



A survey and panel discussion of the effects of the COVID-19 pandemic on paediatric urological productivity, guideline adherence and provider stress

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Summary

Introduction

The COVID-19 pandemic has led to an unprecedented need to re-organise and re-align priorities for all surgical specialties. Despite the current declining numbers globally, the direct effects of the pandemic on institutional practices and on personal stress and coping mechanisms remains unknown. The aims of this study were to assess the effect of the pandemic on daily scheduling and work balances, its effects on stress, and to determine compliance with guidelines and to assess whether quarantining has led to other areas of increased productivity.

Methods

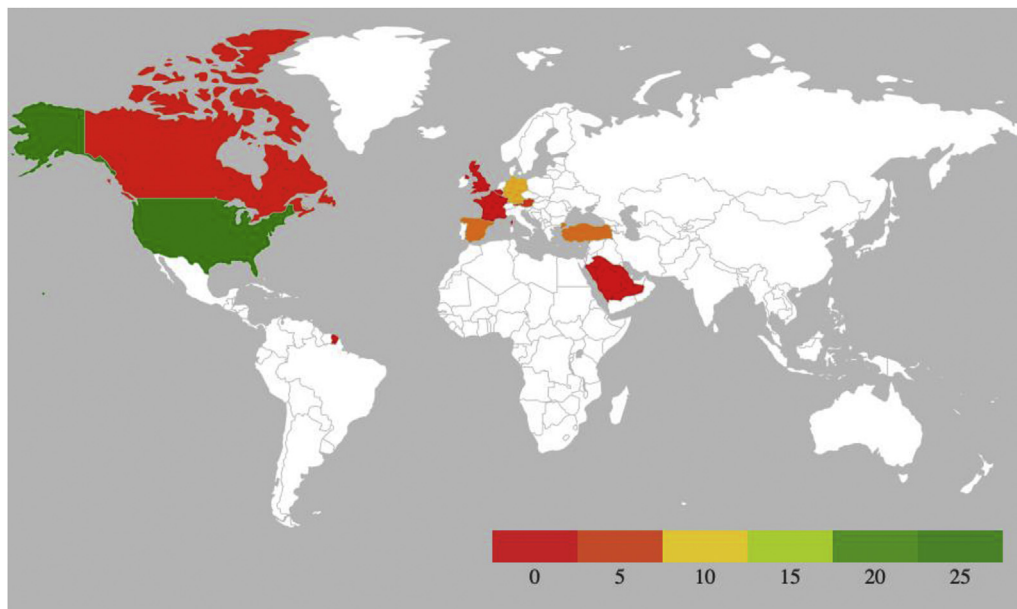
A trans-Atlantic convenience sample of paediatric urologists was created in which panellists (Zoom) discussed the direct effects of the COVID-19 pandemic on individual units, as well as creating a questionnaire using a mini-Delphi method to provide current semi-quantitative data regarding practice, and adherence levels to recently published risk stratification guidelines. They also filled out a Perceived Stress Scale (PSS) questionnaire to assess contemporary pandemic stress levels.

Results

There was an 86% response rate from paediatric urologists. The majority of respondents reported near complete disruption to planned operations (70%), and trainee education (70%). They were also worried about the effects of altered home-lives on productivity ($\leq 90\%$), as well as a lack of personal protective equipment (57%). The baseline stress rate was measured at a very high level (PSS) during the pandemic. Adherence to recent operative guidelines for urgent cases was 100%.

Conclusion

This study represents a panel discussion of a number of practical implications for paediatric urologists, and is one of the few papers to assess more pragmatic effects and combines opinions from both sides of the Atlantic. The impact of the pandemic has been very significant for paediatric urologists and includes a decrease in the number of patients seen and operated on, decreased salary, increased self-reported stress levels, substantially increased telemedicine usage, increased free time for various activities, and good compliance with guidelines and hospital management decisions.



Summary Figure Geographic heatmap demonstrating Transatlantic international discussion of the effects of the COVID-19 pandemic on paediatric urological practice.

Introduction

The SARS-CoV-2 (COVID-19) pandemic which spread rapidly around the world led to unprecedented changes in the way we, as paediatric urologists, were expected to manage children and deliver healthcare. There has been a misconception that children were immune to this virus, however, it would appear that symptoms are mild to moderate in nature and encompass a spectrum including fever, cough, otorrhea, GI upset, and skin manifestation, with children under the age of 1 year old appearing to be the most susceptible [1–3]. One of the things that has made a concerted effort against the COVID-19 virus difficult is the widespread variation in responses from different countries and governments in containing the spread, and declaring states of emergency [4]. The overlap of COVID-19 clinical syndrome with different conditions such as urosepsis is worrisome, and can include lymphopenia (70%), prolonged prothrombin time (58%), and elevated lactate dehydrogenase (40%), as well as an elevated calcitonin. Furthermore, emergence of a Kawasaki-like syndrome recently described in children by Viner et al. in the *Lancet* termed paediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2 (PIMS-TS), suggested the possibility of a dangerous systemic antibody/immune-related post-infectious entity in children. Therefore, recognition leading to public health interventions to slow spread have been critical [5–7].

There is little data available at present regarding the effects of COVID-19 on surgical trainees. Residents and fellows have reported a significant reduction in index cases, and in some cases have been redeployed to areas of need, sometimes outside their subspecialty. Furthermore, accreditation site visits have been cancelled [8,9]. A study

by Abdessater et al. examining the impact of COVID-19 on French trainee urologists noted a negative impact on anxiety, work, and training quality [10]. International conferences and educational courses have been universally cancelled, with little current understanding as to how these may be replaced. Porpiglia et al. have suggested that we it may be necessary to conduct smaller meetings which rely more on technology and social media to allow for more flexible and dynamic use of content [11]. The COVID-19 pandemic has led to the increased utilization of telemedicine to facilitate quarantining and social distancing, however, there are some instances in which telemedicine is not appropriate. Luciani et al. found that 45% visits could be cancelled without rescheduling, with a further 10% for more pressing conditions (suspected malignancy) could be rescheduled within a month [12]. Finkelstein et al. reported that paediatric urologists could counsel children and families in adherence with social distancing policy using what they dubbed a “website” manner [13].

From a paediatric urological perspective, there has been little guidance on how to re-stratify and prioritize cases during this pandemic. Spinoit et al. outlined how disparate and varied paediatric urology is compared with adult counterparts. Prioritization is difficult outside emergent cases such as testicular torsion, and obstructed stones. The notion of reconstruction to prevent morbidity and renal loss secondary to underlying genitourinary congenital malformations is difficult to quantify in the long run given the longitudinal nature of the relationship with this cohort [14]. The EAU guidelines panel for paediatric urology have provided some guidance with a caveat that future renal function or fertility must always be considered. They recommended regular ongoing contact with children and their carers, and provided some recommendations for how

to postpone cases based on a combination of published studies and expert opinion using a Stage 1–4 model [15].

There is little evidence available in the literature for how quarantine and social isolation in the midst of this pandemic would affect daily scheduling and working conditions for paediatric urologists. Therefore, this Trans-Atlantic collaborative group working across 31 different sites sought to address some of these effects through a convenience sample of paediatric urologists. The primary outcome of this study was to assess the effect of the pandemic on daily scheduling and work balances, and to determine compliance with guidelines. The secondary outcome was to assess whether quarantining has led to other areas of increased productivity, or affected baseline stress levels as measured through a perceived stress scale for each respondent.

Methods

A cross-sectional, web-based survey to assess the impact of COVID-19 was conducted following structured Zoom interviews and by using a mini-Delphi method of author group feedback and revisions. The survey was distributed to a convenience sample of paediatric urologists on 24th April 2020. Due to the rapid nature of this pandemic, a convenience sample allowed for the most efficient means of communications during this time period. All of the participants were active on social media, which enabled the authors to quickly share and communicate on a real-time basis. The survey was also sent to members of the Young Academic Urologists group in Europe (YAU). No survey reminders were sent. The survey was sent to physicians, but not to urology nurse specialists/advanced nurse practitioners. Participant implied consent after agreeing to proceed with the survey, which required an answer to all questions. Internet protocol (IP) restrictions were implemented ensuring that only one response could come from a single IP address. The effects on daily practice were measured in 3 ways. Clinicodemographic and practice details were acquired and presented in a descriptive manner, but were kept anonymous (Google Forms). The respondent panel were also asked to fill out a Perceived Stress Scale questionnaire to assess ongoing self-reported stress levels within the month of lockdown from the pandemic (PSS-10 score) [16].

Adherence to published suggested guidelines was self-measured and analysed. All participants undertook Zoom® (Web-based video conferencing) calls were placed to gauge responses, discuss hypothetical scenarios and to debate the impacts of the pandemic on surgical waiting lists, and the effects on training. There were no identifiable patient scenarios used at any stage. Chi-squared testing was used to assess for significant differences between categorical variables, otherwise descriptive statistics were used. A *p*-value of 0.05 was taken as significant. Statistical testing was carried out using GraphPad Prism® (v8.4.2; California, USA). We used a cut-off of 8 weeks as a significant delay for non-emergent procedures as a result of COVID-19, as suggested by the American College of Surgeons (<https://www.facs.org/about-ac/s/covid-19/information-for-surgeons/triage>).

Results

There was an 87% (58/67) response rate to the questionnaire and perceived stress scale survey. Respondents were included from 31 academic institution across 10 countries (45% North America; 41% Europe; 14% Western Asia). The median age range for respondents was 40–49 years old, with 97% respondents within a range of 30–49 years old. The gender split was 39.7% (*n* = 23) female to 61.3% (*n* = 35) male. The majority of respondents were working as paediatric urologists for 5–10 years (50%), and had attained a position of assistant professor within their academic institution (60%). All respondents reported an increase in the use of telemedicine for clinics with over half of respondents reporting at least a 200% increase (Table 1).

Respondents also reported significant effects to service provision as a result of the pandemic based on a scale of 0% (no effect at all) to 100% (complete disruption). Of these respondents, 70% (41/58) paediatric urologists reported an 80–100% disruption to education and training of fellows and residents. The effect on income and salaries was more evenly distributed with more than 25% respondents reporting little effect on income. The effects on emergency urology cover and elective scheduling appeared to be mirror effects of each other with nearly half of respondents claiming little effect on emergency cases, and 70% claiming complete disruption of their elective and planned cases (Fig. 1). The panel was also asked to gauge various effects of the pandemic on their productivity. 63% paediatric urologists regularly suffered from vivid dreams and nightmares during the past month, with 90% concerned that worry and home-schooling were having an impact on

Table 1 Clinicodemographic profile of COVID-19 paediatric urologist respondents (*n* = 58), and changes in the use of institutional telemedicine during social isolation periods (Feb–April 2020 inclusive).

Characteristic	Value n (%)
Years in Practice	
<5years	18 (31)
5–10years	29 (50)
10–15years	8 (14)
>15years	3 (5)
Institutional Role	
Full Professor	3 (5)
Associate Professor	16 (28)
Assistant Professor	35 (60)
Fellow	4 (7)
Divisional Chief	5 (9)
Fellow/Resident Coordinator	6 (10)
Use of Telemedicine for clinics	
No Effect	0 (0)
<50% increase	4 (7)
50–100% increase	10 (17)
100–200% increase	14 (24)
200–300% increase	21 (36)
>300% increase	9 (16)

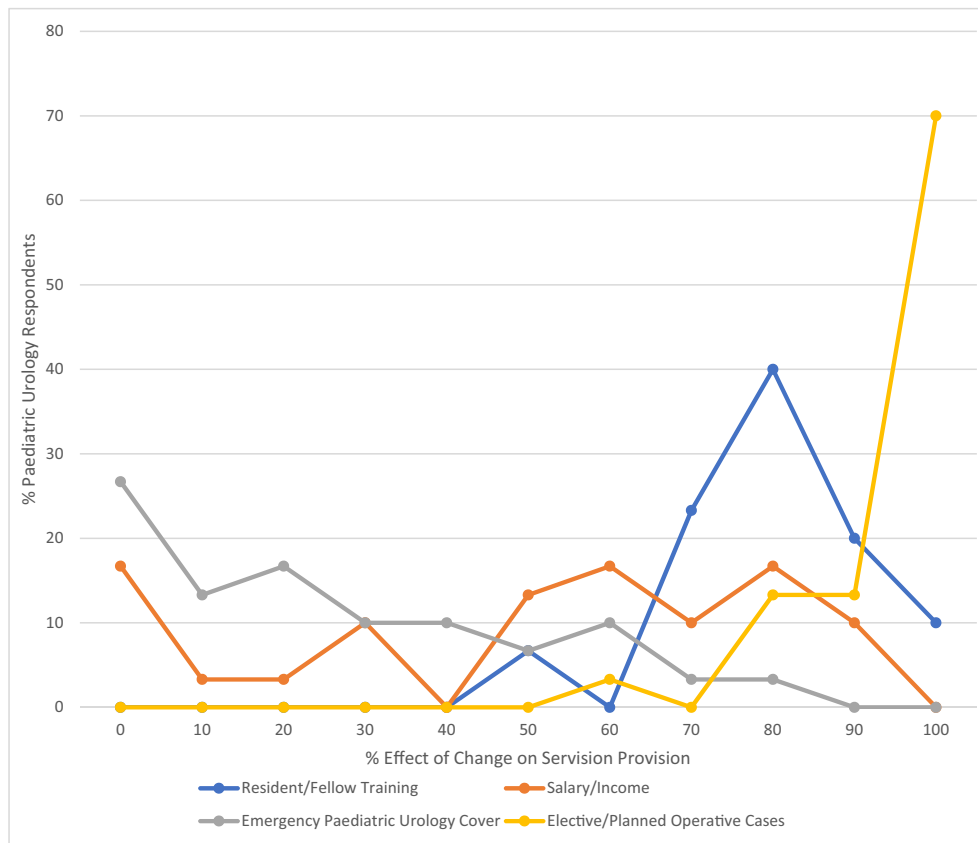


Figure 1 Effect of COVID-19 pandemic on service Provision in Academic Paediatric Urologic Institutions (Horizontal axis represents % effect of change; 0 = No effect, 100 = Complete devastation).

productivity, as was a lack of occupational personal protective equipment (Fig. 2).

Respondents who filled out a Perceived Stress Scale (PSS) demonstrated a high level of stress over the last month (Mean score 23.3; Range 10–37). The most negative scoring response in the scale was for “In the last month, how often have you felt nervous and stressed?” (Mean score 2.9; Range 0–4), whereas the response with the most positive response was for “In the last month, how often have you felt confident about your ability to handle your personal problems?” (Mean score 1.4; Range 0–4) (Fig. 3). 63.7% paediatric urologists scored above 20 in the PSS indicative of high stress levels. As a means to combat self-isolation, quarantine and stress levels associated with the current pandemic, the panel was asked to indicate any new or resumed hobbies that they had taken up recently. The results were based on freehand entries and could include anything the panel wished. 26% had recently taken up reading, with another 16% enjoying cooking/baking at home. A further quarter of respondents preferred to remain active with DIY/gardening/workouts/meditation (21%) (see Fig. 4).

Adherence to the EAU guidelines panel for paediatric urology operative cases was universal (100% panelled respondents), with no deviations from those suggested staged operations, and screening performed where possible prior to cases. Respondents continued to perform Stage 3 and Stage 4 procedures (in which delay will cause irreversible

progression of disease, organ damage, or organ/life-threatening disease). These included obstructive uropathies, febrile stones, unstable traumas, pyeloplasties with loss of function, testicular torsion, and placement of peritoneal dialysis catheters. All respondents in this study reported (where applicable) that their paediatric renal transplant programs had been placed on hiatus. Urological oncology patients were all swabbed for COVID, and planned for surgery in careful consultation with medical oncology, and/or nephrology. Adherence to guidelines for outpatient visits was at a much lower level (43.3%) with a much greater variation in cases seen.

There were no statistically significant differences in responses from North America vs. Europe in terms of PSS scale ($p = 0.42$), adherence to suggested operative guidelines ($p = 1.0$), effects on training ($p = 0.67$), or effects on scheduling planned/elective cases ($p = 0.9$). The only difference between these two groups was the financial effect on salaries/income, with North America being more affected by pandemic restrictions ($p = 0.04$).

Discussion

This pandemic has, at least in living memory, had an unprecedented effect on working conditions and operative load. From a European perspective, Italy was quickly overwhelmed with the number of infected patients, and quickly began to devise a system to triage and risk stratify

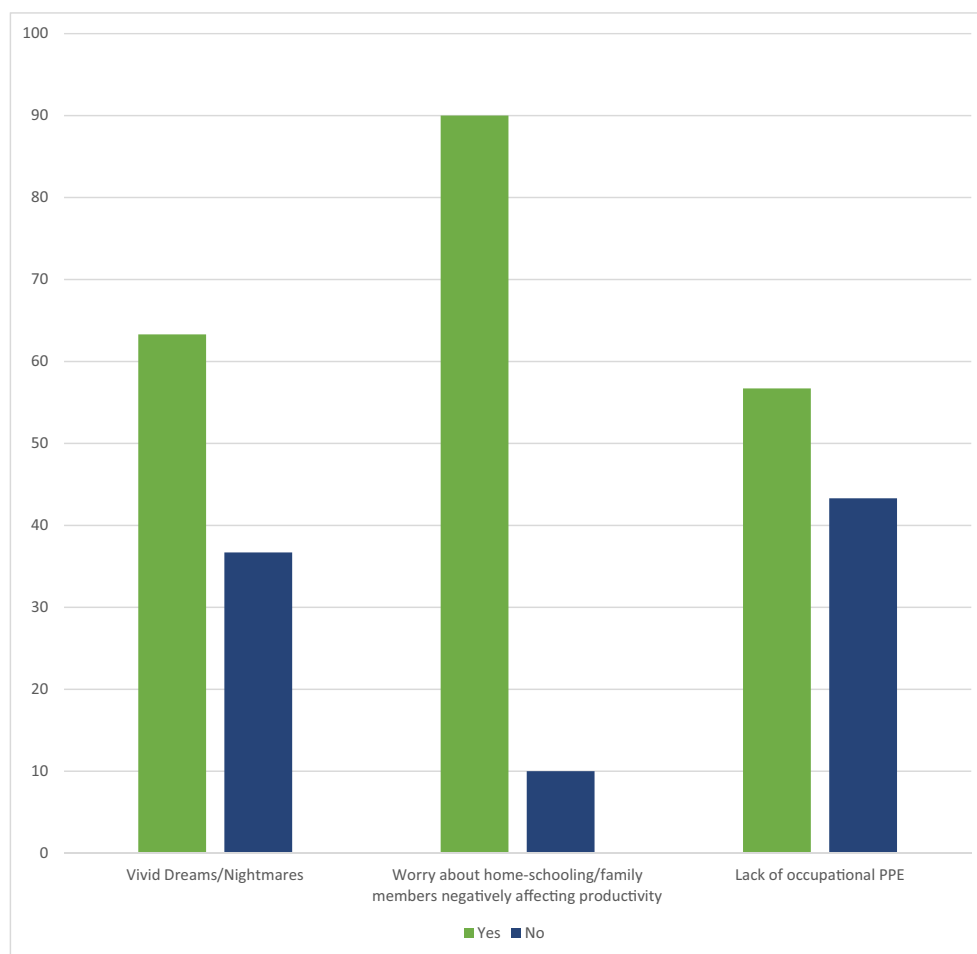


Figure 2 Effect of COVID-19 pandemic on aspects of paediatric urologist productivity (PPE: personal protective equipment).

patients according to imminent necessity, with a strategy proposed to focus on oncological and life-threatening illnesses such as those put forward by Ficarra et al. [17]. As such, in adult urological patients, pathways were created and proposed by the same group to simplify entry into the system by reducing non-essential hospital visits, increase nasopharyngeal swab testing, putting in steps to reduce readmission rates, and increase telemedicine consults where possible. This was also quickly adopted and echoed by Leva et al. in Northern Italy [18,19].

Many of these implemented actions had a natural knock-on effect for residency and fellowship training. Only cases deemed necessary were being carried out, which would reduce the number of index cases for logbooks, and furthermore, with speed being a priority, consultants and attendings were the ones to carry out the procedures as quickly and efficiently as possible. As such, Porpiglia et al. sought to propose alternatives to traditional teaching methods. These included pre-recorded videos, webinars, podcasts, simulations and social media [9]. These findings are similar to what we found and quantified in our panel discussion with significant knock-on effects to training in both north America and Europe. The pandemic has also naturally had a massive effect on medical and surgical conferences which have been cancelled due to the risk of

COVID-19 transmission through large crowds. This in addition to the changes in teaching methods above have led to the call for the use of technology and social media to change how information is delivered. This has the added benefit of reducing travelling expenses and carbon footprints, with content being individualised to the needs of each virtual attendee [11]. One of the most significant and positively viewed changes to daily urological practice, has been the increased utilization of telemedicine [12,19]. Every member of the panel proclaimed an increase in the use of telemedicine with the majority of respondents finding increases of 3–4x over baseline.

The adherence of this panel to the operative guidelines (100%) set out by the EAU paediatric urology working group is not surprising, and would represent what many would consider to be logical triaging of complexity and necessity, notwithstanding later issues associated with time-sensitive surgery. Those operations without which, one might reasonably expect subsequent loss of function, organ, or life, were all carried out in a carefully timed manner. COVID testing was performed if possible on all patients, with an assumption that a lack of symptoms and a negative swab provided satisfactory evidence to proceed as planned, with a caveat for laparoscopic procedures, all of which necessitated consultation with anaesthesiology. The

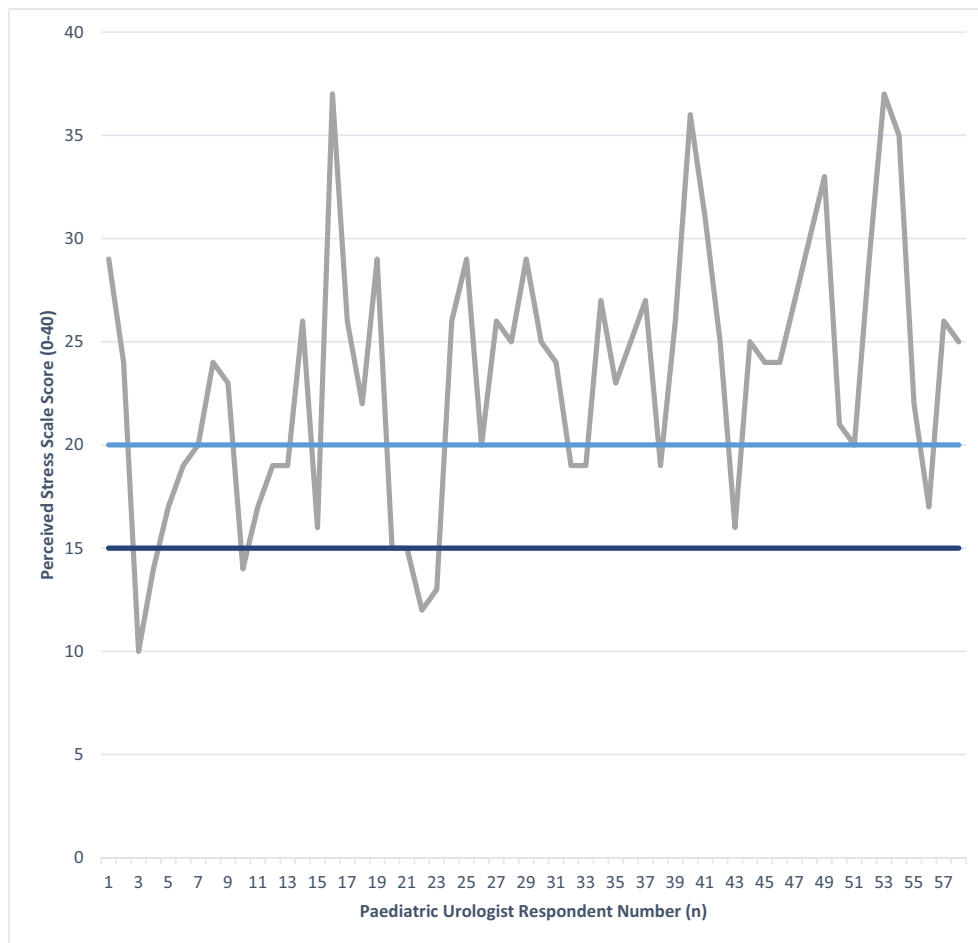


Figure 3 Levels of stress amongst paediatric urologists during the COVID-19 pandemic as measured by the Perceived Stress Scale (PSS). The grey horizontal line (PSS = 13) represents an average level for a measured population. The orange horizontal line (PSS = 20) represents a high stress level. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

adherence to outpatient clinic guidelines (43.3%) is naturally more varied and likely represents cultural differences, differences in professional opinion and bias, as well as expected push-back from various parents and care-givers in an attempt to have their children seen as quickly as possible either in person or via telemedicine.

This study is the first to quantify effects of this pandemic on the practice and well-being of paediatric urologists. The results of the effects on training, scheduling, emergency cover and income were broadly similar and provide an insight into some of the challenges being faced on a daily basis. The lack of PPE in over half of respondents is concerning, however not unexpected and broadly reflects news and hospital reports. The ability as a group to quickly adopt and adhere to proposed paediatric urology guidelines is a testament to the flexibility of this sub-specialty to adapt to different situations whilst still advocating for the highest possible levels of healthcare delivery. There is of course little that can be done on a divisional level to offset decisions made by hospital senior management, and how to influence these decisions was outside the scope of this study, however, the ability to demonstrate flexibility and

adapt is noteworthy. This can serve as a basis for any future unexpected global events.

One of the more concerning features of this study was the high levels of stress seen on both sides of the Atlantic. Perceived Stress Scale (PSS) questions are rated on a 5-point scale ranging from never (0) to almost always (4). Positively worded items are reverse scored, and the ratings are summed, with higher scores indicating more perceived stress. This validated scale has been used previously in paediatric urology around post-operative pain following orchiopexy, disorders of sexual development and congenital adrenal hyperplasia [20–23]. Scores around 13, are considered average, with those scores of 20 and above representing high levels of stress. In this study, only 12% respondents demonstrated (below) average levels of stress, with 69% demonstrating high stress levels. Aside from the physiological effects of high stress, these findings can also be associated with poor productivity and burnout [24,25]. This validated scale is a perception of general stress levels and is appropriate for measuring over a period of time, unlike situational stress scales which relate to specific issues. There will of course be confounders such as personal

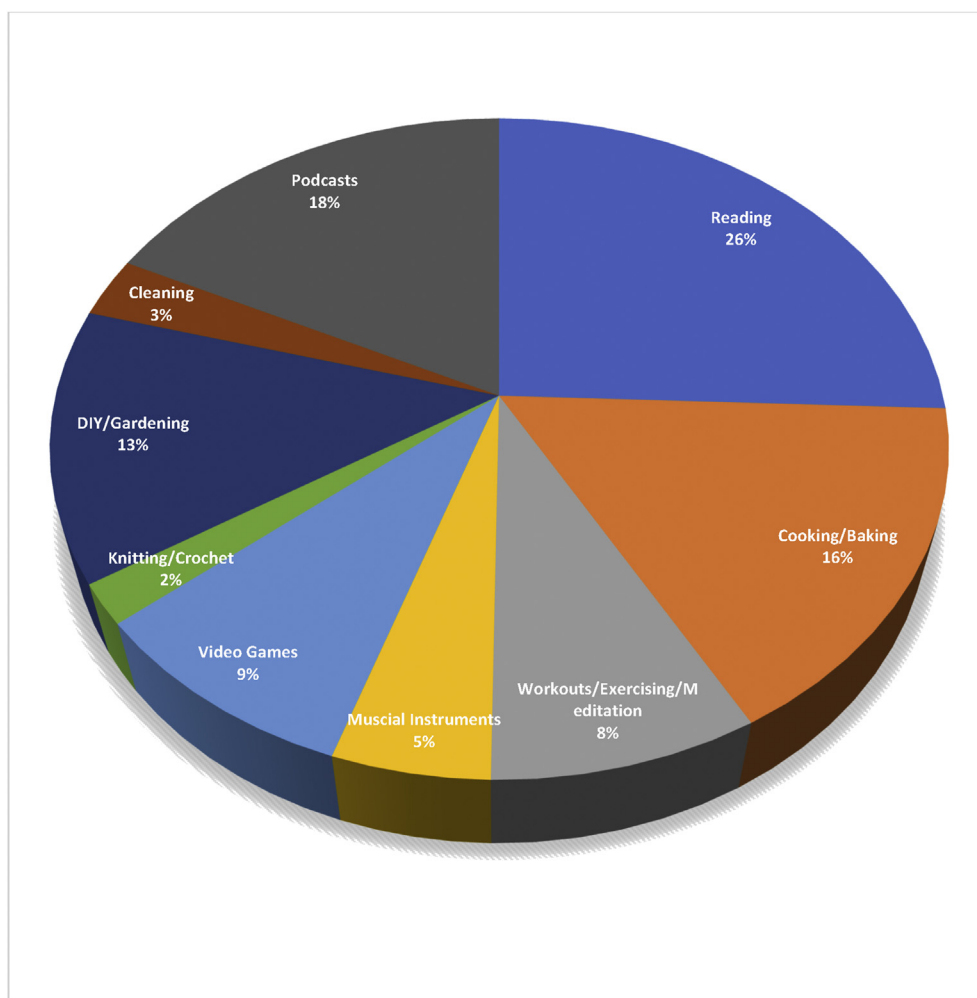


Figure 4 Pie Chart demonstrating new/resumed hobbies taken up by paediatric urologists to combat quarantine fatigue and stress during the COVID-19 pandemic.

life stress, substance abuse, mental health etc, which are a valid criticism of all these kinds of scales, however, this does not negate their validity.

There are a number of outstanding concerns which were not addressed by this panel, and remained outside the scope of the discussion. They were more esoteric in nature, and related to concerns practical solutions to existing waiting lists, cancellations, future financial implications for attendings, and difficulties in acquiring continuous professional development (CPD) credit. Some of these can be ameliorated through quality improvement initiatives to assess suitability for outpatient streamlining, while issues addressed through a combination of online collaboration, online learning, and telemedicine initiatives. False negative readings of swabs were discussed and currently stand between 25 and 40% [26]. This did not have much of an impact on services, as those who were symptomatic were invariably advised by their respective occupational health departments to stay at home for a minimum of 48-h after full symptom resolution. Furthermore, issues relating to laparoscopic procedures were discussed with participants feeling that these needed to be assessed on a case by case basis. The potential adverse outcomes are not well-

described, are multifactorial, and the consensus was therefore to avoid unnecessary laparoscopy in cases where COVID status was unknown, and to have a frank discussion with anaesthesiology colleagues.

Much of the evidence in the literature relating to urological adaptations during the COVID-19 era pertain to adult populations. There are significant differences in paediatric urology aside from operations for renal replacement therapy, renal transplantation, paediatric cancers, and obstructive cases arising from underlying congenital anomalies of the kidneys and urinary tract (ureterocealic junction obstruction, posterior urethral valves). These include time-sensitive operations for undescended testes, hypospadias procedures, and neurogenic patients who are at risk of febrile urinary tract infections [28]. We simply do not know the implications for postponing cryptorchid surgery, and then dealing with backlogs as a result. One of the limitations of this study is that the number of participants is low ($n = 58$). This is in contrast to findings by Yuen-Chun et al. who surveyed over 1000 adult urological providers. In that study they described similar findings to ours in that >30% services would be likely delayed >8 weeks, only 33% respondents felt they were given adequate PPE, and 50%

felt that treatment and survival outcomes would be affected as a result of the pandemic [26,27]. However, one could argue that neither are particularly representative of actual global opinion. Another limitation is the possible selection bias demonstrated by this group in that they are young, and active on social media, which may influence their stress scores, and use of technological aides. Finally, it is worth noting that globally, pandemic numbers are declining, and that many of the responses and measures put in place are potentially no longer necessary, however, in our opinion, the resilience and ability of the contemporary paediatric urological community to collaborate, adapt and innovate for their trainee and patient populations is worthy of aspiration.

Conclusion

This study represents a panel discussion of a number of practical implications for paediatric urologists, and is one of the few papers to assess more pragmatic effects and combines opinions from both sides of the Atlantic. The impact of the pandemic has been very significant for paediatric urologists and includes a decrease in the number of patients seen and operated on, decreased salary, increased self-reported stress levels, substantially increased telemedicine usage, increased free time for various activities, and good compliance with guidelines and hospital management decisions.

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None.

Ethics approval

Not applicable.

Conflicts of interest

None Declared.

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