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SMARTPHONE IN SMART ANAESTHESIA PRACTICE IN LOW RESOURCE SETTINGS IN WEST AFRICA

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Abstract: Smartphones are used in many areas of anaesthesia practice. However, recent studies have expressed concerns about smartphone uses in the operating room. It is hoped that this study might serve as a modest beginning to the assessment smartphone's future in the operating room in developing countries. We performed a survey to learn about the smartphone use habits and views of anaesthesia providers in low resourced settings like Ghana in West Africa. A prospective cross sectional study was conducted after obtaining Institutional ethical committee approval from May, 2018 to July 2018. A questionnaire consisting of 15 questions about smartphone use habits during anaesthesia care was sent electronically. A simple random sampling technique was used to select anaesthetists registered with Ghana Medical and Dental Council. Comparisons of category variables were performed using Chi Square test using the Statistical Package for Social Science (SPSS) 15.0 windows vista. A p-value of <0.05 was considered statistically significant. In our study a total of 272 participants answered our survey. We had 47.3% respondents less than 30 years and 5.1% more than 51 years. Smartphones were used more by younger generation for calculating drug dosage (40.3%), surfing the internet (29.2%), calling for assistance / help (16.7%), medical references (9.6%) and monitoring patient -heart rate, SpO_2 (4.2%) during anaesthesia delivery. 76.4% of the respondents indicated that smartphone usage has a benefit on patient care. 81.9% of the respondents indicated they had an anaesthesia related application on their smartphone. 54.2% of the respondents indicated they had never been distracted as a result of using smartphone during anaesthesia care. According to the results of the survey, smartphones are used in the operating room often for non-medical purposes. Distraction with the use of smartphone remains a concern needs more evidence-based data.

Keywords: Smartphone, Anaesthesists, Benefit, Distraction (Source: MeSH, NLM)

1. Introduction: Over the past decade, the role of smartphones has exponentially grown, making it tough to conceive of life without them. Smartphone use has recently undergone a large scale increases worldwide, and smartphones have become an indispensable part of daily life. These handy technological devices have provided unique opportunities for anaesthetists in developing countries like Ghana to use them for patients care. A variety of health care-related medical applications (apps) are available in the market. Some of them

are free and others are paid. In the developed countries, smartphones are used in anaesthesia practice for communication with team members [1], knowledge acquisition through internet [2], Mobile apps [3] - smartphones as oximetry devices [4], for determining neuromuscular function [5], application like “Bubble level,” to maintain level of operating table during caesarean section or steep tilts like pelvic robotic or laparoscopic surgeries with fruitful evaluations without additional cost to the patient [6].

Worldwide warnings like by the American Association of Nurse Anaesthesists that smartphones are a distracting factor especially in the operating room but they do not suggest full restriction of smartphone usage in operating rooms [7]. However, many studies have expressed concerns about smartphone uses in the operating room. As yet there is no clear answer to the question “whether smartphones are distracting devices or useful devices”. For instance, is it safe to use smartphones to read about anaesthesiology or literature searche during patient management? Some studies have shown that these smartphones act as significant source of nosocomial infections, distraction for medical professionals, interfere with medical equipments in operating rooms and they may put privacy and security of patients at stake [8, 9].

Despite of these concerns about smartphone use, no study has yet evaluated the impact of smartphone use on anaesthetists in low resource settings of Ghana in West Africa. For performance assessments in anaesthesiology, it is necessary to focus on the domain of anaesthesia practice. Monitoring of anesthetized patients requires multitasking as well as maintenance of situational awareness [10]. Anaesthesiologists perform monitor checks throughout surgeries at regular intervals, and smartphone use may occupy some of their monitoring time. However, no study to date has reviewed the use of smartphone and how they can help integrate technology into clinical practice.

2. Material and Methods: A prospective cross sectional study was conducted after obtaining Institutional ethical committee approval from May, 2018 to July 2018. A 15 item questionnaire about smartphone use habits during anaesthesia care was sent electronically. All the questions in the questionnaire were multiple choices based on previous similar studies found in literature [11, 12]. Google form was used as a platform to create online questionnaires that were automatically hosted via a Unique Resource Locator (URL) and the respondents answered the questionnaire either through an internet link on a mobile phone or a link sent to them through their What’s App contact. A simple random sampling technique was used to select anaesthetists registered with Ghana Medical and Dental Council. Statistical analysis between age groups for smartphone use during patient care was performed via Chi square test using the Statistical Package for Social Science (SPSS) 15.0 windows vista. A p-value of <0.05 was considered statistically significant.

3. Results: Socio-demographic data: The study enrolled 272 respondents. The age of respondents in groups <30 years, 31 to 40 years, 41 to 50 years and >51 years were 47.3%, 31.2%, 16.4% and 5.1% respectively. There is a significant decrease in terms of smartphone use frequency during patient care in respondents aged ≥51 years ($p<0.05$). There were 58.2% male and 41.8% female respondents. On years of work experience anaesthetists were grouped in less than 2 years (27.8%), 2-5 years (30.2%), 6-10 years (26.7%) and more than 10 years (15.3%). 58% Smartphone users had less than 6 years of work experience (Table1&2).

Table 1: Smartphone use habits of Anaesthetists

	Frequency of Smartphone use					
Age (year)	**Never**	**Seldom**	**Sometimes**	**Often**	**Very often**	**Percent**
< 30	3.1 %	6.3 %	37.9 %	46.7 %	6 %	47.3%
31-40	4.1%	5.8%	27.2%	54.6%	8.3%	31.2%
41-50	2.6 %	36.9%	32.4 %	17.5 %	10.6 %	16.4%
>51	42.7 %	38.4 %	2.3 %	9.4%	7.2 %	5.1%

Chi square value (X^2) =13.84; (n=272); df=(3) ;P<0.05

Table 2: Years of work experience

Years of work experience	**Percent**
Less than 2 years	27.8%
2-5 years	30.2%
6-10 years	26.7%
More than 10 years	15.3%

98.6% of the respondents indicated they had a smartphone. Interestingly, all respondents indicated no restriction on smartphone usage in the operating theatres (OT) as per hospital policy. However, 57 % of the respondents were of the view that smartphone usage should be restricted in the operating theatre (Figure1).

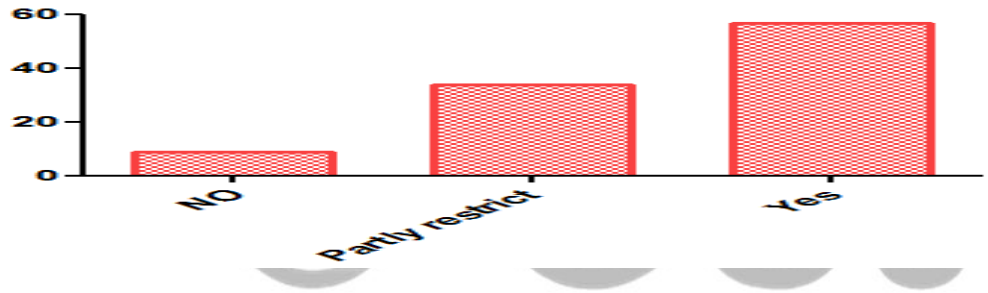

Figure 1: Whether smartphone usage should be restricted in the operating theatre (OT)

Among those who indicated that there should be restrictions on smartphone usage in the OT, 68.4% stated that it would interfere with patient monitoring and 31.6% stated with patient care (Table3).

Table3: Reasons why smartphone usage should be restricted in the OT

Variable	**Percent**
It interferes with patient care	31.6%
It interferes with patient monitoring	68.4%

Moreover, more than half (59.2%) of the respondents indicated they had never been distracted or experienced any distraction or negative medical consequence as a result of using a smartphone during anaesthesia care. While distracted once (28.6%), 2-5 times (4.1%) and more than 5 times (8.1%) in figure 2.

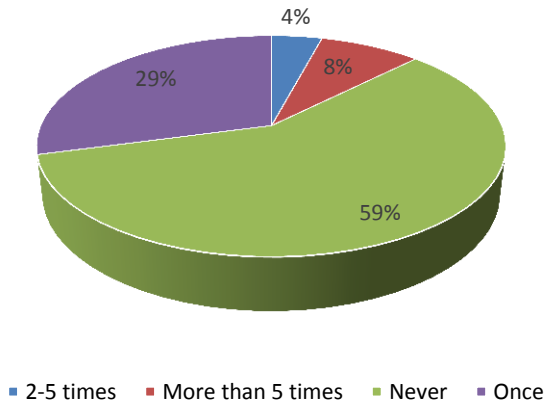

Figure2: Percentage of anaesthetists distracted as a result of using smartphone during anaesthesia care

76.4% of the respondents indicated that smartphone usage during anaesthesia care has a benefit on patient care. In table 4 some of the benefits indicated includes calculation of drug dosages (40.3%), searching for information on patient (29.2%), calling for assistance/ help (16.7%), reference books (9.6%) and monitoring heart rate, SpO_2 (4.2%).

Table 4: Benefits of smartphone usage during anaesthesia care

Variable	Percent
Calculating drug dosage	40.3%
Search for information on patient	29.2%
Calling for assistance/ help	16.7%
Reference/ books	9.6%
Monitoring heart rate, SpO_2	4.2%

Moreover, the majority (81.9%) of the respondents indicated they had an anaesthesia related application on their smartphone as Journal Apps (Anaesthesiology 55.9%), anaesthesia drug calculator (18.6%), Textbooks / References (13.6%) and Medical Calculator Apps (11.9%) as shown in table 5.

Table 5: Anaesthesia related applications available on respondent's smartphone

Variable	Percent
Journal Apps Anaesthesiology	55.9%
Anaesthesia drug calculator Apps	18.6%
Textbooks / References	13.6%
Medical Calculator Apps	11.9%

23.6% of the respondents indicated that smartphone usage during anaesthesia care causes distractions in patient care. Playing games (36.1%), phone calls (34.7%) and surfing the internet (29.2%) were indicated as smartphone usages that might result in as distraction or negative medical consequence during anaesthesia care (Figure3).

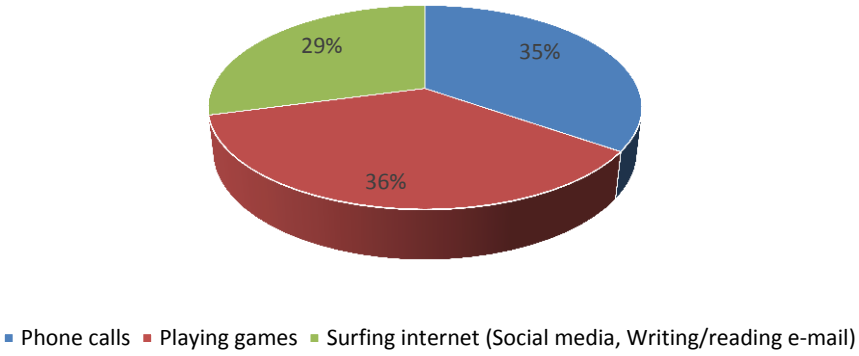

Figure 3: Smartphone usage methods that might result in a distraction or negative medical consequence during anaesthesia care

Respondents indicated that poor patient care due to distraction from smartphone (56.9%), loss of concentration (23.7%) and error in drug administration (19.4%) are some of the consequences that can occur as a result of using your smartphone during anaesthesia care (Table 6).

Table6: Disadvantages caused due to use of smartphone during anaesthesia care

Variable	Percent
Error in drug administration	19.4%
Loss of concentration	23.7%
Poor patient care	56.9%

4. Discussion: Smartphone ownership is increasing across much of the developing world, including in sub-Saharan Africa [13]. A handy, easily available, and user friendly smartphone can be of great help for patient care and intraoperative safety. Applications of smartphone in medicine and surgery are especially promising [14]. The rate of smartphone use in operating room among study participants was 98.6%. This is the first survey of its kind among anaesthetists of West Africa, but similar studies have been undertaken in developed countries. This study found that anaesthetists usually used smartphones for calls, messaging, writing/ reading e-mails, surfing the internet, social media and referencing of academic documents while rendering anaesthesia services to patients. Similarly, previous studies have revealed that anaesthetists during anaesthesia care used smartphones mainly for phone calls, messaging, social media and surfing the internet [15]. The most common uses of smartphone were calculating drug dosage and Search for information on patient, with rates of 40.3 % and 29.2 % respectively. As the majority (78.5%) of the participants were young anaesthetists less than 41years. The most common distractions were playing games (36.1%), phone calls (34.7%) and surfing the internet (29.2%). Similar results were seen in a study by Mcbride et al. in 2015, reported that 78.1 % of participating nurses used smartphones at work. They use smartphone for e-mail 38.6 %, read news 25.7 %, social media 20.8 %, and for playing games 6.5 % [16]. Cho et al. (2016) reported that smartphone usage during anaesthesia care causes 24.7% distractions in patient care similar to our finding of 23.6%. However, our results show that younger anaesthetists (≤41years) use smartphone more (78.5%) than senior anaesthetists (≥41years) use only (21.5%) as seen in Cho et al. [17]. Smartphone use leads to reduced focud and lowered behavioral

performance during cognitive tasks especially driving as suggested by Leunget al. [18]. Hence, inexperienced anaesthetists should avoid additional distractions in the operating room, such as smartphone uses.

5. Conclusions: Most anaesthetists have never been distracted or experienced any negative medical consequence as a result of using a smartphone during anaesthesia care. Many distracting factors put strain on anaesthetists during patient care. An increasing trend towards their use in the operating room, have also started to emerge as a significant distracter. However, with little evidence based information that exists, it appears impractical and unwise to completely restrict their use in the operating room. As it is handy, easily available, and user friendly smartphone is of great help for patient care and intraoperative safety, if used with caution.

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