry other than Intuitive were not considered as a COI for the purpose of this analysis.

We then determined whether there was a discrepancy between the declared COI (as determined by the declaration statement in the journal article) and the actual presence of a COI (as determined by the presence of a payment from Intuitive in the “Open Payments” database).

For the study level data, we consider a discrepancy to exist if a COI was not declared and at least on author was found to have an Intuitive payment (as determined by the “Open Payments” database). We similarly considered a discrepancy to exist at the author level if the author did not declare a conflict of interest and was found to have had payments from Intuitive.

We defined conflict of interest in two ways. The first was “undisclosed conflict of interest” which included studies that had at least one payment to a study author and either did not declare the payment (when a declaration statement was present) or if there was no declaration statement present at all. The second definition was “discrepancy between declaration and payments”, in which we only assessed studies with a declaration statement present.

Finally, we assessed whether robotic surgery was recommended in the study conclusions. This was assessed based on the authors concluding statements. We considered authors to have recommended the use of robotic surgery if they explicitly stated so in their concluding statement. We also considered the authors to have recommended robotic surgery if they indicated the role for such a platform in standard practice.

Risk Factors

We looked at several risk factors for undisclosed COI. These included comparative vs. non comparative studies, Journal Impact Factor (as determined through the Impact Per Publication method) (7), Surgical specialty (General Surgery, Urology, Obstetrics & Gynecology and Other). General Surgery included subspecialties of general surgery (Colorectal Surgery, Upper Gastrointestinal Surgery, etc.) while “Other” included less represented subspecialties (including Cardiothoracic Surgery, Head and Neck, Neurosurgery, Vascular Surgery). Multivariate analysis was planned adjusting for these potential risk factors to assess for an association with our outcomes.

We also attempted to determine the importance of author order on our outcomes. Author order was defined as 1st author, last author and middle author (any author that wasn’t first or last).

Statistical Analysis

All statistical analyses were completed in STATA 12.0 (Statacorp, College Station, TX). Differences in proportions between groups were calculated, and differences assessed using the χ^2 test. Odds Ratios and confidence intervals were reported as appropriate. Differences in means were also calculated and differences were assessed using either the T-test (for comparison of two groups) or ANOVA (for comparison of 3 or more groups). For multivariate analysis, logistic regression was used and odds ratios calculated. Significant

testing was conducted using the likelihood ratio test, with a P value of <0.05 (two tailed) considered significant.

Results

After searching MEDLINE and EMBASE, 3,579 studies were identified. Removing duplicates, 1,652 were assessed for inclusion. A total of 458 studies met our inclusion criteria (Figure 1), which included 2,253 American Authors. There were 1,775 unique authors, with some authors appearing in up to 10 studies. The studies were retrieved from 128 different journals (number of studies per journal, range 1 – 26).

Study Level Results

Of the 458 included studies, 303 (66.1%) had at least one author receive payments from Intuitive. Only Sixty-three studies (20.8% of those receiving payments) declared these payments in a COI statement. Interestingly, 29 of these studies (46%) only partially declared their payments as they had at least one author who didn't declare their payments in the COI statement.

In the declaration statements of 287 studies which indicated no COI, 183 studies (63.8%) were found to have payments from Intuitive to at least one author. One hundred-eight studies did not have a declaration statement (23.6% of all studies). Of these studies, 57 had at least one author receive a payment from Intuitive.

Of note, 5 studies declared funding from Intuitive in a declaration statement, but we did not find payments on the Open Payments database. These payments may have been made prior to the database reporting period, or to non-American authors. We could not include these studies in the analyses of the size amounts of payments. (Figure 2)

The mean total payment (from all authors) per study receiving payments was \$26,931 (range \$15 – \$714,518). Studies that declared a COI had a higher average total payment than those that did not declare a COI (\$81,463 vs. \$13,753, $P < 0.0001$). In the studies that only partially declared their payments ($N = 29$), we found that the average amount which was undeclared was \$3,456 (Range \$55 – \$41,803).

Author Level Results

At the author level, a total of 575 authors (25.5%) received at least one payment from Intuitive Surgical, Inc. (Figure 3). Twenty-four authors declared payments, but were not found in the Open Payments database. It is assumed that these authors received payments prior to 2013 and were not included in analyses that assessed size of payments. Only 18.1% ($N = 104/575$) of authors who received payments declared it in a COI statement. (Figure 3) In the studies with a declaration statement present in which authors received a payment, 78.4% (377 of 481) did not declare it so.

Author order was associated with receiving a payment from Intuitive (First Author 17.8% vs. Middle Author 19.9% vs. Last Author 47.0%, $P < 0.001$). The average amount received by authors who received at least one payment was \$14,578 (range \$15 – \$270,716), with a

median payment of \$881 (IQR \$153 – \$4,797). The average declared amount of individual payments was \$55,170 (Median \$10,035, IQR \$202 – \$60,994) compared with \$6,967 (Median \$602, IQR \$118 – \$3,092) in undeclared payments

For those authors who received at least one payment, we found that undeclared funding was associated with author order (First author 83.1% vs. Middle Author 90.0% vs. Last Author 77.9%, $P < 0.001$). (Figure 4) The amount received was then categorized (\$1 – \$500; \$500 – \$1,000; \$1,000 – \$10,000; \$10,000 – \$100,000; >\$100,000) to assess for an association. We found that authors were less likely to disclose a conflict of interest at lower payment amounts. (Figure 4) However, 30% of all authors who received over \$100,000 from Intuitive did not disclose payments from Intuitive in the COI statement.

Declarations and Discrepancies

We found that declaration statements were more likely to be present in comparative studies (80.1% vs. 65.2% in non comparative studies, $P = 0.001$) and in journals with a higher impact factor ($P = 0.049$). We did not appreciate an association between presence of a declaration statement and surgical specialty ($P = 0.24$).

Of the assessed factors, we found that surgical specialty was associated with receiving an undeclared payment ($P = 0.006$), whereas there was no association with impact factor ($P = 0.46$) or study type ($P = 0.47$).

In those studies with a declaration statement present, we found that surgical specialty was associated with a discrepancy between declared COI and actual COI ($P = 0.02$), whereas study type ($P = 0.31$) and impact factor ($P = 0.68$) were not. (Table 1)

Multivariate analysis was conducted, adjusting for surgical specialty, impact factor and study type. Similar associations were found between specialty and the odds of receiving undeclared payments ($P = 0.008$) and a discrepancy between the declared COI and actual COI for those with a declaration statement present ($P = 0.01$). (Table 2)

Overall, 79.5% ($n = 364$) of studies recommended the use of robotic surgery in their conclusions. On a univariate analysis, studies that received undeclared payments (89.6% vs. 68.4%, $P < 0.001$) and those with a discrepancy between declared COI and actual COI (88.0% vs. 70.1%, $P < 0.001$) were both more likely to recommend the use of robotic surgery. Multivariate analysis, after adjusting for impact factor, surgical specialty and study type found that undeclared payments were associated with recommending robotic surgery (OR 4.29, 95%CI 2.55 – 7.21, $P < 0.0001$) as was a discrepancy between declaration and actual COI (OR 3.21, 95%CI 1.81 – 5.70, $P < 0.0001$). (Table 3)

Discussion

This is the first study which has assessed the validity of the conflict of interest statements in robotic surgery journal publications by using the Open Payment Database. We found high rates of undeclared payments both at the article level (accounting for all authors) and at the individual author level. Only 20.9% of studies with a conflict of interest declared it in a conflict of interest statement, and only 18.1% of authors who received payments, declared it.

It is some solace that higher payments were associated with a greater likelihood of declaration. However, it is concerning that undeclared payments were associated with a higher likelihood of recommending robotic surgery for clinical use.

Strengths and Weaknesses of the Study

The strength of this study was the inclusive nature of our study selection process. We included all surgical specialties, and a variety of study types. This allowed us to review a large number of studies and authors, to gain a broad perspective on the state of COI disclosures within robotic surgery. By including studies published after the industry payment reporting period, we can assume that a conflict of interest existed prior to publication.

An additional strength of this study is the use of the Open Payments Database. This database is maintained as part of the Physician Payments Sunshine Act of 2010, and payments are reported by industry (not the physician). As such, the accuracy of payment information is likely quite high. Furthermore, physicians have an opportunity to challenge any payments that are deemed to be inaccurate; however, the frequency with which physicians review or challenge these reports is unknown.

Robotic surgery was selected, as it is unique in that there is one manufacturer (Intuitive) of the robotic platform. This is in comparison to laparoscopic surgery, in which a number of manufacturers produce a variety of devices, which can make determining a conflict of interest difficult. Intuitive exclusively produces the robotic platform, so payments from Intuitive can be assumed to be related to robotic surgery. It should be noted that a number of companies are developing robotic platforms, although these platforms are not yet available for use. These companies were not included in our analysis, and as such authors who received funding in this situation would not have been captured in our study.

This study is limited in that we have likely underreported the true extent of payments. The Open Payments database only captures payments to American physicians. A number of included studies had non-American surgeons whose industry funding could not be determined. This may have led to misclassification of a study into not having a conflict of interest, when one existed. Also, we may have underreported the true value of the payments, as payments made prior to the reporting period were not captured. In addition, a number of studies were excluded as there were no American authors to assess.

An additional potential weakness is the classification of “recommendation for robotic surgery”. This is an inherently subjective assessment. We attempted to bypass this issue by reviewing studies in duplicate and coming to a consensus about categorization of this variable.

We did not compare compliance of disclosure in robotic surgery studies to that of non-robotic surgery studies. Perhaps the results we report may be similar to those found if other device manufacturers were assessed. However, we believe that a comparison is unnecessary as any undeclared COI poses the problem of concealed potential bias.

Results in relation to previous publications

Our results are similar to previous publications assessing the accuracy and completeness of reporting COI in medical research. Buerba et al. assessed attendees of the 2011 North American Spine Society conference (4) which required Physicians to declare payments. These declaration statements were then validated against a manufacturer's (Medtronic) website detailing payments. Half of attendees failed to disclose payments made by the manufacturer. Another study assessed the declaration statements of gynecologists presenting abstracts at a national meeting (N = 335) and compared these to payments identified through the Open Payments Database. Presenters frequently received payments (62%), while only rarely listing this as a conflict of interest (11.5% of those receiving payments).⁽⁵⁾ An additional study by Norris et al. (8) assessed physicians (N = 373) who received large amounts from industry (>\$100,000) as per the Dollars for Docs database. They found that studies published by this group contained a conflict of interest statement 77% of the time, but only 31% of these publications declared the author's conflict of interest.

Our study confirms the findings of these smaller publications in that the concordance between declared COI and actual COI was poor. This discordance has now been seen at national meetings (6, 7) and in publications (Current Study, 8).

Meaning of this study

Our study has called into question the accuracy of declaration statements accompanying journal publications. Authors appear to be less likely to declare smaller amounts (especially under \$10,000). A possible explanation for this is that perhaps the author is unaware that they are being identified as receiving payments by Intuitive. A number of payments we found were related to meals, travel and other lower value payments. Authors may believe these smaller amounts to be inconsequential and unlikely to exert a bias in their study.

It is clear that self-reporting potential COI is not effective, and editors of publications must address the lack of transparency within this context rather than leave readers uncertain of accuracy of COI disclosures. A previous study assessed the effect of a declared competing interest on reader's perceptions of research results (9). Readers were randomized to receive the same article with either a declared competing interest or no declared competing interest. Despite receiving the same article, with the same methods and results, readers found articles without a declared competing interest to be more important, relevant, valid and believable than the same study with a declared competing interest.

Much has been written about the value of industry-physician relationships in advancing innovation and improving care (10 – 12). Collaboration between industry and physicians may well be essential to innovation, but the extent of this relationship needs to be transparent, and easily ascertained to allow readers of these studies to assess how a conflict of interest could bias the study results and recommendations.

Journals may want to consider the routine validation of author's declared conflicts of interest, and those found in the "Open Payments" database. This approach would allow identification of recent payments made to American authors. Older payments, and payments made to non-Americans would not be captured.

Conclusions

Conflicts of interest in robotic studies exist commonly and are rarely reported. We have shown that self reporting of these conflicts is not effective and can be misleading. There needs to be complete transparency in these types of studies to allow a reader to more accurately assess the validity of the study results and recommendations.

References

1. International Committee of Medical Journal Editors (ICMJE). [Accessed November 2016] Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals. <http://icmje.org/recommendations/>
2. American Medical Association (AMA). [Accessed November 2016] Code of Medical Ethics, Chapter 7 Opinion on Research and Innovation. <https://www.ama-assn.org/about-us/code-medical-ethics>
3. Lundh A, Sismondo S, Lexchin J, Busuioc OA, Bero L. Industry sponsorship and research outcome. *Cochrane Database Syst Rev*. 2012 Dec;12:12.doi: 10.1002/14651858.MR000033.pub2
4. Buerba RA, Fu MC, Grauer JN. Discrepancies in spine surgeon conflict of interest disclosures between a national meeting and physician payment listings on device manufacturer web sites. *Spine J*. 2013 Dec; 13(12):1780–8. [PubMed: 23830826]
5. Thompson JC, Volpe KA, Bridgewater LK, Qeadan F, Dunivan GC, Komesu YM, Cichowski SB, Jeppson PC, Rogers RG. Sunshine Act: shedding light on inaccurate disclosures at a gynecologic annual meeting. *Am J Obstet Gynecol*. 2016 Nov; 215(5):661.e1–661.e7. [PubMed: 27319366]
6. [Last accessed September 2016] Open Payments – Centers for Medicare & Medicaid Services. <http://www.cms.gov/OpenPayments/>
7. [Last accessed September 2016] Journal Metrics - Scopus. <https://www.journalmetrics.com/>
8. Norris SL, Holmer HK, Ogden LA, Burda BU, Fu R. Characteristics of physicians receiving large payments from pharmaceutical companies and the accuracy of their disclosures in publications: an observational study. *BMC Med Ethics*. 2012 Sep ;13:24.doi: 10.1186/1472-6939-13-24 [PubMed: 23013260]
9. Chaudhry, Samena, et al. Does Declaration of Competing Interests Affect Readers' Perceptions? A Randomised Trial. *BMJ: British Medical Journal*. 2002 Dec ;325(7377):1391–1392. [PubMed: 12480854]
10. Lewin J, Arend TE Jr. Industry and the profession of medicine: balancing appropriate relationships with the need for innovation. *J Vasc Surg*. 2011 Sep; 54(3 Suppl):47S–9S. [PubMed: 21872116]
11. Nakayama DK. In defense of industry-physician relationships. *Am Surg*. 2010 Sep; 76(9):987–94. [PubMed: 20836349]
12. Smith CD, MacFadyen B. Industry relationships between physicians and professional medical associations: corrupt or essential? *Surg Endosc*. 2010 Feb; 24(2):251–3. [PubMed: 20087748]

Figure 1.
Flowsheet of Included Studies

Figure 2.

Study payments, by declaration statement

*5 Studies declared funding, which was not found in the “Open Payments” Database

Figure 3.

Author Payments, by declaration statement

* 24 Authors declared funding which was not found in the “Open Payments” Database

Figure 4. Proportion of Authors with an undeclared payment, by (a) total amount received and (b) author order

Study Level Data Summary: Risk factors for funding without declaration and discrepancy between declaration and funding: Univariate Analysis

Table 1

	Declaration Statement Present (N, %)	Declared Payments (N, %)	Undeclared Payments ^(b) (N, %)	Discrepancy between declaration and actual COI ^(c) (N, %)
Study Type	<i>N</i> = 350/458 (76.4%)	<i>N</i> = 63/458 (13.8%)	<i>N</i> = 240/458 (52.4%)	<i>N</i> = 183/350 (52.3%)
Comparative	346 (75.5%)	277/346 (80.1%)	51/346 (14.7%)	141/277 (50.9%)
Non Comparative	112 (24.5%)	73/112 (65.2%)	12/112 (10.7%)	42/73 (57.5%)
	<i>P</i> = 0.001	<i>P</i> = 0.28	<i>P</i> = 0.47	<i>P</i> = 0.31
Impact Factor ^(a)				
0 – 1	76 (16.6%)	52/76 (68.4%)	9/76 (11.8%)	24/52 (46.1%)
1 – 2	136 (29.7%)	105/136 (77.2%)	14/136 (10.3%)	55/105 (52.4%)
2 – 3	69 (15.1%)	48/69 (69.6%)	6/69 (8.7%)	24/48 (50.0%)
3 – 4	150 (32.75%)	120/150 (80.0%)	30/150 (20%)	64/120 (53.3%)
> 4	27 (5.9%)	25/27 (92.6%)	4/27 (14.8%)	16/25 (64.0%)
	<i>P</i> = 0.049	<i>P</i> = 0.09	<i>P</i> = 0.47	<i>P</i> = 0.68
Specialty				
General Surgery	133 (29.0%)	107/133 (80.5%)	25/133 (18.8%)	64/107 (59.8%)
Urology	148 (32.3%)	109/148 (73.7%)	14/148 (9.5%)	54/109 (49.5%)
Obstetrics & Gynecology	92 (20.1%)	74/92 (80.4%)	12/92 (13.0%)	43/74 (58.1%)
Other	85 (18.6%)	60/85 (70.6%)	12/85 (14.1%)	22/60 (36.7%)
	<i>P</i> = 0.24	<i>P</i> = 0.16	<i>P</i> = 0.006	<i>P</i> = 0.02

^(a) Impact factor using IPP method from <https://www.journalmetrics.com/>^(b) includes those without a declaration statement and those with payments which were not declared in the conflict of interest statement^(c) includes only those with a declaration statement present

REF: Reference variable

Table 2

Multivariate Analysis of association between study factors and (i) undeclared payments and (ii) discrepancy between payments

	Undeclared Payments ^(b) (OR, 95%CI)	Discrepancy between declaration and actual COI ^(c) (OR, 95%CI)
Study Type		
Comparative	0.80 (0.51 – 1.25)	0.69 (0.40 – 1.20)
Non Comparative	<i>REF</i>	<i>REF</i>
	P = 0.33	P = 0.20
Impact Factor ^(a)		
0 – 1	<i>REF</i>	<i>REF</i>
1 – 2	1.16 (0.65 – 2.07)	1.34 (0.67 – 2.68)
2 – 3	1.00 (0.51 – 1.97)	1.34 (0.59 – 3.02)
3 – 4	1.30 (0.74 – 2.29)	1.23 (0.63 – 2.41)
> 4	1.78 (0.71 – 4.46)	2.36 (0.85 – 6.57)
	P = 0.67	P = 0.58
Specialty		
General Surgery	<i>REF</i>	<i>REF</i>
Urology	0.64 (0.39 – 1.04)	0.83 (0.58 – 1.19)
Obstetrics & Gynecology	0.98 (0.56 – 1.70)	0.97 (0.66 – 1.43)
Other	0.41 (0.23 – 0.73)	0.61 (0.38 – 1.00)
	P = 0.008	P = 0.01

^(a) Impact factor using IPP method from <https://www.journalmetrics.com/>

^(b) includes those without a declaration statement and those with payments which were not declared in the conflict of interest statement

^(c) includes only those with a declaration statement present

REF Reference variable

Table 3

Univariate and Multivariate Analysis of association between study factors and recommending robotic surgery

	Recommended Robotic Surgery (N, %)	Multivariate Analysis (OR, 95%CI)
Study Type		
Comparative	266/346 (76.9%)	2.16 (1.13 – 4.13)
Non Comparative	98/112 (87.5%)	<i>REF</i>
	P = 0.02	P = 0.01
Impact Factor ^(a)		
0 – 1	55/76 (72.4%)	<i>REF</i>
1 – 2	111/136 (81.6%)	1.80 (0.88 – 3.66)
2 – 3	52/69 (75.4%)	1.25 (0.56 – 2.78)
3 – 4	124/150 (82.7%)	1.95 (0.97 – 3.93)
> 4	22/27 (81.5%)	1.71 (0.53 – 5.52)
	P = 0.35	P = 0.35
Specialty		
General Surgery	106/133 (79.7%)	<i>REF</i>
Urology	115/148 (77.7%)	0.91 (0.49 – 1.68)
Obstetrics & Gynecology	72/92 (78.3%)	0.76 (0.38 – 1.53)
Other	71/85 (83.5%)	1.78 (0.82 – 3.86)
	P = 0.75	P = 0.19
Undeclared Payments^(b)		
No	149/218 (68.4%)	<i>REF</i>
Yes	215/240 (89.6%)	4.29 (2.55 – 7.21)
	P < 0.001	P < 0.0001
Discrepancy between declaration and actual COI ^(c)		
No	117/167 (70.1%)	<i>REF</i>
Yes	161/183 (88.0%)	3.21 (1.81 – 5.70)
	P < 0.001	P < 0.0001

^(a) Impact factor using IPP method from <https://www.journalmetrics.com/>^(b) includes those without a declaration statement and those with payments which were not declared in the conflict of interest statement^(c) includes only those with a declaration statement present*REF* Reference variable