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Patterns of Internet and smartphone use by parents of children attending a pediatric otolaryngology service

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ABSTRACT

Objectives: To assess Internet use and the influence of smartphones on health-information seeking by parents and carers of children with ENT conditions.

Methods: A paper-based questionnaire was circulated to parents attending otolaryngology services in both the out-patient and day-case settings at a tertiary referral centre.

Results: 79.5% of questionnaires were returned. 29.9% had consulted the Internet for ENT-related information. Factors associated with increased rates of ENT-related online activity included younger age, university education, and access to a smartphone (all $p \leq 0.001$). 65.7% and 57.7% had found the information which they had found online to be understandable and helpful, respectively; however, just 25.5% felt that it had influenced the medical decisions they had made for their child. 50.3% had previously or intended to discuss information found online with their surgeon. 9.2% had searched online for information regarding their child's surgeon; 19.6% of these said that this had been a factor in choosing that particular surgeon. On ranking 8 information sources in terms of importance (scale 0–5), the ENT Surgeon ranked as most important (mean = 4.63), whilst the Internet ranked lowest (3.10). 48.6% of respondents or their partners had an Internet-enabled smartphone; 45.2% said they would definitely use an iPhone app regarding their child's condition if one was available. 36.1% reported they would definitely use the Internet in the future.

Conclusions: Whilst online sources must increasingly be considered in the dialogue with parents, it is clear that parents still rate the clinical team as most important for information gathering. Clinician-provided websites and smartphone applications may be the key to ensuring the provision of quality information into the future.

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1. Introduction

Eurostat have recently reported that more than half of individuals (56%) in the EU use the Internet everyday or almost every day, whilst 68% now go online at least once a week [1]. A key driver in the growth of the Internet has been the introduction of Internet-enabled 'smartphones', and these devices are now emerging as everyday platforms for accessing information and managing daily routines; there are now an estimated 1.08 billion smartphones globally, with 84% of users using their devices to browse online, and 69% downloading applications [2].

eHealth, and use of the Internet as a source of health information, has been postulated to present a range of benefits

to the end-user, including supplementation of information received from a health practitioner, the provision of anonymity in health information-seeking, a means of information exchange and community support, and empowerment in seeking help for, and understanding, medical conditions [3]. 80% (113 million individuals) and 54% of American and European Internet users employ the Internet to access health information, respectively, [1,4] and those who use the Internet to search for information regarding a personal health problem are 60% more likely to contact a health professional compared with those who have not searched online [5].

A subsection of eHealth, mobile or mHealth, may be defined as "the use of wireless communication devices to support public health and clinical practice" [6], with eight mHealth domains identified – education and awareness systems, point-of-care support and diagnostics, patient monitoring, disease and epidemic outbreak surveillance, emergency medical response systems, health information systems for management of clinical data, educational support for health professionals (mLearning), and

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health financing with applications which facilitate the use of smart cards or vouchers for mobile payments [7,8]. One recent study has suggested a doubling in mHealth use by the U.S. population between 2010 and 2012 [9], and the 2012 Healthcare Innovation and Marketplace Technologies Bill in the United States has called for the establishment of an office at the U.S. Food and Drug Administration specializing in mobile health.

Within otolaryngology, a number of papers have examined Internet use by patients in both the out- [10–12] and in-patient settings [13]. Just one, however, has examined its use as an information source for parents of children attending a paediatric otolaryngology service, and this was in the day-case setting only [14]. Only one study has examined patterns post-2007, and none have examined the use of smartphones as a means of obtaining relevant information. This present work thus aimed to determine contemporary trends in traditional and online health-information seeking by parents of children attending both out-patient clinic and day-case otolaryngology services at a tertiary referral centre.

2. Methods

A paper-based questionnaire, modelled on those employed by Boston et al. and Tassone et al. [10,14], was circulated to parents attending Otolaryngology services in both the out-patient and day-case settings at the Children's University Hospital, Temple Street, Dublin, between October and November 2011. Ethical approval for the study had been sought and obtained from the Hospital's Ethics Committee. Parents who had completed the questionnaire in the out-patient setting were not asked to submit a second form on the day-case unit. Data was entered into a database and analysed using Excel and SPSS software. Where responses were left blank, they were excluded from data analyses, and percentages were expressed relative to the number of respondents who answered individual questions. The Chi-squared and Mann–Whitney *U* tests were employed to assess for significant differences; *p*-values less than 0.05 were considered significant.

3. Results

79.5% (*n* = 501) of questionnaires were returned, 351 from the out-patients department and 150 from the day-case unit. Demographic data is presented in Table 1.

3.1. General patterns of Internet use

4.4% (22/500) respondents reported that they had no access to the Internet; 69.4% (*n* = 347) had access at home. Whilst just 1.4% (*n* = 7) reported access at work only, 21.6% (*n* = 108) reported access at home and at work. 1.8% (*n* = 9) used their public library

for access, with the remainder (1.4%, *n* = 7) using a combination of home or work and the public library to get online.

72.2% (358/496) and 16.9% (*n* = 84) employed the Internet on a daily or weekly basis, respectively; 1.8% (*n* = 9) used it on a monthly basis, and 9.1% (*n* = 45) only went online very rarely.

3.2. mHealth

48.6% (243/500) of respondents reported that they or their partner had a phone with Internet access; those with access to a smartphone were significantly more likely to browse online on a daily basis versus those without such access; (195/243 (80.2%)) versus (163/253) (64.4%)) (*p* < 0.001). Those with access to a smartphone were also significantly more likely to have searched online for pertinent health information, (89/241 (36.9%)) versus (60/256 (23.4%)) (*p* = 0.001).

3.3. Patterns of online otolaryngology-related behaviour

29.9% (149/497) of respondents had searched online for information regarding their child's ENT problem. 36.7% (54/147) of those attending for a day-case procedure had employed the Internet for information related to the procedure, whilst 27.1% (95/350) of those attending the outpatient department had browsed online. 30% (105/350) of those attending this department were doing so for the first time; 20.9% (*n* = 22) had been online prior to this initial attendance. 34.8% (120/344) of those aged 40 or less had searched online in relation to their child's condition or symptoms; this compared with 19.1% (29/152) of those aged between 41 or older (*p* < 0.001). 44.3% (78/176) of respondents who had a postgraduate education had searched online; this compared with 22.1% (69/311) of those who had left formal education at an earlier stage (*p* < 0.001). Those with private health insurance were significantly more likely to have searched online for ENT-related information; 39.1% (70/179) of those insured privately consulted the Internet compared with 24.8% (78/315) of those who did not hold private insurance (*p* = 0.001). 35.9% (128/356) of daily Internet users had searched online for relevant information versus 15.3% (21/137) of those who used the Internet less frequently (*p* < 0.001).

When asked if the information they had found online was understandable, 65.7% (94/143) agreed, 25.2% (*n* = 36) partially agreed, 7.7% (*n* = 11) were uncertain, and 1.4% (*n* = 2) disagreed. When asked if the information was helpful, 57.7% (82/142) of respondents agreed, 30.3% (*n* = 43) partially agreed, 9.9% (*n* = 14) were uncertain, and 2.1% (*n* = 3) disagreed. When the parents or carers were asked if what they had learnt online had influenced the treatment decisions they had made for their child, 25.5% (36/141) agreed that it had, 29.8% (*n* = 42) partially agreed, 15.6% (*n* = 22) were uncertain, and 29.1% (*n* = 41) disagreed. 50.3% (71/141) of respondents had discussed or intended to discuss the information which they had found online with their surgeon.

Of 499 respondents, 9.2% (*n* = 46) had searched online for information regarding their child's surgeon; 19.6% (*n* = 9) of these reported that what they had found had influenced their choice of surgeon.

3.4. Comparison with traditional information sources

Respondents were asked to rank 8 information sources on Likert-type scales ranging from 0 (did not use) to 5 (very important) in terms of importance; the ENT surgeon was ranked as most important (mean = 4.63), followed by the general practitioner (4.14), paediatrician (4.09) and ENT nurse (4.06), whilst the Internet ranked lowest (3.10) (Fig. 1). The importance placed on the Internet was not affected by age (*p* = 0.209),

Table 1
Demographic data.

Relationship to child		Education level	
Mother	378	National School	23
Father	112	Junior Certificate	75
Grandparent	3	Leaving Certificate	215
Sibling	3	(High School Completion)	
Mother and father	3	University Graduate	178
Foster parent	2	Unknown	10
Age		Private health insurance	
<18	5	Yes	182
18–40	341	No	315
41–65	153	Unknown	4
>65	1		
Unknown	1

Fig. 1. Mean importance of information sources in finding information.

attainment of postgraduate education ($p = 0.610$), or insurance status ($p = 0.846$). Respondents attending the day-case unit were asked specifically if they had received an information leaflet relating to their child's condition or proposed procedure; 63.6% (96/150) reported that they had, and these respondents gave the leaflets a mean score of 3.99 in terms of importance in information gathering.

3.5. Future plans

When asked if they would use the Internet in the future to search for information regarding their child's health, 36.1% (178/493) reported that they definitely would, 49.6% ($n = 245$) said that they may do, and 14.4% ($n = 70$) said that they would not. When asked if they would use a smartphone application with information regarding their child's ENT problem, were it to be developed, 45.2% of respondents reported that they would definitely use it, whilst 38.5% ($n = 190$) said they would consider it, and 16.2% ($n = 80$) said that they would not use it.

4. Discussion

The study has reiterated the increasing ubiquity of the Internet, with just 4.4% of respondents having no access to it at all, and over 92% able to go online at home. Our finding that 29.9% of respondents had searched online for information regarding their child's symptoms or condition correlates well with that of recent work by Shaw et al., in the adult setting, in the UK (32%) [11]. Significant predictors of health information seeking activity online were younger age (≤ 40 years), higher level of educational attainment, private insurance status, daily Internet use, and access to an Internet-enabled smartphone. This latter factor appears to be a key driver in Internet use, with over 80% of those with access to these devices going online on a daily basis. Given the aforementioned ubiquity of smartphone coverage, and the fact that coverage is weighted towards younger age, it is plausible that the vast majority of parents will have access to this technology in the near future; one author has estimated that 80–90% of the UK population will have a smartphone in 10 years [15].

Whilst Internet use generally, and health seeking use in particular, may be on the rise, doubts have been raised as to the quality or otherwise of the information which patients or their carers encounter online [16,17]. Within otolaryngology, Chestnutt and Pothier et al. have reported on the poor readability of websites relating to common oral pathologies [18] and glue ear [19], respectively, whilst Volsky et al. demonstrated content accuracy

on common ENT diagnoses in MedlinePlus and Wikipedia of just 49% and 46%, respectively [20]. This present work has found that over 90% of those who had searched online for health information at least partially agreed that the information found was understandable, with a similar number (88%) agreeing that the information was at least somewhat helpful. In contrast, however, 29.1% felt that the information found online would not influence the treatment decisions which they would make for their child, although over half had discussed or intended to discuss information found online with their surgeon. This latter finding highlights the importance of clinician awareness in relation to patient's online activity; such activity will increasingly mandate the adoption of the shared clinical decision making model between patient/carer and doctor. That said, the encroachment of the Internet into medical practice need not be seen as a negative by doctors for, as pointed out by Hartzband and Groopman in a treatise on the significance of the Internet for physicians, it is they who "are in the best position to weigh information and advise patients, drawing on their understanding of available evidence as well as their training and experience...if anything, the wealth of information on the Internet will make such expertise and experience more essential" [21].

Despite the widespread use of the Internet, respondents still ranked it less important relative to traditional sources of health information. As noted elsewhere [14,22], the clinician remains the most important source of information for parents. One limitation of this work is that we did not ask parents if they trusted the information found online; certainly, it appears from the results of other studies that parents mistrust this information [22], and this may well explain the relative lack of importance placed on material found online. There thus appears to exist an opportunity for clinicians to become the gateway to the Internet for parents; it seems plausible that if parents trust their clinicians, they will thus trust those websites to which they are directed by their clinicians. Healthcare professionals have considerable experience in weighing up information and evaluating the evidence base for individual treatments or management strategies; the next step will be to utilise this experience in the evaluation of online information such that we can identify those websites which are (a) accurate and (b) complete, and then pass this information to our patients. More importantly, we can identify those websites which are potentially damaging to the patient or parent, and subsequently advise them to avoid visiting those sites. Clinicians can thus provide an "Internet prescription" for the parent or patient [23], thereby reducing consultation times and improving the process of informed consent and patient-doctor collaboration. This approach is all the more important when one considers that up to 80% of information given to patients is forgotten [24]; 70% of patients were unable to remember a single possible complication associated with their procedure on the day of surgery in one study of ENT patients at one UK university teaching hospital [25].

Whilst 29.9% of respondents had used the Internet to search for information regarding their child's ENT problem, 85.7% of respondents said that they would possibly or definitely use it in the future as an information source. Similarly, 83.7% of patients reported that they would at least consider using a disease specific smartphone application containing relevant information. For clinicians who are wary of prescribing Internet content, an "app-script" may be a more palatable alternative in that the information therein can be controlled by the clinician. Unfortunately, whilst a number of patient-specific apps have been developed within ENT, including those which allow the patient to can test their own hearing (uHear [Unitron Hearing Ltd.]), self-assess for sleep apnoea (Sleep Assess [ResMed]), self-manage tinnitus (iTinnitus [Inner ear solutions]), and find information on

different ENT-related conditions (Sinusitis [Dr. Kenny Pang]), ENTDecide™ [Orca MD], and 'Patient.co.uk'), the majority of these applications have not been independently assessed and validated for content and accuracy. In addition, within the realm of pediatric ENT specifically, very little has yet been developed which might reasonably aid the parent/carer in learning about a particular condition or treatment. On the otherhand, however, there are now a myriad of smartphone applications available which have been developed with doctors in mind, among them a multitude designed specifically for otolaryngologists [26]; as we increasingly adopt this technology in improving our own knowledge and efficiency, the practice of developing and "prescribing" patient-centred applications may well become an accepted component within the overall process of information provision.

5. Conclusion

This work has demonstrated the pervasive growth of the Internet and mobile health and their increasing influence on healthcare provision in the setting of pediatric otolaryngology. It is clear that these advances are set to continue, and hence clinicians must be cognisant of this growth and attempt to harness it, to enhance both the doctor–patient relationship and the related processes of information delivery and informed consent.

Conflicts of interest

None.

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