












COVID Pandemic Impact on Healthcare Provision and Patient Psychosocial Distress: A Multi-National Cross-Sectional Survey among Asia-Pacific Countries

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Purpose: COVID pandemic significantly affected the delivery and maintenance of healthcare system, resulting in greater utilization of digital health interventions.

Materials and Methods: This multi-national cross-sectional survey was administered to clinicians working in major Asia-Pacific cities during the mandatory social lockdown period in June 2020. Clinical demographics and professional data, delivery of Andrology-related healthcare services, and patient distress based on validated questionnaires such as Depression and Anxiety Stress Scales (DASS) and Decisional Engagement Scale (DES) were collected.

Results: Telehealth medicine was instituted in all the centres with the majority of centres (92.9%) reported a 50% or more reduction in out-patient related services. The numbers of phone calls, emails correspondence and educational webinars have significantly increased. Despite the provision of reasons for changes in healthcare service and delay in surgery, more than half of the patients (57.1%) rated 2 on the DASS score for the item on patients over-react to situations, while a third of the patients (35.7%) scored a 2 for DASS item on patients being more demanding or unreasonable. The DES scores were more positive with most patients reported a score above 7 out of 10 in terms of items on accepting current arrangement (85.7%), confident in clinician decision-making about treatment (92.9%) and comfortable that the decision is consistent with their preferences (71.4%). Most patients (85.7%) indicated their preferences for more detailed information on healthcare provision.

Conclusions: Our study showed telehealth services were integrated early and successfully during the COVID pandemic and patients were generally receptive with minimal psychosocial distress.

Keywords: Andrology; COVID-19; Digital technology; Psychological distress; Telemedicine

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Received: Mar 9, 2021 **Revised:** Apr 28, 2021 **Accepted:** Apr 29, 2021 **Published online** May 21, 2021

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INTRODUCTION

The coronavirus (COVID) global pandemic has significantly affected the delivery and maintenance of healthcare system with many clinicians tasked to make difficult decisions to balance between providing optimal and high-quality urological care to their patients, and utilising the increasingly burdened healthcare resources. In hospitals which are tasked to manage COVID patients, various surgical departments have been instructed to minimise (or suspend) all non-urgent elective surgeries to cope with the number of COVID admissions and near-deaths that are consuming precious resources such as ventilators, intensive care unit beds and theatre sessions. Many urological societies have released various position statements and clinical guidelines advocating for a tier healthcare system that prioritise surgeries based on the degree of urgency so that critical patients continue to receive appropriate clinical care [1-6].

To date, most countries are facing second (or third) waves of COVID infection and worldwide, it is estimated that more than 110 million people have been infected with 2.5 million reported deaths [7]. While several COVID vaccines have been approved, delivered and administered across many countries and continents, this COVID pandemic will likely remain a threat for the considerable future. Healthcare system remains under duress and constraint with rapidly depleted resources have increased mental and physical stress to healthcare personnel and patients. In the climate of social restrictive measures and a need for an accurate update on healthcare information, the digital healthcare system has become the new norm [1,2,5]. Telemedicine and digital health interventions, which allow many clinical activities to be carried out effectively and safely, have been instituted promptly to address some of the limitations in the current healthcare system.

Considering the above-mentioned, we conducted a multi-national survey to study the impact of COVID pandemic on andro-urological services across countries in Asia-Pacific. The objectives of this study are to evaluate the impact of COVID pandemic on the provision of clinical care and digital healthcare interventions in each centre, as well as patient distress and acceptance of the telehealth services.

MATERIALS AND METHODS

1. Data collection

This cross-sectional survey was administered and distributed through emails to clinicians working in major Asia-Pacific cities during the mandatory social lockdown period in June 2020. The participants are recognised as Andrology leaders in their respective cities and countries. The countries (and cities) surveyed are Australia (Brisbane and Sydney), China (Beijing), Indonesia (Surabaya), Japan (Tokyo and Sapporo), Singapore, South Korea (Busan and Gwangju), Taiwan (Taipei and Kaohsiung), Thailand (Bangkok) and Vietnam (Hanoi and Ho Chi Minh).

2. Main outcome measures and survey instruments

A structured survey was designed by one of the authors (EC) based on a comprehensive review of pertinent literature and psychological-related measures. The questions asked in this survey was reviewed and revised accordingly by two senior authors (BPJ and KSP) to ensure that these questions were appropriate and clear.

This structured survey included the following sections: demographics and professional data, the impact of COVID pandemic on the delivery of Andrology/Urology-related healthcare services, the evolution of patient distress and the impact on healthcare access for patients during the mandatory social restriction and precautionary period. The ease of telehealth service was rated on a 5-point scale with 1 being very easy, to 5 as very difficult experience based on feedback from patients. Validated questionnaires such as Depression and Anxiety Stress Scales (DASS) [8,9] and Decisional Engagement Scale (DES) [10,11] were used to measure anxiety and depression symptoms in patients as a result of the changes in clinical service, and the extent of patient engagement in the healthcare decision-making process.

3. Statistical analysis

All comparisons were recorded, and a descriptive statistical analysis of the variables was conducted. All statistical analyses were conducted using STATA®10 (StataCorp, College Station, TX, USA).

4. Ethics statement

Ethics approval for this study was not required in compliance with the United States federal regulation for Institutional Review Board exemption 45 CFR 46.104 (section d3ii). Written informed consent was obtained from the patients.

RESULTS

1. Demographic data

Complete data were collected in 14 tertiary Andrology centres across 9 countries during June 2020. Information regarding the actual number of positive COVID cases was obtained from the World Health Organization (WHO) [12] and the Johns Hopkins Coronavirus Resource Centre website rolling updates on coronavirus disease (COVID-19) (Table 1) [13].

2. Impact on Andrology-related service provision in 14 major centres (Table 1)

Almost all of the participant centres (92.9%) reported a 50% or more reduction in out-patient services. The number of new referrals were down by more than 30% in 8 centres (57.1%) but was maintained in 3 (21.4%) of the tertiary units. Telehealth medicine was instituted in all the centres although physical attendance remained feasible with select numbers of new patients. The number of phone calls had risen by more than 100% in 3 (21.4%) centres, at least 50% in 4 (28.6%) centres and remained similar in 3 (21.4%) centres. Emails

correspondence regarding clinical service provision between colleagues and patients have increased by more than 50% were reported by more than a third of the clinicians (35.7%).

For clinical units that offer out-patient services such as low-intensity shockwave treatment, intracavernosal educational program and intralesional therapy for Peyronie's disease, these were either temporary postponed (63.6%) or reduced to minimal patient attendance (36.4%) to meet the local hospital guideline on social precautionary measures. All non-urgent elective theatre cases were postponed by at least 3 months in more than two-thirds of the hospitals (71.4%), and the number of urgent operating cases were reduced by at least 50% in all of the hospitals.

Educational webinars for patients and colleagues in the healthcare system were increased by more than 100% or at least 50% in 5 (35.7%) and 4 (28.6%) centres while the remainder centres reported no change or did not offer webinars in the first place. The majority of physical tutorials for residents were cancelled or reduced in most of the hospitals (71.4%).

3. Impact on patients due to changes in access to treatment service

Most of the patients (85.7%) found telehealth service to be relatively straightforward and reported a score of 1 (very easy) or 2 (easy). Despite the provision of reasons for changes in healthcare service and delay in surgery, more than half of the patients (57.1%) rated 2

Table 1. Selected variables on the Andrology-related service provision across Asia-Pacific countries during the COVID19 pandemic period in June 2020

Change in percentages of patient seen or treated per normal standard week workload pre-COVID	Australia	China	Indonesia	Japan	Singapore	South Korea	Taiwan	Thailand	Vietnam
Numbers of COVID cases by end of June 2020 ^a	7,767	85,232	56,385	18,723	44,310	12,850	499	3,173	355
Less physical attendance in outpatient clinics (%)	80	60	10	40	30	60	50	50	30
More phone calls and emails correspondence (%)	200	100	NC	100	50	NC	20	30	100
Less outpatient treatments (non-operative) (%)	100	30 to 10	90	240 to 180	20	75	70	NC	30
More internet (digital) education activities (%)	50	NC	50	NC	50	50	NC	NC	60

^aEstimated cases based on data obtained from World Health Organization, worldometers website and the Center for Systems Science and Engineering at John Hopkins University [7,12,13].

NC: no change.

(apply to a considerable or a good part of the time) on the DASS score for the item on patients over-react to situations, while a third of the patients (35.7%) scored a 2 (apply to a considerable or a good part of the time) for DASS item on patients being more demanding or unreasonable. Less than a third (28.5%) reported a negative outlook on the situation with a score of 3 (apply very much or most of the time) on the current healthcare system.

The reported DES scores were more positive with most patients scored above 7 out of 10 in terms of items on accepting current arrangement (85.7%), confident in clinician decision-making about treatment (92.9%) and comfortable that the decision is consistent with their preferences (71.4%). Most patients (85.7%) indicated their preferences for more detailed information on healthcare provision with a score of above 5 out of 10.

DISCUSSION

The COVID pandemic has significantly altered the way various healthcare systems manage personnel and patients worldwide. Various governmental policies and contingency plans have been implemented to ensure strict social measures to limit COVID contagion and redirect the healthcare system with prioritisation to more critical areas [2,5,14]. Many urological departments and urologists are forced to make difficult and at times, extraordinary decisions to balance between providing optimal and timely urological care to their patients, while meeting the strict guidelines on safety and social measures to patients and healthcare workers. In hospitals that cater for managing COVID patients, valued healthcare resources are diverted to cope to emergency frontline services with adjustment, suspension or cancellation of non-critical and elective services to cope with the devastating increment of COVID-19 cases. Both outpatient clinics and operating theatres are regularly adjusted, sometimes on a daily to weekly basis, based on the directions by the governmental agencies.

The integration of digital telemedicine in the healthcare system has been significantly accelerated in this COVID pandemic. Government policymakers and healthcare providers strongly advocate the incorporation of various digital interventions to maximise clinical interface and effectively streamline many clinical activities within a safe environment [15,16]. In our

study, the use and integration of telemedicine has resulted in more than 50% reduction in the out-patient services in most centres with conversion to telehealth consultations although physical attendance to clinic remained possible if patients fulfilled certain criteria. This was associated with more phone calls and emails correspondence with the patients. The decrease in the number of new referrals was likely a result of fewer patients seeing their primary care physician during the social restriction period or perhaps relating to the fear of contracting COVID with exposure to medical centres and hospitals, although we did not collect data on this aspect.

Telehealth practise has expanded beyond traditional activities to include out-patient consultations, medical education, videoconferencing to coordinate clinical care and remote monitoring on patient's well-being [17]. Furthermore, these telemedicine and educational webinars conducted through internet-based platforms have been shown to improve healthcare access with greater convenience and efficiency [18-20] with the additional advantages in terms of cost and time saving, as well as environmental pollution prevention [21]. Boehm et al [22] showed that most patients (63.2%) were judged suitable for telemedicine and preferred telemedicine consultations to a face-to-face consultation, with no difference in preference between those with oncological or benign conditions, or patients with COVID-19 risks factors. In our study, most of the patients (85.7%) found telehealth service to be relatively straightforward and reported a score of 1 (very easy) or 2 (easy). We reported a significant increase in the number of educational webinars for patients and colleagues to promote health awareness and clinical management during this pandemic.

Whilst various alternative strategies may have been put in place as temporary measures as directed by government policy and hospital administrations each patient's condition must be weighted appropriately and individualised. The volumes of publication on the changes in urological care and urology providers have highlighted considerable cut-down of urological services and patients with benign conditions faced longer delayed in clinical management than those with malignant conditions [5,14]. Nonetheless, urgent (or semi-urgent) cases remain eligible on a case-by-case basis and can continue to be performed by adhering to local institution guideline. In our cohort, many out-patient

services were reduced or postponed by adhering to new hospital policy and regulation during the COVID pandemic. As expected, all the non-urgent elective theatre cases were postponed while the number of urgent cases was reduced by at least 50% in all the hospitals.

Despite constant media awareness campaigns and efforts, many patients are faced with uncertainty and expressed some degree of psychosocial distress as a result of this pandemic [23-25]. In our study, we found that most of the patients were reasonably happy and accepted the current clinical arrangements under this COVID situation, although some patients expressed dissatisfaction (35.7%) and hold a pessimistic view on the current healthcare system (28.5%). Psychometric validated questionnaire measures such as DASS and DES were scored in a relatively positive manner although most patients (85.7%) indicated their preferences for more detailed information on healthcare provision with a score of above 5 out of 10. A shared decision making with open communication, based on clinical evidence that balances risks, expected outcomes and available resources with patient preferences and expectations, are necessary to minimise psychological distress. In this rapidly-evolving pandemic, prompt and up-to-date precautionary measures based on local data with the provision of pragmatic evidence-based clinical care should be implemented by various institutions while governmental policies will need to be modified and adapted to provide, support, and treat patients safely and efficiently.

We acknowledged several limitations in our study such as the relatively small sample size and that data was collected in a single cross-sectional timeline amid the pandemic. Furthermore, reporting and selection biases may arise since our cohort consists of key leaders in highly specialised centres may not be representative of the general population. Our sample size also precludes the ability to provide more granular data analysis beyond individual hospital centres. The impact on other subspecialty care as a result of government shutdown policies or hospital directives are not covered by our study too. Nonetheless, the relative homogeneity of responses across various centres in our study highlights several generalised observations regarding the management strategies adopted by various centres and are in keeping with current evidence-based best practice. In our study, all surveyed healthcare systems are proactive in COVID management in terms of re-

source allocation, service optimisation and patient well-being. However, the longer-term impact of telemedicine and some of the delays in surgical management will require future study.

The clinical and regulatory framework for the implementation of telehealth service is rapidly evolving and will likely be different across institutions, healthcare systems, cities and countries. While numerous studies including a recent systematic review [15] have shown that electronic-based health-related interventions can be effective and safe, other aspects of telemedicine, especially with regard to maintaining clinical professionalism, confidentiality, quality data transmission, and adequate comprehension by patients must be adhered and uphold [26]. Furthermore, many clinicians have to adapt to the rapidly changing landscape of digital information without affecting the quality of their work [14,27]. The role of telesurgery and telementoring are an emerging field that will require further studies and refinements too. Long-term data including health-economic cost-analysis assessments and patient-reported psychometric measures are needed to understand the economic implications and the impact of telehealth applications on patient well-being and quality of care.

CONCLUSIONS

The COVID pandemic has significantly changed the way healthcare systems manage personnel and patients worldwide. Telemedicine and digital healthcare interventions have been adopted to provide more efficient and safe healthcare services while adhering to strict social measures to limit viral contagion. Despite what technology might enable us to do in the now and in the future, it will be critical to develop standardised systems with real time tracking and appropriate backup protocols to facilitate efficient and safe delivery of high-quality evidence-based healthcare. Our study showed telehealth services have been integrated early and successfully during the COVID pandemic and patients are generally receptive to this arrangement with minimal psychosocial distress.

Conflict of Interest

The authors have nothing to disclose.

Author Contribution

Conception and Design: EC. Acquisition of Data: EC, BPJ, KN, LH, WH, JL, HCL, DMBT, QN, HJP, YS, KT, YY, KSP. Analysis and Interpretation of Data: EC, BPJ, KN, LH, WH, JL, HCL, DMBT, QN, HJP, YS, KT, YY, KSP. Drafting the Article: EC, KSP. Revising It for Intellectual Content: EC, BPJ, KN, LH, WH, JL, HCL, DMBT, QN, HJP, YS, KT, YY, KSP. Final Approval of the Completed Article: EC, BPJ, KN, LH, WH, JL, HCL, DMBT, QN, HJP, YS, KT, YY, KSP.

REFERENCES

1. Heldwein FL, Loeb S, Wroclawski ML, Sridhar AN, Carneiro A, Lima FS, et al. A systematic review on guidelines and recommendations for urology standard of care during the COVID-19 pandemic. *Eur Urol Focus* 2020;6:1070-85.
2. Chung E, Jiann BP, Nagao K, Hakim L, Huang W, Lee J, et al. Provision of sexual medicine services during the coronavirus disease-2019 pandemic: an Asia Pacific Society of Sexual Medicine position statement. *Sex Med* 2020;8:325-6.
3. Amparore D, Campi R, Checcucci E, Sessa F, Pecoraro A, Minervini A, et al. Forecasting the future of urology practice: a comprehensive review of the recommendations by International and European Associations on priority procedures during the COVID-19 pandemic. *Eur Urol Focus* 2020;6:1032-48.
4. Michel F, Gaillet S, Cornu JN, Robert G, Game X, Phé V, et al.; Comité de neuro-urologie-CUROPF-CTMH de l'AFU. [French Association of Urology. COVID-19: recommendations for functional urology]. *Prog Urol* 2020;30:414-25. French.
5. Ribal MJ, Cornford P, Briganti A, Knoll T, Gravas S, Babjuk M, et al.; EAU Section Offices and the EAU Guidelines Panels. European Association of Urology guidelines office rapid reaction group: an organisation-wide collaborative effort to adapt the European Association of Urology guidelines recommendations to the coronavirus disease 2019 era. *Eur Urol* 2020;78:21-8.
6. Nicola M, O'Neill N, Sohrabi C, Khan M, Agha M, Agha R. Evidence based management guideline for the COVID-19 pandemic - review article. *Int J Surg* 2020;77:206-16.
7. Worldometer. COVID-19 coronavirus pandemic [Internet]. Shanghai: Dadax; c2021 [cited 2021 Jan 20]. Available from: <https://www.worldometers.info/coronavirus/>.
8. Brown TA, Chorpita BF, Korotitsch W, Barlow DH. Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behav Res Ther* 1997;35:79-89.
9. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behav Res Ther* 1995;33:335-43.
10. Hoerger M, Chapman BP, Mohile SG, Duberstein PR. Development and psychometric evaluation of the Decisional Engagement Scale (DES-10): a patient-reported psychosocial survey for quality cancer care. *Psychol Assess* 2016;28:1087-100.
11. Osborn R, Moulds D, Squires D, Doty MM, Anderson C. International survey of older adults finds shortcomings in access, coordination, and patient-centered care. *Health Aff (Millwood)* 2014;33:2247-55.
12. World Health Organization (WHO). Rolling updates on coronavirus disease (COVID-19) [Internet]. Geneva: WHO; c2020 [cited 2020 Jul 1]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>.
13. Johns Hopkins Coronavirus Resource Center. COVID-19 data in motion [Internet]. Baltimore: Johns Hopkins University; c2020 [cited 2020 Jul 1]. Available from: <https://coronavirus.jhu.edu/>.
14. Teoh JY, Ong WLK, Gonzalez-Padilla D, Castellani D, Dubin JM, Esperto F, et al.; UroSoMe Working Group. A global survey on the impact of COVID-19 on urological services. *Eur Urol* 2020;78:265-75.
15. Novara G, Checcucci E, Crestani A, Abrate A, Esperto F, Pavan N, et al.; Research Urology Network (RUN). Telehealth in urology: a systematic review of the literature. How much can telemedicine be useful during and after the COVID-19 pandemic? *Eur Urol* 2020;78:786-811.
16. Sosnowski R, Kamecki H, Joniau S, Walz J, Klaassen Z, Palou J. Introduction of telemedicine during the COVID-19 pandemic: a challenge for now, an opportunity for the future. *Eur Urol* 2020;78:820-1.
17. Gómez Rivas J, Rodríguez-Serrano A, Loeb S, Yuen-Chun Teoh J, Ribal MJ, Bloemberg J, et al. Telemedicine and smart working: Spanish adaptation of the European Association of Urology recommendations. *Actas Urol Esp* 2020;44:644-52.
18. Dorsey ER, Topol EJ. State of telehealth. *N Engl J Med* 2016;375:154-61.
19. Rodrigues Netto N Jr, Mitre AI, Lima SV, Fugita OE, Lima ML, Stoianovici D, et al. Telementoring between Brazil and the United States: initial experience. *J Endourol* 2003;17:217-20.
20. van Lankveld JJ, Leusink P, van Diest S, Gijs L, Slob AK. Internet-based brief sex therapy for heterosexual men with sexual dysfunctions: a randomized controlled pilot trial. *J Sex*

- Med 2009;6:2224-36.
21. Chu S, Boxer R, Madison P, Kleinman L, Skolarus T, Altman L, et al. Veterans affairs telemedicine: bringing urologic care to remote clinics. *Urology* 2015;86:255-60.
 22. Boehm K, Ziewers S, Brandt MP, Sparwasser P, Haack M, Willems F, et al. Telemedicine online visits in urology during the COVID-19 pandemic-potential, risk factors, and patients' perspective. *Eur Urol* 2020;78:16-20.
 23. Rahman M, Ahmed R, Moitra M, Damschroder L, Brownson R, Chorpita B, et al. Mental distress and human rights violations during COVID-19: a rapid review of the evidence informing rights, mental health needs, and public policy around vulnerable populations. *Front Psychiatry* 2021;11:603875.
 24. Dean DJ, Tso IF, Giersch A, Lee HS, Baxter T, Griffith T, et al. Cross-cultural comparisons of psychosocial distress in the USA, South Korea, France, and Hong Kong during the initial phase of COVID-19. *Psychiatry Res* 2021;295:113593.
 25. Ravindran S, P LN, Channaveerachari NK, Seshadri SP, Kasi S, Manikappa SK, et al. Crossing barriers: role of a tele-outreach program addressing psychosocial needs in the midst of COVID-19 pandemic. *Asian J Psychiatr* 2020;53:102351.
 26. Rodriguez Socarrás M, Loeb S, Teoh JY, Ribal MJ, Bloemberg J, Catto J, et al. Telemedicine and smart working: recommendations of the European Association of Urology. *Eur Urol* 2020;78:812-9.
 27. Abdessater M, Rouprêt M, Misrai V, Pinar U, Matillon X, Gondran-Tellier B, et al. COVID-19 outbreak situation and its psychological impact among surgeons in training in France. *World J Urol* 2021;39:971-2.