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Electronic consultation use by advanced practice nurses in older adult care—A descriptive study of service utilization data

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Abstract

Aims and Objectives: To describe characteristics of service utilization by advanced practice nurses (APNs) employing an electronic consultation (eConsult) service in their care for older adults.

Background: Canada's aging population is projected to place unprecedented demands on the healthcare system. APNs, which include clinical nurse specialists (CNSs) and nurse practitioners (NPs), are nurses with advanced knowledge who can independently provide age-appropriate care. eConsult is a secure web-based platform enabling asynchronous, provider-to-provider communication. APNs can send and receive eConsults to address patient-specific concerns.

Methods: This is a retrospective analysis of eConsult utilization and user survey data for cases completed in 2019, reported in line with the STROBE guidelines. Eligible eConsults included those that had APN involvement (as a referrer or responder) and were concerning an older patient (≥65 years). Descriptive statistics were used to analyse service utilization and survey response data.

Results: Of 430 eligible eConsults, 421 (97.9%) were initiated by NPs and the rest by physicians. 23 (5.3%) were received by a CNS, of which 14 (3.3%) involved an NP-to-CNS exchange. Median specialist response interval was 0.9 days. 53% of eConsults was for dermatology, haematology, cardiology, gastroenterology and endocrinology. 73% of eConsults avoided a face-to-face referral after the consultation. In 90% of eConsults, APNs rated the service as helpful and/or educational.

Conclusions: Through eConsult, APNs can collaborate with each other and physicians to access and provide a breadth of advice facilitating timely specialist-informed care for older patients, thus helping to alleviate some of the demands placed on the healthcare system.

Relevance to Clinical Practice: There is an opportunity for APNs to further adopt eConsult into their clinical practice, and this can, in turn, support the integration of the APN role in the health workforce.

Patient or Public Contribution: Current APN eConsult users were involved in the study design and interpretation of results.

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KEYWORDS
advanced practice nursing, electronic consultation, interprofessional healthcare, older adults, telehealth, telemedicine

1 | INTRODUCTION

Older adults frequently face challenges when accessing care (World Health Organization, 2017). In a recent poll, 2 million Canadians aged 55+ identified difficulties seeing a primary care provider (PCP), and long wait times for physician specialist care, surgery and diagnostic tests as challenges encountered in their provincial healthcare systems (Angus Reid Institute, 2019). Like many other countries, Canada has a short supply of primary care physicians (Maier & Aiken, 2016) and decreasing numbers of geriatricians (Bloom et al., 2015; Gordon, 2011) further exacerbating the situation. These gaps can be bridged by Advanced Practice Nurses (APNs) – an internationally recognized group of healthcare providers improving access to care, reducing physician workload and mitigating physician shortages (Bryant-Lukosius & Martin-Misener, 2015; Martin-Misener et al., 2015). Recognized APN roles in Canada are the clinical nurse specialist (CNS) and nurse practitioner (NP) (Canadian Nurses Association, 2019). APNs focus on the clinical domain in various practice settings, including care coordination and providing clinical expertise through patient-centred consultation with other healthcare providers.

2 | BACKGROUND

Digital tools, such as electronic consultation (eConsult), could improve the quality of care for older adults and are uniquely positioned to further integrate APNs into the healthcare system. eConsult enables asynchronous, consultative provider-to-provider communication between PCPs and specialists. Its use allows PCPs to access timely specialist advice, decrease wait times and reduce burdens, such as unnecessary face-to-face visits, for patients (Joschko et al., 2018; Liddy, Drosinis, & Keely, 2016). The Champlain BASE™ (Building Access to Specialists through eConsultation) eConsult service, launched in Ottawa, Ontario, is one such program and has been available to the region's family physicians (FPs) and APNs alike since its inception in 2010. NPs, who have regulatory authority to diagnose, prescribe and order tests autonomously, can register as PCPs and submit questions to specialists. Additionally, CNSs and NPs are eligible to register as specialists to answer questions submitted to their specialty group via eConsult. APNs currently using the service have expressed high levels of satisfaction with eConsult, citing the tool's ability to reassure patients and facilitate high-quality interactions with specialists (Liddy et al., 2015). This intersection between APNs and eConsult is encouraging since eConsult services can facilitate timely access to specialist advice for older adults (Liddy, Drosinis, Joschko, & Keely, 2016) and APNs have been listed as integral to efficient health systems (Canadian Nurses Association, 2019).

While APNs seem well-positioned to adopt eConsult when caring for older adults, the use of eConsult among geriatric APNs is not well understood. As such, we sought to describe APNs' use of and experience with the Champlain BASE™ eConsult service in their delivery of care to older adults.

3 | METHODS

We conducted a retrospective descriptive analysis of eConsults and PCP feedback survey data collected through the Champlain BASE™ eConsult service. Eligible eConsults were completed between January 1 and December 31, 2019, submitted by an NP or responded to by an APN, and concerned a patient aged 65 years or older. This study was reported in line with the STROBE (STrengthening the Reporting of OBservational studies in Epidemiology) guidelines (Appendix S1).

3.1 | The Champlain BASE eConsult service

The Champlain BASE™ eConsult service operates in the Champlain health region. Located in Eastern Ontario, this health region has a population of 1.3 million, of which 250,000 are aged 65 years or older. All PCPs (which includes FPs and NPs) are eligible to use the service. Once registered, PCPs may submit a non-urgent patient-specific clinical question to one of 150 specialty and sub-specialty groups. When submitting an eConsult, PCPs can attach additional files deemed relevant to the case (e.g., imaging or test results), which are then assigned to a specialist based on their availability. Specialists are asked to reply within 7 days. When responding, specialists can provide a recommendation, request more information or recommend a face-to-face referral. The exchange occurs until the PCP decides to close the case. After each case, PCPs complete a mandatory five-question close-out survey (Table 1).

3.2 | Data collection

The eConsult service automatically collects the following information: the type of PCP (i.e., FP or NP) submitting the eConsult and the location of their practice (i.e., organization name and postal code), the specialty group referred to and the specialist's response time and self-reported billing time associated with each eConsult. Data on the type of specialist were determined using unique identifiers assigned to specialists on the platform.

The mandatory close-out survey (Table 1) consists of five questions asking the referring PCP about the perceived usefulness of the advice received, the referral outcome for the eConsult, its educational

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value, its relevance for upcoming continuing medical education (CME) activities and an optional open text question for any further feedback. Data from Question 5 were not included in the present analysis.

The practice settings of referring NPs were identified and categorized as either: acute care hospitals, NP-led clinics (NPLCs), Community Health Centres (CHCs), Family Health Teams (FHTs) and long-term care (LTC) homes or "Other." Cases from acute care hospitals, CHCs, FHTs, NPLCs and "Other" were identified by linking the name of the primary organization registered with the referring NP (Glazier et al., 2012; Mattison & Wilson, 2018) with publicly available information. Cases submitted from LTC settings were determined using a method our group previously developed (Fung et al., 2021), allowing us to identify a subset of providers working in LTC homes and their eConsult cases. We also assessed the rurality of each practice setting (urban versus rural). Cases were identified as "rural" if the Rurality Index for Ontario (RIO) scores were 40 or greater (Glazier et al., 2012).

We displayed the geographical distribution of eConsults submitted and closed by NPs on a map of Ontario using the practice location of participating NPs. These were determined by the forward sortation area (the first three characters in a Canadian postal code).

3.3 | Statistical analysis

We present the total number of cases closed by NPs (the referring provider) or answered by APNs (the responding specialist) for older patients during the investigation period, and the number and types of specialty groups were consulted. We computed means and standard deviations, and medians and interquartile ranges (IQR) for the following continuous variables: specialist response time, the specialist time billed and the cost per case. We present frequencies of responses to the survey questions. The frequency and distribution of eConsults across different practice settings and the rurality of these settings are described.

TABLE 1 Champlain BASE™ eConsult primary care provider close-out survey questions.

Q1. Which of the following best describes the outcome of this eConsult for your patient: • I was able to confirm a course of action that I originally had in mind • I got good advice for a new or additional course of action that I will be implementing • I got good advice for a new or additional course of action that I am not able to implement • None of the above (please comment)
Q2. As a result of this eConsult, would you say that: • Referral was originally contemplated but now avoided at this stage • Referral was originally contemplated and is still needed • Referral was not originally contemplated and is still not needed • Referral was not originally contemplated, but eConsult resulted in a referral being initiated • Other (please explain)
Q3. How helpful and/or educational was this response in guiding your ongoing evaluation or management of the patient? (Minimal) 1 2 3 4 5 (Very Valuable)
Q4. This eConsult addresses an important clinical problem that should be incorporated into upcoming CME events. (Strongly Disagree) 1 2 3 4 5 (Strongly Agree)
Q5. We would value any additional feedback you provide [Comments for the specialist will be forwarded to her/him]: (Free text comment box)

Abbreviation: CME, continuing medical education.

3.4 | Research ethics approval

The Ottawa Health Science Network Research Ethics Board provided ethics approval for this study (Protocol 2009848-0).

4 | RESULTS

We identified 430 eConsults that involved APNs and related to patients 65 years or older, representing 11.0% (n = 3,909) of all eConsults closed on the service in 2019. Of these, 421 (97.9%) were initiated by NPs, and 23 (5.3%) eConsults were submitted to a CNS serving as the specialist. The latter included NP-to-CNS cases (n = 14) and FP-to-CNS cases (n = 9).

One hundred and three individual NPs closed between one and 28 eConsults. The top 5 specialties accessed by NPs (n = 421) were dermatology (25%), haematology (9%), cardiology (7%), gastroenterology (6%) and endocrinology (6%), accounting for 53% of all eConsults (Figure 1). One CNS answered all 23 cases submitted to a CNS-led specialty, responding on behalf of the wound care (n = 22) and ostomy and peristomal complications (n = 1) specialty groups.

4.1 | Response times

Table 2 provides details on APN service utilization. Among NP-submitted cases (n = 421, 98%), the median response interval was 0.9 days (IQR: 0.2–3.0), the median specialist time billed was 15 minutes (IQR: 10.00–20.00) and the median cost per case was $50.00 (IQR: 33.3–66.6). Ninety-two percent of NP-submitted cases were responded to in 7 days or less. Among CNS-answered cases (n = 23), the median response interval was 0.8 days (IQR: 0.2–1.5), the median time billed was 20 minutes (IQR: 15.0–30.0 min) and the median cost per case was $16.70 (IQR: 12.5–25.0). All CNS-answered cases were responded to in 7 days or less.

4.2 | Close-out survey

Nurse practitioners' responses to the first four questions of the close-out survey (Table 1) are presented in Figure 2. Sixty-seven percent of NPs received clear advice for a new or additional course of action that they could implement, and 5% received advice for a

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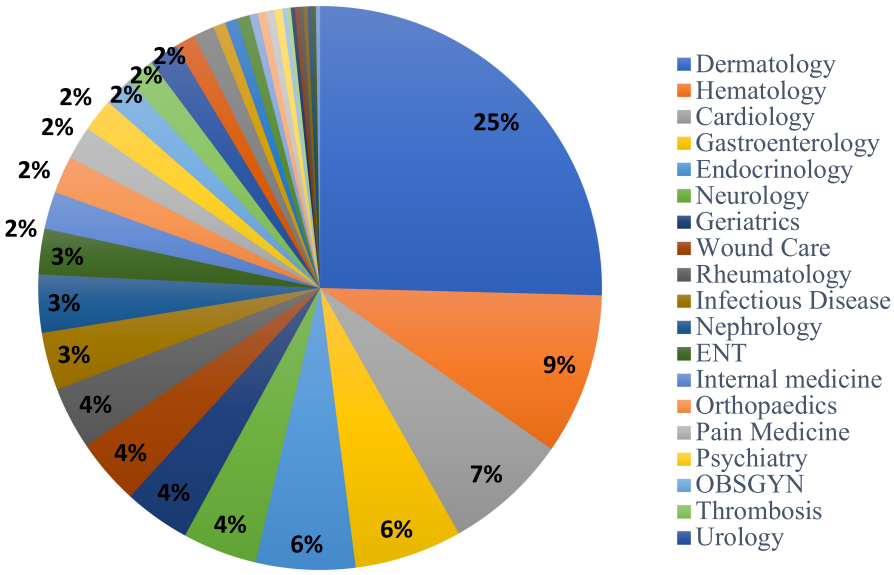

FIGURE 1 A pie chart demonstrating the specialty distribution for eConsults submitted by nurse practitioners ($N = 421$) from January to December 2019. ENT, ear, nose and throat; OBSGYN, obstetrics and gynaecology.

TABLE 2 APN eConsult utilization for older adults (Jan 2019 – Dec 2019).

	NPs only ($n = 421$)		CNS ($n = 23$)	
Indicator	**Mean (*SD*)[a]**	**Median (IQR)[a]**	**Mean (*SD*)[b]**	**Median (IQR)[b]**
Response time	2.3 days	0.9 (0.2–3.0) days	1.2 days	0.8 (0.2–1.5) days
Percentage of cases sent with response time <7 days	91.9%		100.0%	
Percentage of cases sent with response time <30 days	99.5%		100.0%	
Time billed	15.5 min	15.0 (10.0–20.0) min	23.0 min	20.0 (15.0–30.0 min
Cost per case	49.3	$50.00 (33.3–66.6)	19.6	16.7 (12.5–25.0)

[a]Based on 421 eConsults closed by Nurse Practitioners on Champlain eConsult BASE™.

[b]Based on 23 eConsults closed on the Ontario eConsult Service and the Champlain eConsult BASE™.

new or additional course of action that they could not implement (Figure 2a). Seventy-three percent of eConsults did not require a face-to-face referral after the consultation; this includes 43% of eConsults where a referral was initially contemplated but could then be avoided after the eConsult interaction (Figure 2b). Overall, the platform facilitated a change in referral decision-making in 45% of NP-submitted eConsults. NPs rated eConsults to be valuable (20%) or very valuable (70%) in terms of their helpfulness and/or educational value (Figure 2c). Most responding NPs agreed (36%) or strongly agreed (22%) that clinical topics covered in their eConsult interactions were worthy of consideration for future CME events; 38% of responses were neutral (Figure 2d).

4.3 | Geographical distribution

One hundred sixty-nine eConsults (40.1%) were submitted from a CHC, 100 (23.8%) from an FHT, 61 (14.5%) from an LTC setting, 27 (6.4%) from an NPLC and 15 (3.6%) from an acute care hospital. The "Other" category included 49 (11.6%) eConsults from various organizations and, given the small number of cases in each category, were combined into one group to maintain the anonymity of the organizations. Overall, we identified 80 eConsults (18.9%) submitted by NPs practicing in a rural setting. Geographically, 80% of eConsults were closed by NPs in the Champlain region and 20% in other regions of Ontario (Figure 3).

5 | DISCUSSION

Our findings demonstrate that APNs use eConsult in a variety of practice settings to provide timely access to specialist advice for older patients. APNs almost exclusively served as the referring PCP submitting clinical questions for older patients (fulfilled by NPs; 97.9% of eConsults) rather than the responding specialist (fulfilled by a CNS; 2.0% of eConsults). For NPs submitting eConsults, the service was highly valued, delivered new or confirmatory clinical information and often led to the avoidance of a face-to-face referral. To our knowledge, this is the first study describing characteristics of utilization and uptake of eConsult in advanced practice nursing for Ontario's older population.

Achieving timely specialty advice is important for older adults. Disability and co-morbidity overlap with other deficits associated with frailty (Theou et al., 2012), producing complex, interacting

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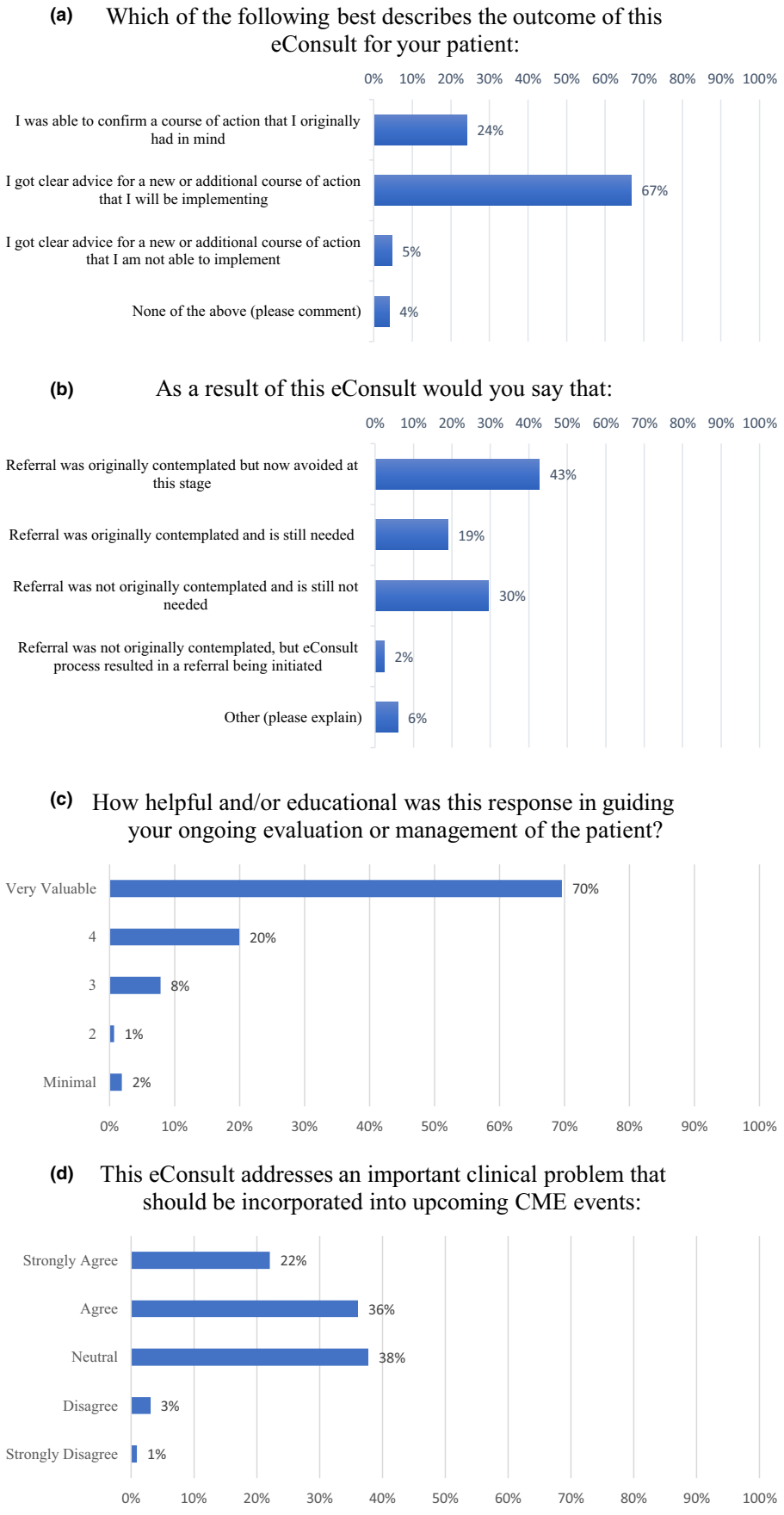

FIGURE 2 Bar charts demonstrating survey results from requesting nurse practitioners using the Champlain eConsult BASE™ between January and December 2019 ($N = 421$). CME, continuing medical education.

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FIGURE 3 A map of Ontario demonstrating the distribution of eConsults closed by nurse practitioners between January and December 2019.

medical and social difficulties that pose challenges for health systems (Prince et al., 2015). For example, transportation to appointments can be difficult with frailty and mobility issues being more common in older adults, who also have higher referral rates (Collard et al., 2012; Davis et al., 2011). eConsult fosters access to specialist advice while avoiding the burden of face-to-face referrals.

Like a previous study examining PCPs' use of Champlain BASE™ eConsult service for older adults (Liddy, Drosinis, Joschko, & Keely, 2016), the most common specialties NPs submitted to were dermatology, haematology, cardiology, gastroenterology and endocrinology. While cardiovascular disease is a leading contributor to the burden of disease in people aged 60+ (Prince et al., 2015), the proportion of eConsults to cardiology (7%) in our sample was one-third of those to dermatology (25%). This implies that contributors to the burden of disease among older adults are not necessarily associated with the drivers of eConsult use among APNs. Further research on clinical topics and types of questions asked could clarify the reasons behind NPs eConsult usage when seeking specialty advice for older patients.

Only one CNS accounted for all eConsults sent to any APN in our sample. Although APNs can register as specialists on the Champlain BASE™ eConsult service, the scope of practice limitations and available payment models may present barriers to adoption. This highlights that there is room to grow the adoption of eConsult by APNs, particularly CNSs, providing specialty services, and further research should investigate specific barriers and enablers to facilitate further integration of this tool into the APN role. For example, the benefit of having clinical champions for eConsult uptake has already been observed in LTC (Helmer-Smith et al., 2020) and, with the help of similar support for this tool, could be observed with APNs.

An international scoping review found that, using a variety of markers including service utilization and patient satisfaction, NPs providing care for older adults consistently produce equivalent or better outcomes, compared with physician care alone or usual care across various geriatric settings (Chavez et al., 2018). Despite such findings, the APN role, which includes NPs and CNSs, is underused and its full potential in Canada has yet to be realized (Canadian Nurses Association, 2019). Perhaps, the underrepresentation of APNs being consulted on the eConsult platform for specialty advice regarding older adults is a reflection of this.

Our findings showed that NPs most frequently submitted eConsults from CHCs, which, in Ontario, typically serve disadvantaged populations (Glazier et al., 2012). Older adults with low income are over-represented in CHCs compared with settings employing other models of care (Glazier et al., 2012), suggesting that eConsult is well-suited to equip NPs to improve access for these patients. eConsults submitted from LTC were less common (14.4% of cases), but they still represent a notable setting from which NPs have adopted eConsult. LTC homes are complex healthcare environments that can benefit from the addition of geriatric NPs, who typically have a broader scope of practice in this setting compared with others and who have been shown to positively impact key outcomes including reduced health service utilization (Chavez et al., 2018). There is evidence that LTC NPs may enhance their practice by adopting eConsult, which has been shown to be feasible in an LTC setting (Helmer-Smith et al., 2020). Furthermore, eConsult adoption in LTC would be timely, given that the COVID-19 pandemic experience and other long-standing issues in Canada's LTC homes have spurred calls for increased adoption of advanced technologies in the sector (Gauvin et al., 2021).

There is an opportunity to expand the implementation of eConsult services in new regions globally to advance the well-being of older adults. An environmental scan of eConsult services available worldwide identified 53 eConsult services from 17 different regions in the United States, Canada, Brazil and Spain (Joschko et al., 2018). A more recent systematic review identified a similar distribution, with the majority of studies on eConsult conducted in the United States and Canada, with some in Brazil, Europe (i.e. Spain, Italy, Austria, The Netherlands) and Australia (Liddy et al., 2019). Internationally, NPs are already being used extensively in geriatric care (Chavez et al., 2018). Our findings demonstrate that eConsult can supplement advanced nursing practice in a variety of healthcare settings, supporting the notion that APNs are well-positioned to help promote the adoption of this digital health innovation to address the unique needs of older adults across the globe.

5.1 | Limitations

Our study has several limitations: (1) routine utilization data collected automatically by the eConsult service does not permit the exploration of patient outcomes after eConsult case completion; (2) the practice location associated with each PCP registered on the service that was used to infer the practice settings of NPs in the sample may not always reflect the setting from which the NP is providing care; (3) since the mandatory close-out survey is not distributed to specialists, no survey response data from the perspective of the CNS were available; and (4) given the small sample size of eConsults answered by CNSs, results may not be

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generalizable. Other studies on NPs in geriatric care have similarly been burdened, where outcomes were based on data generated by a limited number of NPs (Chavez et al., 2018). This is a limitation but also reflects the potential for prospective CNSs considering eConsult adoption. By championing the use of eConsult in their practice, the actions of one CNS are simultaneously impactful for their patients and the profession. Future studies should pursue larger sample sizes, perhaps by including patients of all ages. The extent to which CNSs are providing consultation services in other specialty areas and the frequency of FPs consulting CNSs through eConsult (FP-to-CNS) compared with NPs (NP-to-CNS) are important topics of future inquiry.

6 | CONCLUSION

Our study describes the use of eConsult as a tool among APNs in various practice settings in Ontario and highlights the importance of advanced practice nursing in the care of older adults.

Although APNs participated as senders and receivers of eConsults, APNs as specialists represented a small proportion of the overall utilization, with most participating NPs acting as PCPs. Further research is needed to better understand how to implement such technology in the profession. Advocacy should be considered to increase adoption, particularly for APNs providing care for older patients with complex health needs and barriers to accessing health services. Our results provide baseline data for academics, policymakers, nursing leaders and clinical champions interested in exploring innovative windows of opportunity to integrate APNs into the healthcare system.

Relevance to clinical practice

We propose several opportunities for eConsult adoption in advanced practice nursing. First, further expansion of eConsult is possible from the perspective of referrers and responders. Referrers – NPs adopting eConsult to submit questions on behalf of patients – may continue to use this tool to facilitate improved access for older adults in key geriatric settings such as LTC (Chavez et al., 2018). Responders – primarily CNSs answering eConsults submitted to their specialty area – offer high value in specific areas (e.g., wound care) (Canadian Nurses Association, 2019) and could experience increased uptake once current payment, credentialing and human health resource limitations are addressed. Second, further adoption of eConsult can benefit the integration of the APN role in the health workforce. Literature shows that models including APNs as part of an interprofessional team enable their integration into healthcare systems (Canadian Nurses Association, 2019; Sangster-Gormley et al., 2011). For example, in a 2008 survey of Ontario's primary healthcare NPs, a high percentage of respondents agreed that the physician with whom they worked most often understood their role (87%) and supported their full scope of practice (93%) (Koren et al., 2010). This suggests that fostering interprofessional awareness and an understanding of each profession's role are building blocks for APN role integration, especially since a lack of role clarity has been identified as a barrier to the integration of advanced practice nursing roles (Donald et al., 2010). In this study, NPs consulted with specialists from 37 different specialty groups and the CNS responded to consultation requests from FPs and NPs, demonstrating eConsult's ability to promote collaborative interprofessional environments. Future work with larger sample sizes may further explore eConsult-based interprofessional networks and the quality of the interactions arising from them. Lastly, another opportunity for eConsult adoption in advanced practice nursing exists in the potential for this tool to serve CME efforts. eConsult has received recognition from PCPs and specialists for its educational value and the learning opportunities aligning with the practice-associated challenges that it generates (Archibald et al., 2018; Keely et al., 2017). NPs in this study frequently agreed (in 58% of cases) that the clinical topics covered in their interactions with specialists were highly educational and worthy of consideration in future CME events. Similarly, a 2016 study of NPs and FPs eConsults revealed that NPs considered their conversations with specialists as a great learning opportunity (Liddy, Deri Armstrong, McKellips, & Keely, 2016). The Canadian Nursing Association deems CME as a key element for enabling APNs to keep pace with the changing needs of the healthcare system, such as those posed by the growing population of older adults (Canadian Nurses Association, 2019). Additionally, there is potential for eConsult to serve as an accurate needs assessment for future CME activities by providing real-time data on the questions most frequently posed by practicing APNs.

AUTHOR CONTRIBUTIONS

Ramtin Hakimjavadi, Sathya Karunananthan, Cheryl Levi, Kimberly LeBlanc, Sheena Guglani, Mary Helmer-Smith, Erin Keely and Clare Liddy each made substantial contributions to either the conception and design, acquisition of data, or analysis and interpretation of data and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Ramtin Hakimjavadi, Sathya Karunananthan and Clare Liddy were involved in drafting the manuscript, and all authors were involved with revising it critically for important intellectual content. Ramtin Hakimjavadi, Sathya Karunananthan, Cheryl Levi, Kimberly LeBlanc, Sheena Guglani, Mary Helmer-Smith, Erin Keely and Clare Liddy have given final approval for the version to be published. Each author has participated sufficiently in the work to take public responsibility for appropriate portions of the content.

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CONFLICTS OF INTEREST

Dr Liddy and Dr Keely are co-founders of the Champlain BASE eConsult Service, but they have no commercial interest in the service and do not retain any proprietary rights. As Co-executive Directors of the Ontario eConsult Centre of Excellence, they receive salary support from the Ontario Ministry of Health. Dr Keely answers occasional eConsults (less than 1 per month) as a specialist through the service, for which she is reimbursed. Other authors report none.

DATA AVAILABILITY STATEMENT

Research data are not shared.

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