Internet use among anaesthesiologists: A cross-sectional survey

INTRODUCTION

Anaesthesiologists access the internet for both personal and professional reasons, and the global network has helped to bridge the information gap between developed and developing countries.1 There are limited data regarding how anaesthesiologists professionally use the internet. The objectives of this study were to assess time spent by anaesthesiologists on the internet, as well as purposes and patterns of use.

METHODS

We compiled a 17-item, English-language questionnaire to evaluate anaesthesiologist’s use of the internet and their perceptions regarding its role in practice. We pre-tested our survey with four anaesthesiologists who evaluated relevance, clarity and comprehensiveness. The final questionnaire had closed-ended response options for all questions [Appendix 1 available online].

We used KwikSurveys® to facilitate online completion of our survey. Responding to survey questions was not mandatory and respondents could choose more than one answer for some questions. We obtained contact information for all 822 members of the Bengaluru branch of the Indian Society of Anaesthesiologists. After excluding 34 entries that were duplicates, missing E-mails or group mails, we sent an E-mail request to the remaining 788 anaesthesiologists detailing the intent of our survey and a link to our questionnaire. One reminder was sent after 1 week.

We hypothesised a priori that greater use of internet by anaesthesiologists would be associated with: (1) male gender (2) involvement in teaching or research (3) earlier career stage and (4) availability of a smartphone. The dependent continuous variables were anaesthesiologist’s self-reported total time and professional time spent on the internet. We calculated that we would require at least forty completed surveys to ensure reliability of our linear regression models (10 respondents for each independent variable).2 We used the enter method to build our adjusted regression model and all comparisons were two-tailed and variables were considered significant if they had P < 0.05. We report the unstandardised regression coefficient and 95% confidence interval for each variable, which represents the change in response score on the dependent variable (hours on the internet per day). We plotted residuals from the regression analyses to ensure that their distributions were reasonably normal. Multicollinearity was deemed concerning if the variance inflation factor for any independent variable was >5.3 We performed analyses using SPSS Statistics, version-23 (IBM Corporation, New York, USA).

RESULTS

The overall response rate was 12.4% (98/788). Most respondents were male (56.8%; 54/95), employed at a medical college (48.4%; 46/95), and junior
consultants (46.9%; 45/96). The majority of respondents endorsed the internet as their most important source of information (61.2%; 60/98); most of them spent 1–2 h (40.6%; 39/96) or >2 h (38.5%; 37/96) on the internet per day. Approximately 1-in-3 respondents (35.1%; 33/94) endorsed an addiction to internet [Table 1].

All 98 respondents endorsed use of the internet for their academic work, research or patient management. Most respondents accessed the internet after working hours (55.1%; 54/98), primarily through a smartphone (77.6%; 76/98). The internet search engine Google® was the main source of scientific information for 89.8% of respondents (88/98). Only 27.6% (27/98) endorsed internet videos as their main source for learning new anaesthesia skills; conventional resources, observing and assisting seniors (46.9%; 46/98) or attending workshops (43.9%; 43/98) were more commonly endorsed. The most popular internet videos were on the topic of regional anaesthesia (67.3%; 66/98) [Table 1]. Most respondents (72.6%; 69/95) used social media and mobile apps for sharing information. The majority of respondents (76.3%; 71/93) felt that online courses and webinars were likely to replace in-person conferences in the future.

In our multivariable analysis, neither gender, career level, involvement in teaching or owning a smartphone were associated with anaesthesiologists’ time spent on the internet [Table 2]. Standardised residual plots showed no violation of model assumptions [Figure 1]. The variance inflation factor was <2 for each independent variable, suggesting no issues with multicollinearity. Our model explained approximately 1% of the variation (adjusted \(R^2 = 0.012\)) in respondents’ time spent on the internet, suggesting that other variables that we did not assess are important in influencing duration of use. Findings were similar for our model exploring factors associated with anaesthesiologists’ professional time spent on the internet (data not shown).

**DISCUSSION**

Our survey found that majority of anaesthesiologists endorsed the internet as their most important source of knowledge and most spent >1 h/day on the internet. Acquisition of new anaesthesia skills primarily occurs through observing peers/seniors and attending workshops, but 27.6% of respondents also used internet videos. Most respondents (76.3%) endorsed use of social media and mobile apps for sharing anaesthesia-related information. Almost 1-in-5 anaesthesiologists reported accessing the internet during surgery. This may facilitate rapid knowledge uptake for patient care, but there is also the possibility for distraction leading to patient harm. However, one study exploring the effect of non-record keeping activity during anaesthesia, including access
to the internet, did not find significant haemodynamic variability or aberrancies from such practice.\cite{4}

Our survey found high use of social media platforms among anaesthesiologists, which was also reported in earlier surveys involving mental health-care professionals,\cite{5} but not in public health researchers.\cite{6} There are certain challenges associated with physician's use of social media, particularly as posted information may be publically available. The American Medical Association Council on Ethical and Judicial Affairs has published guidance for doctors regarding non-clinical use of the internet, including a framework for interaction between patients and physicians, ethical and confidentiality issues and benefits and pitfalls of social media.\cite{7}

A 2012 survey of 1750 physicians found that the number of years in practice did not predict internet use, but male gender, younger age and working in teaching positions were associated with greater use.\cite{8} We did not find an association between internet use and gender, teaching or training roles, career level or ownership of a smartphone. We found that 35% of anaesthesiologists in our survey self-reported addiction to the internet. Our results are similar to rates of internet addiction endorsed by professional students (medical, paramedical and engineering) from Central India (35% scored at least mild addiction on Young's internet addiction scale)\cite{9} and college students in Bengaluru (34% scored at least mild addiction).\cite{10}

Our study is limited by our low response rate (12.4%) and administration to a single branch of the Indian Society of Anaesthesiologists, which limits generalisability of our findings. Unfortunately, similar response rates for surveys of social media/internet usage have been reported among mental health practitioners (11.8%) and Australian physicians (12.5%).\cite{5,11} As well, the factors we explored in our regression model did not explain time spent on the internet. Further, we derived

| Table 1: Contd... | Number of respondents (%) |
|-------------------|-----------------------------|
| Total time spent on the internet related to anaesthesia (n=95) (h/day) | |
| <1                | 50 (52.6)                   |
| 1-2               | 31 (32.6)                   |
| >2-4              | 10 (10.5)                   |
| >4                | 4 (4.2)                     |
| Self-perceived addiction to the internet (n=94) | |
| No                | 61 (64.9)                   |
| Yes               | 33 (35.1)                   |
| Timing of internet use related to anaesthesia* | |
| During a case in the operating room | 18 (18.4) |
| Between cases, during work hours | 48 (49.0) |
| After work hours | 54 (55.1) |
| Device used for accessing the internet* | |
| Smartphone        | 76 (77.6)                   |
| Tablet            | 12 (12.2)                   |
| Laptop computer   | 43 (43.9)                   |
| Desktop computer  | 20 (20.4)                   |
| Source of scientific information on the internet* | |
| Google            | 88 (89.8)                   |
| PubMed            | 51 (52.0)                   |
| Journal articles  | 39 (39.8)                   |
| Social media (e.g. Facebook, Twitter) | 8 (8.2) |
| Mobile applications (e.g. WhatsApp, anaesthesia apps) | 8 (8.2) |
| Most commonly viewed videos on the internet* | |
| Regional anaesthesia | 66 (67.3) |
| Airway techniques | 33 (33.7)                   |
| Echocardiography  | 18 (18.4)                   |
| Interventional techniques for pain | 16 (16.3) |
| General anaesthesia | 8 (8.2) |
| Simulation in anaesthesia (e.g. virtual anaesthesia machine) | 7 (7.1) |
| Primary focus of internet use* | |
| Personal use      | 51 (52.0)                   |
| Current patient-related issues | 38 (38.8) |
| Any anaesthesia-related information | 38 (38.8) |
| Professional non-academic use (e.g. conference registration) | 11 (11.2) |
| Professional focus on internet use* |  |
| Teaching and learning | 71 (72.4) |
| Research          | 32 (32.7)                   |
| Patient care      | 28 (28.6)                   |

*Total percentage is >100% as respondents could choose more than one option

| Table 2: Variables associated with total hours spent on the internet per day (n=93)* | Unstandardised regression coefficient (B) from univariable analysis (95% CI) | P | Unstandardised regression coefficient (B) from multivariable analysis (95% CI) | P |
|----------------------------------|--------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------|----|
| Female gender                    | 0.11 (−0.38-0.59)                                                             | 0.67| 0.09 (−0.40-0.58)                                                             | 0.71|
| Working in a medical college or training hospital | 0.25 (−0.16-0.85)                                                             | 0.18| 0.32 (−0.22-0.87)                                                             | 0.24|
| Seniority                        | −0.29 (−0.61-0.03)                                                            | 0.08| −0.20 (−0.55-0.16)                                                            | 0.27|
| Availability of a smartphone     | 0.31 (−0.27-0.89)                                                             | 0.29| 0.32 (−0.28-0.93)                                                             | 0.29|

*The adjusted $R^2$ for our regression model is 0.012. CI – Confidence interval
rates of internet addiction through self-reporting and not through validated criteria.

**CONCLUSION**

The internet is commonly used by anaesthesiologists in Bengaluru to communicate and obtain information. Strategies to ensure optimal use of the internet to improve anaesthesiologists’ practice are uncertain and require further study. Future studies are also needed to identify factors that explain variability in internet use among anaesthesiologists. High rates of self-reported internet addiction may be a cause for concern.

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**Conflicts of interest**

There are no conflicts of interest.

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| Appendix 1: Survey questionnaire |
|----------------------------------|
| 1. My gender is                   |
| Male                             |
| Female                           |
| 2. I work in a                    |
| Medical college with post-graduates in anaesthesia/sub-specialties |
| Corporate hospital with training programmes in anaesthesia/sub-specialties |
| Corporate setup without trainees |
| Nursing homes/freelance anaesthesiologist |
| 3. I am a                        |
| Trainee in anaesthesia or its sub-specialities |
| Consultant <10 years in anaesthesia |
| Consultant with >10 years in anaesthesia |
| 4. I access internet for anaesthesia-related work mostly |
| During a case in the operating room |
| Between the cases, during work hours |
| After work hours                  |
| 5. I access internet using        |
| Smartphone                        |
| Tablet                            |
| Laptop                            |
| Desktop                           |
| 6. To access scientific information on the internet I use |
| Google                            |
| PubMed                            |
| Journal/scientific society websites |
| Social media websites             |
| Mobile apps                       |
| 7. In the last 3 years, most of the knowledge I have gained is from |
| Internet                          |
| Textbooks/library                 |
| Conferences/meetings             |
| Peers/teachers                    |
| 8. The new skills that I have acquired in last 3 years are mainly by |
| Watching videos on internet       |
| Attending workshops               |
| Observing and assisting seniors   |
| 9. The most commonly watched videos/simulations on internet by me are regarding |
| General anaesthesia               |
| Regional anaesthesia              |
| Airway gadgets and techniques     |

| Appendix 1: Contd... |
|-----------------------|
| Echocardiography      |
| Pain interventions    |
| Simulations in anaesthesia |
| 10. Most of my time spent on internet is for |
| Learning new things about anaesthesia and related |
| Refreshing myself about the patient problem that I am currently dealing |
| Professional non-academic use (memberships, conference registration/travel) |
| Personal purpose      |
| 11. My professional use of internet is mostly for |
| Anaesthesia-related teaching/learning/sharing |
| Reading about current patient care |
| Research in anaesthesia |
| 12. Total time I spend on internet/day (average) |
| Nil                  |
| <1 h                 |
| 1-2 h                |
| 2-4 h                |
| 4-6 h                |
| >6 h                 |
| 13. Do you think internet has helped in academic work, research and patient management? |
| Yes                  |
| No                   |
| 14. Do you use Facebook/WhatsApp for learning/sharing anaesthesia/critical care/patient-related information |
| Yes                  |
| No                   |
| 15. Do you think online CMEs/webinars will cut down costs and travel time and replace conventional conferences in future? |
| Yes                  |
| No                   |
| 16. Do you think your internet usage has increased to the point of addiction? |
| Yes                  |
| No                   |
| 17. Time I spend on internet for purposes related to anaesthesia/day (average) |
| Nil                  |
| <1 h                 |
| 1-2 h                |
| 2-4 h                |
| >4 h                 |