Impact of COVID-19 on the delivery of pharmacy services to patients with cancer: an international survey of oncology pharmacy practitioners

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1. ABSTRACT:

Introduction: The Coronavirus of 2019 (COVID-19) pandemic has necessitated vast and rapid changes in the way oncology pharmacy services are delivered around the world.

Methods/aims: An international survey of oncology pharmacists and technicians was conducted via the International Society of Oncology Pharmacy Practitioners (ISOPP) and collaborating global pharmacy organisations to determine the impact that COVID-19 has had on pharmacy service delivery, pharmacy practitioners, and oncology practice.

Results: The survey received 862 respondents from 40 different countries from September to October 2020. The majority of respondents were pharmacists (n=841, 97.6%), with 24% involved in direct care with COVID-19 patients. Of the survey participants, 55% increased their time working remotely, with remote activities including dispensing, patient assessment/follow-up, and attending multi-disciplinary rounds. Respondents reported a 72% increase in the use of technology to perform remote patient interaction activities and that participation in educational meetings and quality improvement projects was reduced by 68% and 44%, respectively. Workforce impacts included altered working hours (50%), cancelled leave (48%) and forced leave/furloughing (30%). During the pandemic respondents reported reduced access to intensive (19%) and anti-cancer (15%) medications. In addition, 39% of respondents reported reduced access to personal protective equipment (PPE) including N95 masks for chemotherapy compounding. Almost half of respondents (49%) reported that cancer treatments were delayed or intervals were altered for patients being treated with curative intent. A third of practitioners (30%) believed that patient outcomes would be adversely impacted by changes to pharmacy services. Mental health impacted 65% of respondents, with 12% utilising support services.

Conclusion: The COVID-19 pandemic has altered the way oncology pharmacy services are delivered. These results demonstrate the adaptability of the oncology pharmacy profession and highlight the importance of formal evaluation of the varied practice models to determine those that enhance existing pharmacy services, while recognizing pharmacy practice that are evidence based and thus, should be reinstated as soon as practical and reasonable.

2. INTRODUCTION:

The Coronavirus of 2019 (COVID-19) pandemic has resulted in vast changes in the way oncology care is delivered around the world. The number of new cancer diagnoses was significantly reduced in 2020, with modelling studies predicting that delayed presentations will result in stage shifts and excess cancer mortality.[1,2] Standard care pathways have been altered both in the curative and advanced setting, with an as yet unknown impact of cancer outcomes.[3,4] These changes are both the result of resource prioritisation, the desire to minimise patient contact with hospitals and to avoid delivering therapies that may result in an increased risk of severe COVID-19 disease.[5] How care providers deliver cancer care has also changed, with reports of more than 7-fold increase in telehealth use when compared to data prior to the pandemic.[4]

Healthcare professionals, including pharmacy practitioners, have been required to be adaptive in their practice. Pharmacy practitioners have reported undersupply of personal protective equipment (PPE), impacting availability for routine use in chemotherapy compounding and handling of hazardous drugs, reduced availability of medications and increased procurement times.[3] It is unknown, however, how COVID has impacted the delivery of oncology pharmacy services around the world.

During the study period, the global cumulative number of COVID-19 cases per million people increased from 3306 to 5296 (relative change +60%).[6] This study sought to understand the challenges faced in oncology pharmacy practice worldwide as a result of the COVID-19 pandemic and the adaptations implemented to address these challenges.

3. METHODS

3.1 Survey Development

A pilot survey was designed by the project team, consisting of senior oncology pharmacists and a medical oncology clinician. Survey content was informed from a previous survey of oncology pharmacy practice leaders,[4] and a similar survey conducted separately for medical, radiation and surgical oncologists.[5] A question bank was drafted and circulated among representatives from international oncology pharmacy organisations. Questions were ranked for inclusion and consensus achieved during multiple rounds of review. A 27-question survey was then created on REDCap and circulated online via collaborating international oncology pharmacy organisations (appendix 1). This survey (appendix 2) included questions relating to respondent demographics, nature of work prior to and during the pandemic, changes to service delivery attributable to the pandemic, access to medications and personal protective equipment, means of communication with patients and teams, changes to patient management plans and therapy, resources accessed during the pandemic and impact on practitioner mental health. Target respondents were oncology pharmacy practitioners (pharmacists and pharmacy technicians). The survey was administered in the English language and remained opened between 1/9/2020-21/10/2020. Respondents were excluded if they did not practice in oncology pharmacy (n=21) and if they did not proceed beyond the second question (first two questions contained limited demographic information only, n=29).

Responses were anonymous and consent was implied by respondent's decision to take the survey. The Peter MacCallum ethics committee approved this project (HREC/63587/PMCC).

3.2 Data Analysis

Data was extracted from REDCap and analysed using R version 4.0.1 (06-06-2020). Responses consisted of both qualitative and quantitative data. Qualitative data is reported as a percentage of respondents selecting the response (y%) with tables containing both the number and percentage of the selected response (n = x; y%). As the number of respondents answering certain elements of each question varies, the denominator may vary within an individual question set, in which case tables provide y% only. Although the country of respondent was collected, results are reported by major geographical region (see appendix 2).

4. RESULTS:

4.1 Demographics

Oncology pharmacy practitioners from 40 countries (n=862) responded to the survey (Table 1). The majority were pharmacists (98%) with the remainder being technicians (2%). Respondents were from 40 different countries, grouped into 5 major geographical regions (Table 1). Forty percent reported 10 years or more experience working in oncology pharmacy and the most survey respondents worked at cancer centres, either hospital or ambulatory care (42%). Many reported working directly with COVID-19 diagnosed patients, including 16% of respondents that cared for COVID-19 cancer patients and 8% that cared for non-cancer patients with COVID-19. Prior to the pandemic, respondents practiced in various roles in

oncology pharmacy practice (Figure 1), with the most common practice setting in medical oncology (59%) and haematology (40%) ambulatory patients.

4.2 Changes to pharmacy services as a result of the COVID-19 pandemic

Respondents reported a wide variety of changes to service delivery as a result of the pandemic (Table 2). The most commonly cited changes included reduced attendance at educational meetings (68%), increased remote working (55%) and reduced attendance at clinical meetings (such as multidisciplinary rounds, 54%). There appeared to be regional differences in service delivery changes. For example, 68% of respondents from Europe and from North America reported more remote working compared to only 23% in Africa.

4.3 Telehealth use

Telehealth technologies were used to communicate with both patients and colleagues (Figure 2). Overall, 42% reported increased communication with patients via non-video technologies and 29% via video-assisted technologies. When communicating with pharmacy team members and other health professionals, respondents reported increased use of both video enabled (67%) and non-video enabled (53%) technologies. Respondents from Europe reported less communication with patients via video (8%) compared to other regions however, the overall use of digital technologies to communicate with patients (57%) and with pharmacy teams and other health professionals (57%) was similar to other regions. While digital technologies were implemented rapidly and broadly, only 14% of respondents indicated that technologies would be implemented to reduce in person interactions beyond the pandemic.

155 *4.4 Remote activities*

156 Respondents reported practicing a variety of tasks whist working remotely (Table 3).
157 Common tasks included patient assessment (46%), patient follow up (43%) and attending
158 multi-disciplinary rounds (42%). Many respondents also continued to provide education
159 remotely, to individual patients (40%), individual professionals (33%) and groups of
160 professionals (37%).

161

162 *4.5 Access to medications and to personal protective equipment for chemotherapy*
163 *compounding*

164 Respondents reported reduced access to a variety of medications (Table 4). Reduced access
165 to intensive care medications was reported by 19%, anti-cancer medications by 15% and to
166 anti-infectives by 14%. The proportion of respondents reporting lack of access to medications
167 was similar across all major geographical regions for all drug categories except for intensive
168 care medications, where regional disparities in access was reported ($p = 0.011$).

169

170 Many respondents reported reduced access to personal protective equipment (PPE) during
171 chemotherapy compounding (Table 4). Reduced access to N95 masks, gowns, gloves, other
172 masks and scrubs were reported by 39%, 36%, 28%, 22%, and 20%, respectively. Regional
173 disparities for access were noted for all of these items.

174

175 *4.6 Changes to patient management plans as a result of COVID-19*

176 Respondents reported practice changes that involved how patients were treated during the
177 pandemic (Figure 3 and Figure 4). In the curative setting, respondents indicated that their
178 institution was more likely to delay treatment or alter timing of treatment (49%) and more

likely to be prescribed oral rather than parenteral systemic therapy (36%). A few respondents reported that adjuvant therapy was less likely to be administered (8%). In the palliative setting, 45% of respondents indicated their institution would more likely delay treatment or alter timing of treatment and were more likely to prescribe oral rather than parenteral systemic therapy (36%). In addition, some respondents reported that palliative systemic therapy was less likely to be administered (12%) or that a reduced dose was more likely to be prescribed (18%).

4.7 Oncology pharmacy practitioner mental health impact

A large number of respondents (65%) reported a negative impact on mental health associated with practicing during the COVID-19 pandemic (Figure 4a). However, only 12% reported accessing mental health support services, despite nearly half (44%) acknowledging having access to mental health services at their workplaces (Figure 4b/4c).

4.8 Patient outcomes impact

Respondents reported concern that some practice changes related to how patients were treated may impact patient outcomes with 47% predicting worse survival outcomes due to changes in clinical management, 41% due to medication access issues and 30% directly attributed to pharmacy practice changes. Sixty-three percent predicting worse survival outcomes due to patient COVID-19 infection.

4.9 Resources most accessed during the pandemic

Respondents reported accessing a variety of COVID-19 related content (Table 5), including case and mortality data (34%), treatment of COVID-19 (20%) and treatment of cancer during

COVID-19 (16%). Nearly a third (29%) of respondents reported higher frequency in accessing institutional resources and content related to COVID-19. Approximately 20% of respondents reported increased frequency in accessing national pharmacy resources (20% oncology pharmacy specific, 20% general pharmacy), fewer increased their use of available international resources (14% oncology pharmacy specific, 10% general pharmacy).

4.10 Changes to staff hours and deployment

Pharmacy responded to the COVID-19 pandemic by increasing staffing requirements with 30% of respondents reporting longer working hours and 19% hiring additional staff. There is evidence of significant workforce disruption with 60% reporting altered working structures (new roles/remote working), 50% reporting altered working hours, 48% having to cancel planned leave and 29% taking forced leave/furloughing.

5. DISCUSSION:

Patients with cancer are experiencing vast changes in the way they experience care as a result of COVID-19.[4,7] Likewise, oncology pharmacy practitioners and healthcare providers have been required to alter the way they practice in order to accommodate reduced access to PPE, medications shortages and prioritization, changes to staff deployment, staff tasks and staff hours. This is the largest survey of oncology pharmacy practitioners to be published to date, providing novel insights into specific impacts of the pandemic on the pharmacy profession.

Over half of surveyed practitioners reported more remote working. Tasks that were able to be completed remotely included patient focused tasks (patient assessment, patient follow up) and professional development tasks such as education. Additionally, this study indicates

that there are regional differences in the acceptability of remote working. Possible contributors to practitioners doing less remote work include lack of resources to support digital technologies, differences in local policies or guidelines and perceived applicability or acceptability of digital workflows. For many, communicating with patients and with colleagues via digital technologies (telehealth) is a new experience and a different skill set is required.[8] Moving forward, it will be important to validate these methods and to provide relevant education to practitioners to ensure that communication remains effective and efficient.

Increased communication using digital technologies (video and non-video) was reported by many practitioners. A greater proportion of respondents reported using these methods to communicate with team members (67% with video and 53% with non-video technologies) compared to with patients (29% with video and 42% non-video). While reasons are unclear, European respondents utilised digital technologies to a similar degree but video-assisted technologies less than other regions (just 6%), consistent with data from a physician survey (in press) and a recent study of hematologic cancer management (in press) during COVID-19.

In this study, practitioners reported reduced access to medications, particularly those used in the ICU setting and particularly in Africa, Europe and Latin America/Caribbean where >20% of respondents reported reduced or significantly reduced access. This potentially reflects pre-existing as well as COVID-19 related medicines access issues. In many parts of Africa, existing challenges to the delivery of critical care medicine are broad and eloquently discussed elsewhere,[9,10] with any further barriers imposed by pandemic related medicines access issues likely amplifying the magnitude of impact.

In Europe, the COVID-19 pandemic was at its peak during the survey distribution period with travel restrictions imposed by the European Commission,[11] potentially contributing to transport and supply issues, as well as the unprecedented volume of critical care patients impacting utilisation. Pharmacy practitioners play a critical role in the procurement of medicines with many respondents identifying ability to maintain medicines access but with increased procurement time. Time and effort expended on medicines procurement is relevant in daily practice and amplified in the context of resource and transport constraints. Efforts from the pharmaceutical industry to ensure continuous supply and communicate early regarding shortages are critical to support the oncology pharmacy profession.

Practitioners were asked to comment on changes to standard treatment pathways for cancer patients in both the curative and palliative settings. Almost half of respondents reported that patients in the curative setting were more likely to have treatment delays or treatment intervals altered. This is consistent with other studies, which found that approximately 30-40% of medical oncologists reported being more likely to increase intervals between treatments and 30-35% reported being more likely to delay starting treatment as a result of COVID-19.[4] In the palliative setting, just over a third of practitioners reported that patients were more likely to be prescribed oral rather than parental systemic therapy. This is compared to a study by Chazan et al, in which 64% of medical oncologists reported being more likely to prescribe oral rather than systemic therapy in the palliative setting as a result of COVID-19.[4]

Whilst focussing on maintaining the delivery of oncology services to patients with cancer amidst concerns for treatment complications during periods of immunosuppression, ongoing

resource constraints and major workplace changes, it was unsurprising that practitioner wellbeing was significantly impacted. Fortunately, a large number of respondents (44%) reported proactive measures by their workplaces that included an increased availability of mental health services, however it remains concerning that only a small portion of the practitioners that cited negative mental health impacts actually sought out these services (Figure 5). Reasons for this disparity are unclear but may reflect perceived barriers (i.e. stigma) and cultural behaviours of health practitioners failing to seek mental health support for themselves.[12,13] The 65% of oncology pharmacy practitioners reporting impacts on their mental health is comparable to the incidence of 53% reported among oncologists in a recent study by Chazan et al.[4]

While we acknowledge a significant proportion of pharmacy practitioners reported furlough (29%), the survey did not capture details regarding duration or indication. There is variation amongst reported rates of furlough by geographic area, ranging from 14% in Central America and Oceania regions to >20% in Europe and North America and >30% in Africa, Asia and Latin America/Caribbean. This variability may be a reflective of the geographical distribution of COVID-19 at the time of the survey. Notably, higher proportions of respondents reported cancelled leave (48%) and increased staff hours (30%), suggesting overall increased requirements for pharmacists to provide services to ensure ongoing oncology care and quality use of medicines. Although there was no objective data documenting the degree of overall household income changes due to unwanted alterations of work hours, the ability for pharmacists to be short-term flex is truly admirable, but as previously discussed, not without impact to practitioner wellbeing.

Strengths of this study include its large sample size and the collaborative design that included input from many oncology pharmacy professionals that formed a representative group which aided in ensuring wide distribution through multiple international professional societies, rather than snowball sampling which may lead to selection bias. Like all surveys, data collected represents respondents' opinions and individual recall of events and practices which may not precisely represent actual changes that occurred during the pandemic. Additionally, countries were grouped into major geographical regions for the purpose of reporting, but the authors acknowledge that the reality in experiences between these countries may be very different.

This large, international, collaborative study of oncology pharmacy practitioners provides important insight into some of the changes in pharmacy and oncology pharmacy services that are occurring around the world as a result of COVID-19. Results indicate that changes are occurring across all five major geographical regions surveyed and range from vast alterations to the structure of a standard pharmacy workday, changes to how professionals communicate with one another and engage with patients, and modifications to cancer treatment pathways. Data ascertained has provided a snap-shot view of the profession in the midst of rapid-change, however there are clear benefits to be gained from understanding temporary versus permanent changes and the sustained impact on the profession. Accordingly, ISOPP plans to conduct a follow-up survey following global containment of the pandemic, forecasted for 2022/23.

While data demonstrates rapid adaptability of the oncology pharmacy profession, collective opinion from the large number of practitioners surveyed (61% with >5 years oncology

experience, including 40% with >10 years' experience) suggests not all changes should remain longer term nor shape our future practice models. This is evidenced by nearly a third of practitioners (30%) reporting beliefs that patient survival outcomes would be adversely impacted directly by changes to pharmacy services. The significant uptake of digital technologies to enable remote and physically distanced practices was encouraging but seen best to supplement established practices rather than replace; only 14% of respondents indicated that technologies would be implemented to reduce in person interactions beyond the pandemic. The significant reduction in attendance at educational meetings (-68%) and in undertaking of quality improvement activities (-44%) goes against the established body of evidence of the beneficial impact to patient care that pharmacy practitioners can provide through participation in these activities,[14] and should be seen as a temporary pause, to be reinstated at earliest opportunity.

The COVID-19 pandemic has through necessity provided opportunity to rapidly implement mass workforce and healthcare system changes, but now also provides opportunity to evaluate, reflect and plan for the future of our profession.

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406 **Tables**

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415 **Figures**

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Tables and Figures

Table 1: Respondent Demographics

	Total (N=862)
Broad geographical region of practice	
Africa	42 (4.9%)
Oceania/Asia	199 (23.1%)
Central America and Latin America and Caribbean	195 (22.6%)
Europe	135 (15.7%)
North America	291 (33.8%)
Level of experience	
less than 1 year	48 (5.6%)
1-5 years	289 (33.5%)
6-10 years	182 (21.1%)
more than 10 years	343 (39.8%)
Practice setting	
Cancer center (hospital or ambulatory care)	363 (42.1%)
General hospital metropolitan (not cancer specific hospital)	287 (33.3%)
General hospital rural (not cancer specific hospital)	66 (7.7%)
Paediatric hospital (general or cancer)	94 (10.9%)
Other	52 (6.0%)
Role with COVID-19 patients during pandemic	
Patient facing role, including cancer patients with COVID19	138 (16.0%)
Patient facing role, including non-cancer patients with COVID19	71 (8.2%)
Patient facing role, no exposure to COVID-19	333 (38.6%)
Non-patient facing role	338 (39.2%)
Not specified	19 (2.2%)

Table 2. Proportion of respondents reporting changes to oncology pharmacy services in response to COVID-19 pandemic

Change to oncology pharmacy services	Africa	Oceania/Asia	Central America, Latin America, Caribbean	Europe	North America	Total
Less outpatient dispensary service	18 (56.3%)	36 (30.8%)	28 (28.8%)	29 (32.9%)	33(16.9%)	144 (27.2%)
Less outpatient clinical services	17 (53.1%)	37 (31.6%)	32 (33.3%)	28 (31.8%)	64 (32.9%)	178 (33.7%)
Less inpatient dispensary services	12 (37.5%)	32 (17.1%)	30 (23.2%)	42 (29.6%)	76 (20.6%)	120 (22.9%)
Less inpatient clinical services	15 (46.9%)	29 (24.8%)	25 (26.1%)	25 (28.4%)	61 (31.5%)	155 (29.4%)
Less medication supply for clinical trials	4 (12.9%)	31 (26.5%)	17 (17.7%)	30 (34.0%)	38 (19.6%)	120 (22.8%)
More medication postage/postal courier	7 (22.6%)	29 (59.5%)	37 (38.6%)	66 (75.0%)	68 (35.1%)	247 (47.1%)
More remote working	7 (22.6%)	50 (42.8%)	39 (40.6%)	60 (68.1%)	132 (68.1%)	288 (54.7%)
Less attendance at clinical meetings	16 (51.6%)	68 (58.2%)	39 (41.1%)	59 (67.1%)	101 (52.1%)	283 (53.9%)
Less attendance at educational meetings	19 (59.4%)	79 (67.5%)	50 (52.1%)	75 (85.2%)	135 (69.6%)	358 (67.9%)
Less quality improvement projects	15 (48.4%)	53 (45.3%)	39 (40.7%)	52 (59.1%)	73 (37.7%)	232 (44.1%)

*note that total N answering each question varies and so denominator changes for each question. Possible answers including significantly less/less/about the same/more/significantly more. Table about groups responses 'less and significantly less' into 'less' and 'more' and 'significantly more' into 'more'. Percentage of respondents reporting 'less/more' was calculated as number of respondents reporting 'less' or 'significantly less/more' divided by the number of respondents answering the question (i.e. denominator excludes respondents who missed the question).

Table 3. Pharmacy practice activities performed whilst working remotely

	Africa	Oceania/Asia	Central America, Latin America, Caribbean	Europe	North America	**Total**
patient assessments	9 (42.9%)	28 (32.9%)	29 (49.2%)	32 (53.3%)	77 (48.7%)	**175 (45.7%)**
prescribing	6 (28.6%)	11 (12.9%)	7 (11.9%)	21 (35.0%)	54 (34.2%)	**99 (25.8%)**
dispensing	3 (14.3%)	20 (23.5%)	22 (37.3%)	18 (30.0%)	31 (19.6%)	**94 (24.5%)**
multi-disciplinary rounds	2 (9.5%)	25 (29.4%)	18 (30.5%)	21 (35.0%)	94 (59.5%)	**160 (41.8%)**
patient follow up	12 (57.1%)	21 (24.7%)	23 (39.0%)	33 (55.0%)	76 (48.1%)	**165 (43.1%)**
patient medication support	14 (66.7%)	23 (27.1%)	23 (39.0%)	37 (61.7%)	43 (27.2%)	**140 (36.6%)**
individual patient education	8 (38.1%)	21 (24.7%)	18 (30.5%)	24 (40.0%)	82 (51.9%)	**153 (39.9%)**
group patient education	2 (9.5%)	8 (9.4%)	3 (5.1%)	3 (5.0%)	9 (5.7%)	**25 (6.5%)**
individual professional education	7 (33.3%)	25 (29.4%)	19 (32.2%)	17 (28.3%)	59 (37.3%)	**127 (33.2%)**
group professional education	10 (47.6%)	36 (42.4%)	16 (27.1%)	15 (25.0%)	66 (41.8%)	**143 (37.3%)**
other activity	4 (19.0%)	11 (12.9%)	9 (15.3%)	9 (15.0%)	30 (19.0%)	**63 (16.4%)**

*note that total N answering each question varies and so denominator changes for each question.

Table 4. Proportion of respondents reporting reduced Access to Medicines and PPE for chemo compounding

Reduced access to:	Africa	Oceania/Asia	Central America , Latin America, Caribbean	Europe	North America	**Total**
Anti-cancer medications	14 (48.2%)	16 (15.4%)	18 (22.2%)	8 (9.9%)	14 (7.6%)	**70 (14.7%)**
Anti-infective medications	11 (37.9%)	14 (13.5%)	18 (22.2%)	13 (16.1%)	13 (7.1%)	**69 (14.4%)**
Analgesic medications	7 (24.1%)	15 (14.4%)	14 (17.3%)	12 (14.8%)	16 (8.7%)	**64 (13.4%)**
Supportive medications	9 (31%)	12 (11.6%)	21 (26%)	8 (9.9%)	17 (9.3%)	**67 (14%)**
Intensive care medications	6 (20.6%)	16 (15.4%)	24 (29.7%)	25 (30.9%)	20 (11.0%)	**91 (19.1%)**
Anti-pyretic medications	6 (20.6%)	9 (8.7%)	9 (11.3%)	5 (6.2%)	10 (5.5%)	**39 (8.2%)**
Other medications	4 (13.7%)	6 (5.7%)	5 (6.1%)	2 (2.4%)	2 (1.0%)	**19 (4.0%)**
N95 masks during	12 (46.1%)	41 (39.4%)	24 (31.6)	30 (37.6%)	75 (42.3%)	**182 (39.3%)**
Other masks	11 (42.3%)	44 (42.4%)	22 (28.9%)	34 (42.4%)	71 (40.1%)	**182 (21.8%)**
Gowns	9 (34.6%)	24 (32.7%)	21 (27.6%)	25 (31.2%)	76 (43.0%)	**165 (35.6%)**
Scrubs	7 (26.9%)	19 (18.3%)	19 (25.0%)	15 (18.8%)	31 (17.5%)	**91 (19.6%)**
Gloves	11 (42.3%)	29 (27.9%)	16 (21.1%)	19 (23.8%)	55 (31.1%)	**130 (28.1%)**

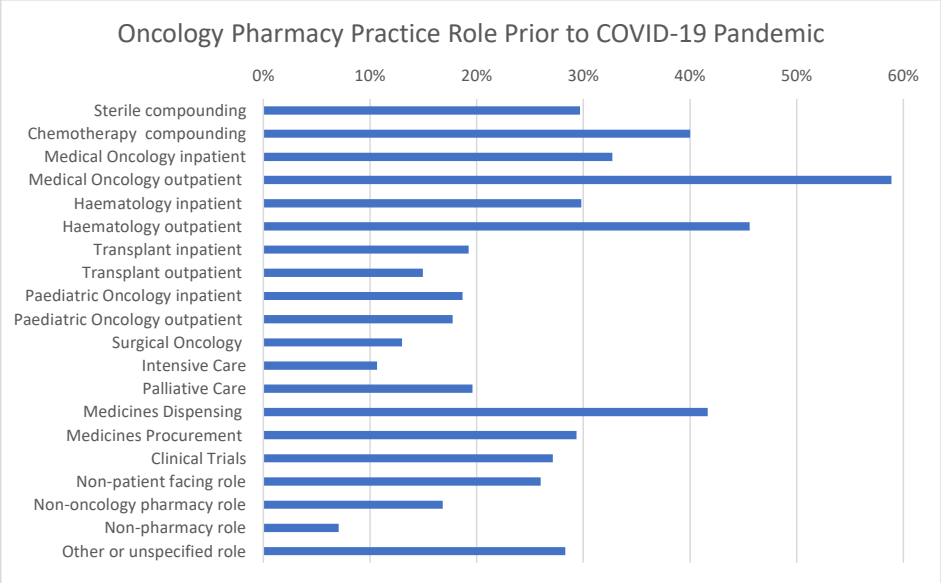
*procurement time was increased for some medications although access remained the same, this is not indicated in this table

462 **Table 5.** Content most accessed during the pandemic

Content accessed most often	Number of respondents (N=381)
COVID-19 case and mortality statistics	131 (34.4%)
COVID-19 treatment	76 (19.9%)
Treatment of cancer during COVID-19	60 (15.7%)
Medication access during COVID-19	27 (7.1%)
Changes to healthcare regulations in response to COVID-19 (policy and regulation updates)	40 (10.5%)
Changes in practice implementation in response to COVID-19	20 (5.2%)
Practitioner safety/wellbeing during COVID-19 (self-care/safety resources)	16 (4.2%)
Other content	1 (0.3%)

463 Note: N(%) refers to number of respondents that selected this type of content as *most* accessed ie ranked first
464
465
466
467

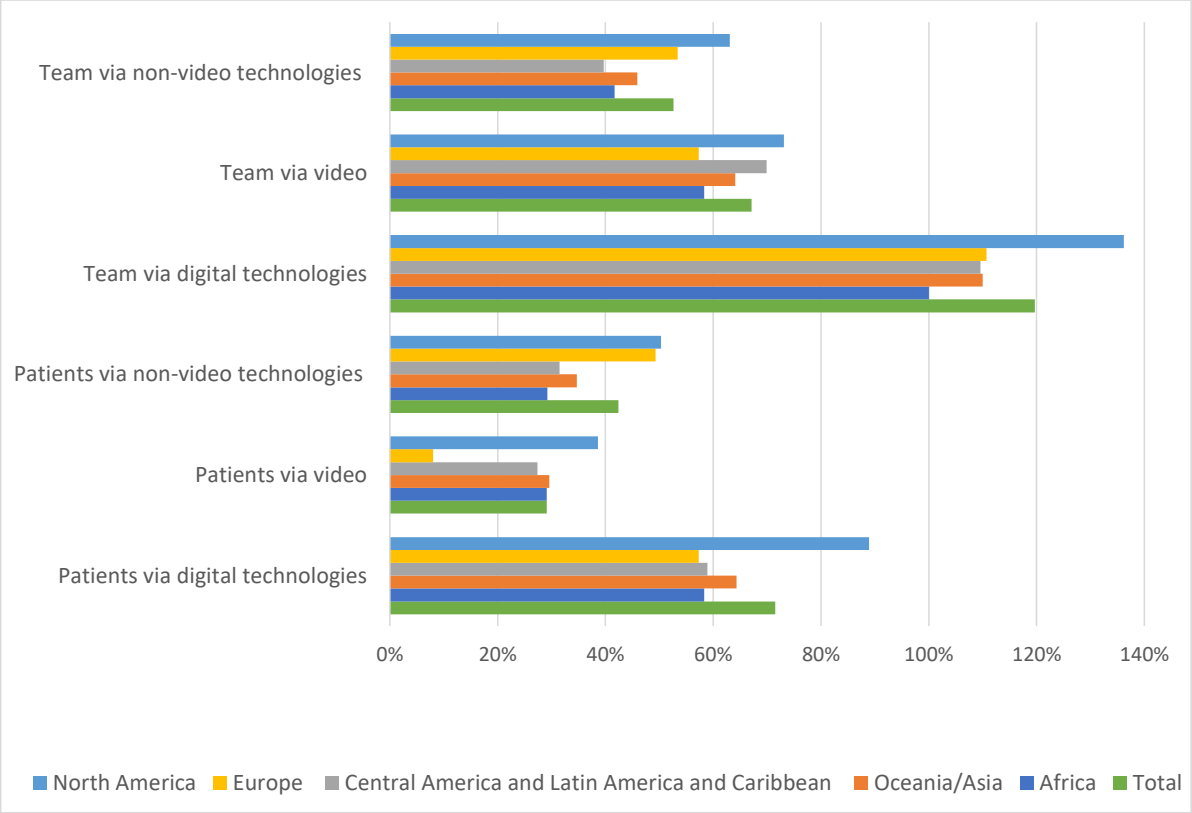
Figure 1. Roles of oncology pharmacy practitioners prior to the COVID-19 pandemic



Note: Respondents practicing in multiple roles were advised to select all that apply

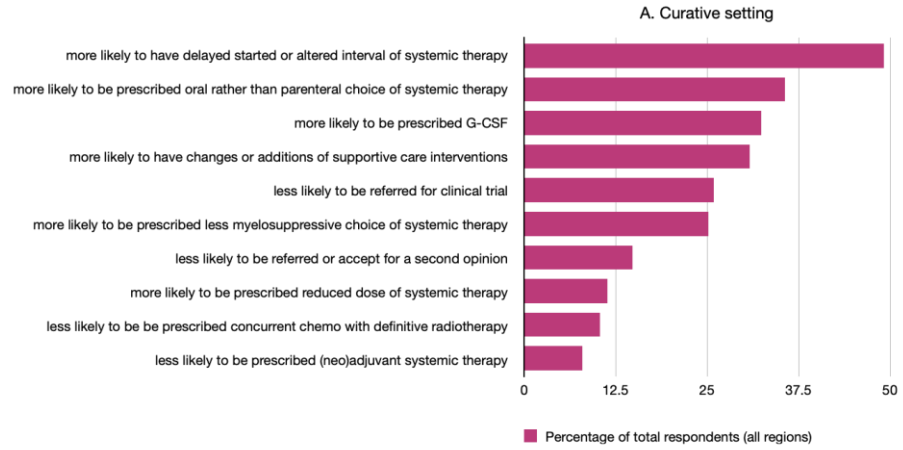
493

Figure 2. Methods utilised for communication with teams and with patients



'Teams/patients via digital technologies' reflects addition of respondents who reported using video technologies and non-video technologies for communication, thus percentage may exceed 100%.

Figure 3 Changes to patient management in the curative setting (A) and the palliative setting (B) reported by pharmacy practitioners



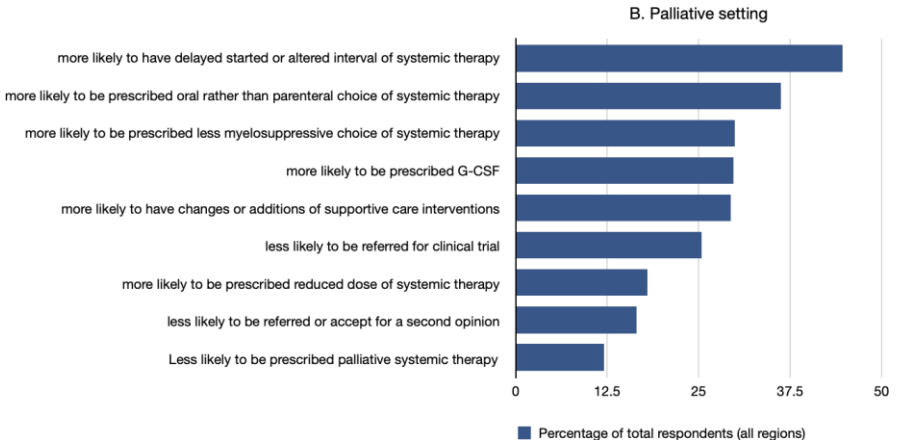


Figure 4. A) impact on oncology pharmacy practitioners; **B)** utilisation of mental health services by oncology pharmacy practitioners; **C)** Availability of mental health services for use by oncology pharmacy practitioners

Figure 4A – Impact on Mental Health

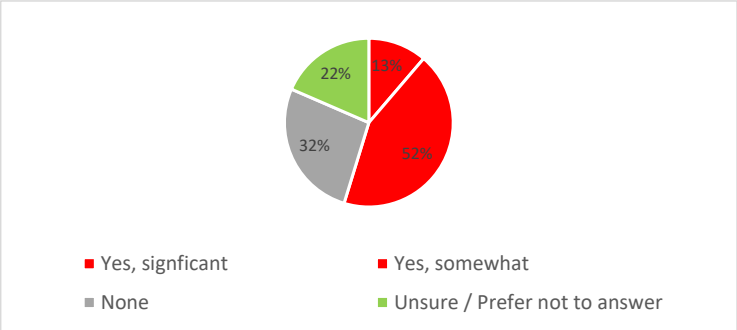


Figure 5B – Utilization of Mental Health Services

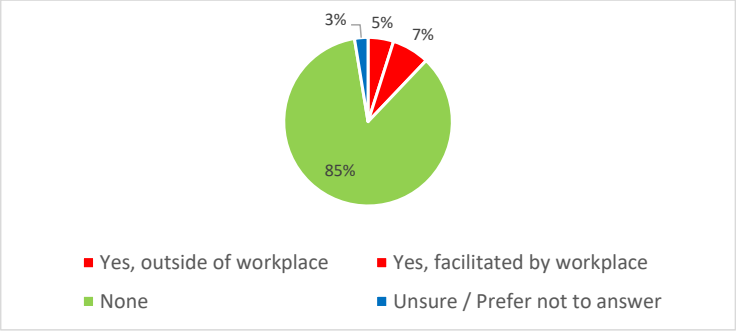
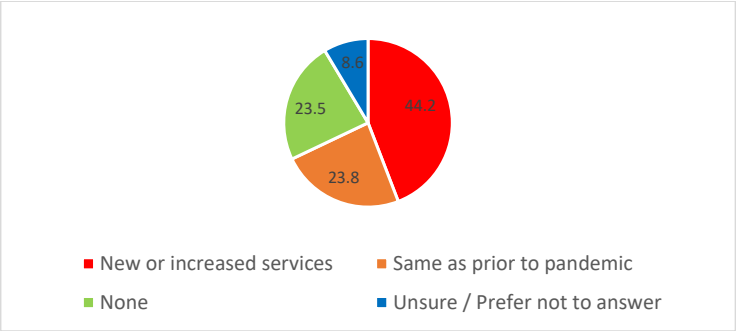


Figure 5C – Availability of Metal Health Services



Appendix 1. Collaborating international oncology pharmacy organisations (alphabetical):

AMeFOH – Asociación Mexicana de Farmacéuticos en Oncología y Hematología

APOPA – Asia Pacific Oncology Pharmacy Association, Thailand

BOPP – Belgian Oncology Pharmacy Practitioners

BOPA – British Oncology Pharmacy Association

Bugando medical Centre Mwanza, Tanzania

CAPhO – Canadian Association of Pharmacy in Oncology

COSA CPG – Clinical Oncology Society of Australia Cancer Pharmacists Group

Chilean Chapter of Oncology Pharmacists

Fudan University Shanghai Cancer Center, China

GEDEFO–SEFH – Grupo de Farmacia Oncológica de la Sociedad Española de Farmacia

Hospitalaria SOBRAFO – Sociedade Brasileira de Farmaceuticos em Oncologia

HOPA – Hematology/Oncology Pharmacy Association, US

HOPAK – Hospital Pharmacists Association of Kenya

ISOPP – International Society of Oncology Pharmacy Practitioners

Istituti Fisioterapici Ospitalieri Rome, Italy

JASPO – Japanese Society of Pharmaceutical Oncology

Macau Government Hospital

National Institute of Oncology, Hungary

National University Singapore

OPAG – Oncology Pharmacy Association of Ghana

SaSOPH – South African Society of Oncology Pharmacists

SOPA – Saudi Oncology Pharmacy Assembly

St. Mary's Hospital, The Catholic University of Korea South Korea

Commented [AM2]: Please review and track any corrections

Tikur Anbessa Specilazed Hospital, Ethiopia

TÜKED – Tüm Kamu Eczacıları Derneği

Ubon Ratchathani University, Ubon Ratchathani, Thailand

University of Malaya Medical Centre, Malaysia