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A RETROSPECTIVE CROSS-SECTIONAL ANALYSIS ON CHANGING WORK PATTERNS OF CONSULTANT ANAESTHETISTS DURING THE FIRST AND SECOND WAVES OF SARS-COV-2: IMPLICATIONS FOR FUTURE PANDEMIC PLANNING.

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Abstract

Background:
The SARS-CoV-2 pandemic has significantly impacted healthcare systems, altering the work patterns of healthcare professionals. This study investigates the evolving work patterns of consultant anaesthetists at a quaternary hospital during the pandemic and examines their implications for future pandemic preparedness.

Methods:
The study involved retrospective analysis of consultant working sessions between January 2019 and March 2021, extracted from the departmental schedule. These sessions were classified into three primary categories: Clinical sessions, Administrative/academic sessions, and Leave sessions, each further subdivided. Quantitative data was portrayed through counts, percentages, and ranges. A comparison was drawn between the pre-pandemic and pandemic datasets, evaluated using Mann-Whitney testing.

Results:
A total of 7812 work sessions were analysed Despite a reduction in total sessions during the pandemic, there was a significant shift in consultants' allocation towards clinical sessions compared to the pre- pandemic phase ($p=0.049$). Allocation to "in theatre" clinical sessions displayed no significant variation ($p=0.768$). The increased clinical sessions during the pandemic were attributed to consultants being redeployed to Cut-off theatre clinical roles, such as the COVID ICU and COVID team. No significant increase was seen in sick leave taken during the study period, however annual leave did reduce significantly. Academic sessions also experienced a significant drop in sessions.

Conclusion:
The study reveals shifts in the work patterns of anaesthetic consultants in response to the global health pandemic. Clinical sessions increased within the anaesthetic department due to staff redistribution to out-of-theatre COVID-related responsibilities. The findings emphasize the importance of effective workforce planning and crisis management strategies to ensure continuous essential healthcare delivery by anaesthetists during future pandemics.

Recommendation:
Adaptable workforce planning, staff flexibility, novel roles, and revised session structures, is pivotal in addressing pandemic challenges and meeting unique demands effectively.

Keywords: SARS-CoV-2, Work Patterns, Anesthetists, Crisis Planning, Healthcare Workforce, South Africa.
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Introduction:
In January 2020, the World Health Organization (WHO) declared the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS CoV 2) a global pandemic, prompting governments worldwide to swiftly implement containment measures based on WHO guidance. This necessitated rapid adoption of remote work and technology for business continuity (1). The resulting pressure triggered fundamental shifts in organizational staffing systems globally to meet operational demands. The pandemic's impact on healthcare systems was profound, particularly on healthcare professionals' work patterns (2, 3). Some institutions, seeking flexibility and enhanced staff availability, explored alternate staffing models like team-based versus tiered staffing (2).

Consultant anaesthetists, positioned at the forefront of disaster management, faced distinctive challenges. They were tasked with managing critical respiratory needs while maintaining team morale amid resource scarcity,

especially in lower to middle-income countries (4). Against this backdrop, our study examined the evolving work patterns of consultant anaesthetists during the initial two waves of the SARS-CoV-2 pandemic, spanning April 1, 2020, to March 31, 2021.

Healthcare systems worldwide confronted unprecedented challenges, adapting to a surge in COVID-19 patients requiring hospitalization for respiratory distress (3). Efficient resource allocation and organizing physicians to address pandemic-related respiratory demands became paramount (3). The impact on healthcare professionals, including consultant anaesthetists, extended beyond clinical aspects. Infection control measures, social distancing, and school closures affected healthcare worker well-being, influencing workforce functionality (1, 5). Staff shortages demanded strategic navigation and role optimization to fulfil operational needs. Personal protective equipment (PPE) usage, alongside potential virus exposure, led to restricted consultant movement (6, 7).

South Africa experienced multiple pandemic waves, each imposing unique challenges on healthcare systems. During these phases, healthcare professionals encountered heightened patient loads, evolving guidelines, and altered working conditions (6). Consultant anaesthetists balanced clinical, administrative, and academic responsibilities while ensuring safety and departmental functionality (7).

Comprehending consultant anaesthetists' evolving work patterns is pivotal for future pandemic preparedness (2). Although rare, events like the SARS CoV 2 pandemic have occurred and are likely to recur (8). Analyzing pandemic-driven work pattern shifts can yield insights into resource allocation, workforce planning, and role optimization during crises (7). Furthermore, understanding these changes informs the enhancement of health crisis management, guidelines, and protocols for subsequent pandemics.
Through this examination, we contribute to the knowledge base needed for effective pandemic response planning. This aim of the study was to investigate work pattern variations among consultant anaesthetists at a South African quaternary level hospital prior to and during the first two SARS-CoV-2 pandemic waves.

Methods:

Study design:

A retrospective cross-sectional quantitative analysis of anaesthetic consultant's work sessions was performed.

Study setting and study population:

This was a single centre study- based at Inkosi Albert Luthuli Central Hospital (IALCH)- Department of Anaesthesia and Critical Care. IALCH is situated in the Kwa-Zulu Natal region of South Africa and stands as a quaternary hospital devoted to addressing the healthcare needs of a substantial population residing along the eastern seaboard region of the country. The hospital's foremost mission revolves around the provision of top-tier, patient-centered healthcare services, administered by a proficient and specialized medical workforce.
IALCH is equipped with a total of 846 beds, which encompass 46 beds allocated to the Burns Unit, 75 beds designated for the intensive care unit (ICU), and an additional 96 high-care beds. Moreover, the hospital maintains the potential to expand its bed capacity by an additional 200 beds, highlighting its readiness for future growth. Within the hospital's premises, there are 16 fully equipped operating theatres , two specialized trauma operating theatres and a dedicated burns operating theatre.
Admission to IALCH is strictly contingent on referrals, with the predominant source of patient referrals originating from lower-level regional healthcare facilities. This referral-based approach is pivotal in ensuring that patients receive the appropriate level of care tailored to their specific medical conditions. Notably, during the pandemic, IALCH assumed the role of the designated referral hospital for ventilated patients affected by the virus.
The anaesthetic consultant staff at the hospital are responsible for the running of a maximum of 18 operating theatres, a pre-anaesthetic clinic and pain services. They are also responsible for performing non-clinical activities including administrative tasks, research and academic teaching of medical officers, registrars and medical students on a daily basis. Consultant anaesthetists are employed to work daily sessions between 7:00-17:00, for 5 days a week. In addition, they provide specialist cover for after-hours and weekend work. Sessions cover both clinical and non-clinical work. Clinical sessions include both in-theatre and out of theatre work. Out-of-theatre work include sessions covering pre-anaesthetic and pain clinic. During the SARS-CoV-2 pandemic consultant sessions also included the provision of clinical cover for the COVID-Team as well as COVID- ICU. In addition, during this period, work sessions were lost due to isolation and sick days. Social distancing work-from-home sessions and the closure of certain outpatient facilities such as the pre-anaesthetic and pain clinics also necessitated a change in working patterns. The sessions were analysed for any changes in working patterns during the two periods concerned.

Study sample:

A total of 7812 work sessions were analysed over the period concerned. The sample size was determined by analysing all work sessions available to each eligible consultant throughout their employment period. Sick days and annual leave days were included as sessions and recorded accordingly, while public holidays and weekends were excluded from the count of "available sessions." As already mentioned, each session was defined as an eligible work day from the hours of 07:00 to 17:00. Consultants who resigned or retired from their position during the investigated period, were only included up until their last day as a full time employee.

The pre-pandemic number of work sessions amounted to a total of 4510 sessions across all eligible consultants

whilst the number of work sessions analysed during the pandemic amounted to a total of 3302 sessions. The observed decrease in sessions during the pandemic year is attributed to a reduced staff numbers as a result of resignations and maternity leave that occurred in this period. The inclusion and exclusion criteria are detailed in table 1.

Table 1: Eligibility criteria for this study

Inclusion Criteria	Exclusion criteria
Consultants employed on a full-time basis	Sessional and visiting consultants
Medical officers who have finished their specialist training and exams who function as consultants	Registrars still in training who took on consultant roles
	Consultants who went on maternity leave during the period

Bias

To mitigate any form of selection bias, all eligible work sessions of the consultants were subject to analysis. In an effort to reduce recall bias, the study focused on the examination of paper schedules rather than relying on the consultants' memory of their work patterns during specific sessions. It is important to recognize that this approach may introduce reporting bias if the paper schedules or the allocated work for a given day did not accurately correspond to the actual work performed, which is acknowledged as a limitation of the study.

Data:

Daily sessions for each employed anaesthetist were obtained from the weekly rota. We analysed the working patterns of 21 to 18 consultant anaesthetists by examining session allocations from January 2019 to March 2021, accounting for changes in consultant numbers due to resignations and maternity leave. We focused our analysis on sessions rather than individual consultants. Data was anonymized, and work sessions were categorized into three main groups: clinical sessions, academic and administrative sessions, and leave sessions. Clinical sessions included in-theatre and out-of-theatre work, with in-theatre work further categorized as outlined in table 2 below. For the pre-pandemic period, out-of-theatre work encompassed sessions related to pre-anaesthetic and pain clinics. During the pandemic, additional variables were introduced to the three main categories, including consultant cover for "COVID-team" and "COVID-ICU." Data was organized in a Microsoft Excel data collection sheet for analysis.

Statistical analysis:

The study samples were analyzed using descriptive statistics. This included presenting the counts, percentages, and ranges for each category. The sessions were analysed for any changes in working patterns during the two periods concerned. IBM SPSS version 28 was used to analyse the data. Data from the pre-pandemic period comprised of sessions covering 1 January 2019 to 31 December 2019, and the pandemic period was 1 April 2020 to 31 March 2021. Variables collected were days spent performing various duties and tasks. These were converted to percentages of the working days in a year by dividing raw data of the day counts by 250 (total working days per year) and multiplying by 100. The percentages were analysed by time period and summarised using medians and interquartile ranges. They were compared between the two time periods using non-parametric statistical tests for two independent groups. The time periods were considered independent groups since not all the participants from the pre-covid era could be matched with records in the covid era. The total sessions in each category were summed up for each participant and compared across the two time periods using Mann-Whitney tests. The total sessions in each category were summed up for each participant and compared across the two time periods using Mann-Whitney tests. These tests yielded a p-value, with $p<0.05$ being considered a statistically significant result.

Study ethics:

This study was approved by the Biomedical Research Ethics Committee at the University of KwaZulu-Natal, South Africa (BREC/00004176/2022) and received approval from the Department of Health (KZ202207002).

Results:

In the pre-pandemic period, the median percentage of time spent performing in-theatre sessions amounted to a median 49.4% (IQR: 30.6-59.4), academic and admin sessions took up a median of 18.8% (IQR:14.6-22.6), total leave accounted for a median of 14.4% (IQR:11.6-24). Of these total leave, sick days as a percentage of total sessions took up a median of 0.8% (IQR: 0.4%-2.4%) and annual leave 12.8% (IQR: 9.6-18.4). Outpatient clinical care a median 0.4 % (IQR: 0-2.4%) The percentage breakdown of sessions as a portion of total sessions for the pre-pandemic period is depicted

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graphically in figure 1. Figure 2 depicts the distribution of work-sessions during the pandemic period.

Figure 1: PERCENTAGE DISTRIBUTION OF CONSULTANT WORK-SESSIONS : pre-pandemic period

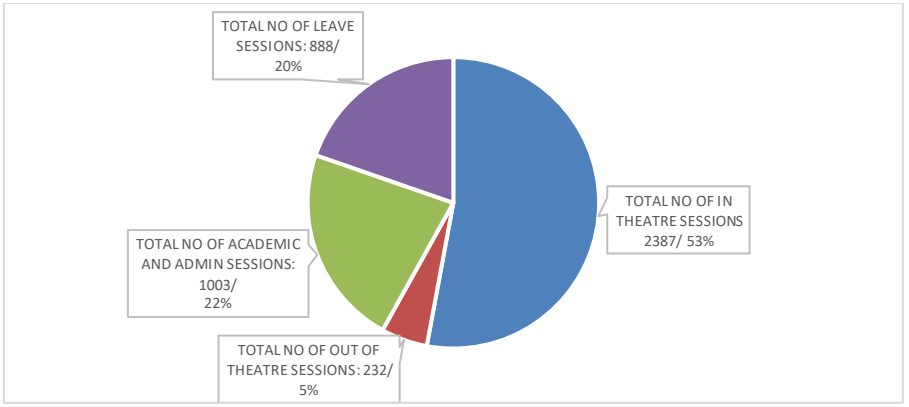
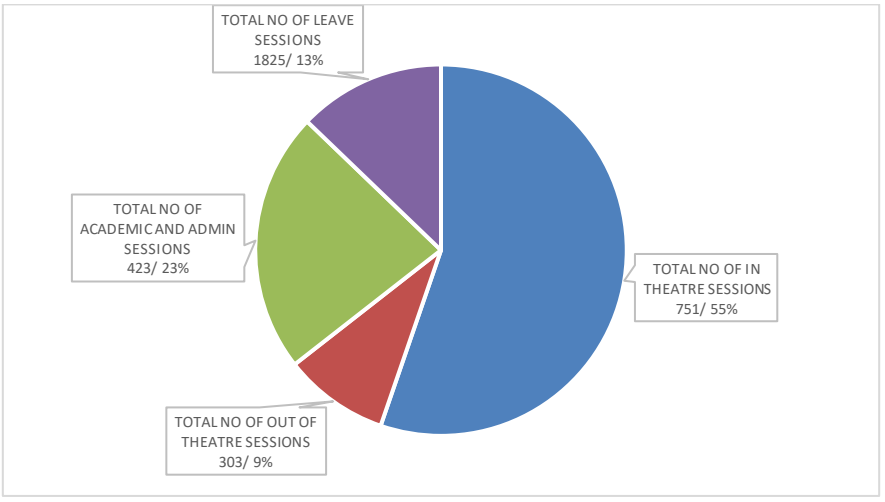


Figure 2: PERCENTAGE DISTRIBUTION OF CONSULTANT WORK-SESSIONS : pandemic period



The categories are further divided into subcategories and this data is presented in table 2. The contribution of each category to overall sessions is also presented for both periods, as well as an indication of the change seen during the pandemic period. During the pandemic period, there was an overall decrease in the absolute number of clinical sessions. However, when taken as a percentage of all sessions in this time period, the percentage showed an increased proportion of time spent doing clinical work, with an increase of 6,38%, a median of 64.8 (IQR:52.8-67.6). During the pandemic, time spent performing in-theatre sessions decreased to a median of 48% (IQR: 39.6-54.4). Total leave sessions taken during this period remained static at 14.4% (IQR:10.0-16). Of this total leave, sick leave actually showed an increase to a median of 1.2% (IQR: 0.8-2.8). During the first two waves of the pandemic, only a total of 38 sessions were taken as isolation days: this translated to an average of 1.15%, but a median of 0%, given that only 8 of the respondents utilized isolation leave.

Sessions dedicated to out-patient care showed an increase to a median of 4.8%(IQR 2.8-14.4) which represents an average of 9,17% of total sessions , up from 5,14% of total sessions. This was broken down into time spent in the pre-anaesthetic clinic (PAC), the pain clinic, the "COVID-TEAM", and the "COVID ICU". The contributions of each of these sessions are shown in the table 2.

Academic and admin sessions increased to a median of 20.4% (IQR: 17.2-24.8). A work-from-home category was created during the pandemic period. This formed part of the Academic and admin session and accounted for 24,63% of the sessions taken in this category and 5,60% of the total sessions. While in the pre-pandemic period, admin and academic sessions accounted for 3,59% and 18,64% of total sessions respectively, the post-pandemic era saw a slight increase in admin sessions to 3,94%, while academic sessions decreased to 13,2%.

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Table 2: Breakdown of sessions Prepandemic versus Pandemic period

WORK SESSION CATEGORY	**PREPANDEMIC number of sessions**	**PREPANDEMIC Percentage**	**PREPANDEMIC Percentage of total**		**PANDEMIC Number of Sessions**	**PANDEMIC Percentage**	**PANDEMIC Percent of total**
TOTAL CLINICAL SESSIONS	**2619**		**58,07**		**2128↓**		**64,45(↑6,38)**
TOTAL in-theatre sessions	2387	100	52,93		**1825 ↓**	**100**	**55,27(↑2,34)**
LIST	2159	90,45	47,87		**1681 ↓**	**92,11 ↑**	**50,91(↑3,04)**
FLOOR	228	9,55	5,06		**144 ↓**	**7,89↓**	**4,36 (↓0,7)**
TOTAL out-of-theatre sessions	232	100	5,14		**303↑**	**100**	**9,18 (↑4,04)**
PAC	165	71,12	3,66		16↓	5,28↓	0,48 (**↓3,18)**
PAIN	67	28,88	1,49		32 ↓	10,56↓	0,97(**↓0,52)**
COVID TEAM	n/a	n/a	**n/a**		109↑	35,97↑	3,30 (**↑3,3)**
COVID ICU	**n/a**	**n/a**	**n/a**		146↑	48,18↑	4,42(**↑4,42)**
TOTAL ACADEMIC AND ADMIN SESSIONS	1003	100	22,24		**751 ↓**	**22,74↑**	
ADMIN	162	16,15	3,59		130 ↓	17,31↑	3,94 (**↑0,35)**
ACADEMIC	841	83,85	18,65		436 ↓	58,05↓	13,20(**↓5,45)**
WFH	**n/a**	**n/a**	**n/a**		185↑	24,63↑	5,60 (**↑5,6)**
TOTAL NO OF LEAVE SESSIONS	888	100	19,69		**423 ↓**	**100**	**12,81(↓6,88)**
SICK LEAVE	99	11,15	2,20		64 ↓	15,13↑	1,93(**↓0,27)**
ANNUAL LEAVE	789	88,85	17,49		321 ↓	75,88 ↓	9,72 (**↓7,77)**
Covid isolation	n/a	n/a	n/a		38↑	8,98↑	1,15(**↑1,15)**
TOTAL	4510				3302		

Mann-Whitney tests were used to compare median percentage of days between the two time periods for various tasks within the broad categories. Overall clinical sessions showed a statistically significant increase during the pandemic (p=0.049).The pandemic period also resulted in significantly higher in-theatre clinical sessions (p=0.031). It does need to be noted however that the absolute number of both these categories showed a decrease. Testing also revealed a statistically significant decrease in consultants covering two lists as well as consultants covering solo list with a p-value of less than 0.05. It also revealed a statistically significant increase in sessions covering "half-admin-half-theatre" lists, with a p-value of less than 0.001. Significance testing also showed a significant increase in time spent performing out-of theatre duties (p <0.001) with the absolute percentage changing from 5,14% in the pre-pandemic period to 9.18% post pandemic. This translated to an absolute increase of 78,4%.

There was a significant difference from pre pandemic to pandemic era in terms of academic days percentage of time (p=0.031) with academic days showing a decrease in the pandemic era.

The plots of the total sessions across two periods are depicted in Figure 3. The total sessions in each category were summed up for each participant and compared across the two time periods using Mann-Whitney tests.

Figure 3: Total sessions between two periods

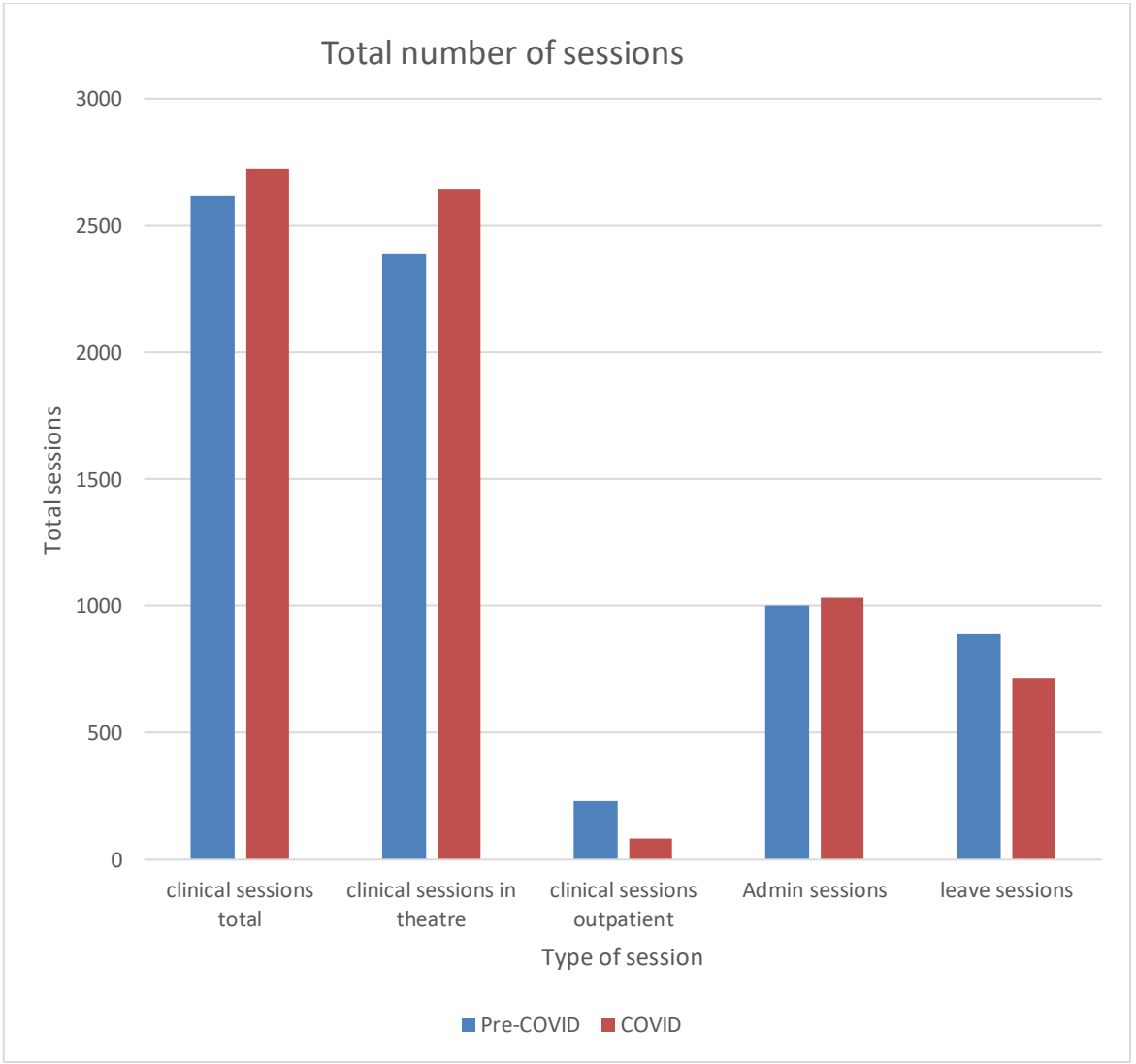

Table 3: Comparison of prepandemic and pandemic work sessions

Category	Prepandemic (N=4520)	Pandemic (N=3302)	p-value
Clinical sessions			
Whole group	53.8 (38.6 – 62.6)	64.8(52.8 – 67.6)	0.049
In-theatre sessions	49.40 (30.6-59.4)	48.0 (39.6-54.4)	0.768
1 consultant/1 list+registrar	32.40 (21.2-43.2)	30.80 (24.0-36.4)	0.503
1 consultant /2 lists	4.00 (1.6-5.2)	0.00 (0.0- 2.4)	<0.001
solo consultant	0.40 (0.0-0.4)	0.0 (0.0- 0.0)	<0.001
Upskilling	3.20 (0.0-6.8)	1.20 (0.0-2.4)	0.088
half list/ half admin	0.20 (0.2-0.6)	8.40 (7.6-10.4)	<0.001
Floor cover	1.60 (0.0 -9.2)	4.00 (2.0-5.6)	0.436
Out of theatre sessions	0.4 (0-2.4)	4.8(2.8-14.4)	<0.001
Pre-anesthetic clinic	0.4 (0.0-0.8)	0.0 (0.0-0.4)	0.124
Pain clinic	0.0 (0.0- 3.0)	0.4 (0.0-2.0)	0.161
COVID ICU	--	0.0 (0.0-10.0)	n/a
COVID TEAM	--	2.4 (1.6-4.8)	n/a
Academic and admin sessions			
Whole group	18.8 (14.6-22.6)	20.4(17.2-24.8)	0.294
Admin	1.8 (1.0-2.4)	1.6 (0.8-5.6)	0.768
Academic	16.8 (13.2-18.8)	13.6 (11.6-14.8)	0.031
Work-from-Home	---	6.0 (2.0-6.8)	n/a
Leave sessions			
Whole group	14.4 (11.6-24.0)	14.4 (10.0-16.0)	0.486
Sick leave	0.8 (0.4-2.4)	1.2 (0.8-2.8)	0.226
Annual Leave	12.8 (9.6-18.4)	10.0 (6.0-14.0)	0.049
Covid isolation	-----	0.0 (0.0-1.6)	n/a

Discussion:

In light of the World Health Organization's declaration of the SARS-CoV-2 pandemic, healthcare systems globally faced a seismic shift in operational dynamics. Initiated by a directive from the Department of Health, elective procedures and work were mandated for cancellation, prompting a consistent deferral of non-urgent services such as outpatients and elective surgeries. This strategic resource allocation aimed to prioritize SARS-CoV-2-related services (6). This trend has been substantiated by various international studies; for instance, a study in Singapore indicated a 43% reduction in elective surgical and outpatient work, with operating room utilization rates declining from 66% in 2019 to 52% during the pandemic (9). An editorial from the University of Colorado's orthopedics department aimed to safeguard staff and resources by halving theatre usage compared to pre-pandemic levels (10).

The study scrutinized the transformative impact on consultant anesthetists' work patterns during the pandemic's initial waves. Surprisingly, the study findings unveil a significant increase ($p=0.049$) in time devoted to clinical activity during the pandemic, contradicting the international trend of decreased clinical engagement due to social distancing measures (5, 6). It is noted, however that the absolute number of sessions spent performing clinical work, as well as its subcategory "in-theatre sessions" did decrease during the pandemic, as expected. These findings could signify a shift from theatre-related work to pandemic-specific responsibilities like "covid-icu" and "covid team" sessions, akin to global reports of workforce reallocation to critical areas (1, 10, 11).

In-theatre activity remained consistent between pre-pandemic and pandemic eras. However, noteworthy shifts occurred within this subset, with "1 consultant/2 lists" ($p<0.001$) and "solo consultant" ($p<0.001$) sessions decreasing, while "half list/half admin" ($p<0.001$) sessions increased during the pandemic. Consultants in quaternary settings occasionally oversee two concurrent lists, managed by senior registrars and supervised by consultants. Pandemic-related restrictions on consultant mobility between theatres led to a significant reduction in dual-list assignments, aligning with global efforts to minimize transmission risk by restricting consultants' coverage across multiple sites (1, 5). A solo list involves a consultant managing the list independently, without a registrar trainee. At IALCH, a training centre, consultants handle solo lists during staffing shortages when there are insufficient registrars for paired lists. With the pandemic causing an overall decrease in sessions, the strain on staffing for theatre needs eased, eliminating the need for consultants on solo lists. Notably, the pandemic brought a significant increase in consultants allocated to "half-list-half-admin" sessions ($p<0.001$), driven by efforts to minimize contacts. Allocating consultants to half-days reduced infection risk, especially with the widespread cancellation of elective cases. This change ensured lists concluded earlier, avoiding redundancy and reducing infection and transmission risk (9, 12).

The pandemic era witnessed a notable decrease in sessions dedicated to academics ($p=0.031$). This aligns with global literature consistently indicating an initial decline in academic and educational activities during the pandemic's early stages (10, 13, 14). Many registrar trainees globally also reported a significant reduction in face-to-face learning opportunities during this period (14).

The category of total leave days encompassed annual leave, sick leave, and COVID isolation leave. As a collective, this category did not demonstrate significant changes during the first two pandemic waves. However, leave sessions were notably impacted by managerial decisions that led to the cancellation of annual leave to address pandemic demands. Consequently, the composition of leave sessions primarily consisted of sick and COVID isolation leave. Notably, sick leave, as a subcategory, exhibited no significant alterations between the two periods. This finding, though unexpected considering the virus's contagious nature, underscores the efficacy of strict PPE implementation and well-planned roster allocations that aimed to enforce social distancing measures. This effectiveness is evidenced by the minimal instances of staff falling ill with the virus (15).

South Africa experienced the initial pandemic wave well after the global emergence of the virus. Its detection within our borders occurred three months after its international identification. This lag granted our nation and institution a unique opportunity to implement containment measures ahead of the virus's peak transmission (16). These factors contributed to the inconsequential change observed in both total and sick leave days between the two periods. However, annual leave, a subset of the "leave" category, did witness a significant decline during the pandemic period ($p=0.048$). This outcome was anticipated, as human resources issued a directive to curtail non-essential leave during the pandemic to mitigate potential staff attrition resulting from the crisis (5, 6, 15).

The widespread adoption of remote work in the healthcare sector marked a significant transformation in global healthcare delivery and management (1, 2, 10). The establishment of remote-site work has been consistently documented in numerous international studies (5, 9, 17). In our specific context, a new category of sessions termed "Work-from-home sessions" was introduced during the pandemic. This initiative aimed to promote social distancing and mitigate the risk of virus transmission among both staff and patients. During these sessions, consultants were responsible for conducting telephonic consultations from an off-site location and developing essential protocols and guidelines for pandemic response. The introduction of these sessions likely contributed to the department's low transmission rates and the relatively minor impact of COVID isolation leave on the overall leave category.

The distribution of consultants for out-of-theatre sessions underwent significant changes: services like the pre-anaesthetic clinic and pain management were scaled back to prioritize pandemic-related activities

like "COVID ICU" and "COVID team." This reallocation of staff to critical care areas mirrored the global response to the SARS-CoV-2 pandemic, which often involved redeploying personnel to intensive care units (ICUs) (10, 18). In our institution, the anaesthetic department played a pivotal role by orchestrating structured drills and training sessions across the hospital. Aligning with international strategies, anaesthetic consultants were redistributed to address the increased demands, contribute to protocol development, and formulate pandemic-specific practice guidelines.

The study's findings share similarities with existing literature, such as increased remote work, leave cancellations, and social distancing measures. However, certain trends commonly observed, like a decline in overall clinical sessions and theatre utilization, along with an increase in sick leave, did not attain statistical significance in our study. This could be attributed to our study's focus on the first two waves of the pandemic rather than its entirety.

paramount for the sustainability of good quality health care service delivery and workforce performance. This research emphasizes the requirement for specialized teams such as COVID Teams and COVID ICU sessions during infectious disease epidemics. Future crisis preparedness should include clear processes and specialized teams to handle such circumstances successfully.

Generalizability:

The study focused on a specific subset of the medical community within a specialized academic center. Although the precise results may not be universally applicable to less specialized centres or the private sector, they do contribute valuable insights to our decision-making and strategic thinking regarding workforce planning. Furthermore, these findings contribute to the expanding body of literature on this crucial subject. It is worth noting that these insights can be reasonably applied to similar academic centers within the sub-Saharan African context.

Conclusion:

The dynamics of workforce planning in the context of a global health pandemic needs to take several factors into consideration. There are significant ramifications for future pandemic planning from the shifting work schedules of consultant anaesthetists at a South African quaternary hospital during the first two waves of the SARS-CoV-2 pandemic (9). Flexibility and adaptability in workforce planning was found to be

Recommendations:

Future crisis planning could consider adaptable working conditions that are practical, allow for remote work, improve productivity, and lower the risk of viral transmission. It is important to realize that the onset of the pandemic placed severe restrictions to learning opportunities. This finding should alert us to develop a more robust learning models which incorporates the concept of social distancing as well as evolving technologies so that future pandemics don't compromise opportunities for learning as much as has been the experience with the SARS-CoV-2 pandemic. Overall, comprehending the pandemic's influence on healthcare workers' work patterns will enhance preparedness for future crises and fortify healthcare systems' resilience.

Acknowledgements:

Special thanks to Hannah Freddy for providing a rota database.

Limitations:

It is important to acknowledge limitations inherent to our retrospective, single-centre study design. A larger sample size is required to thoroughly investigate some of the other workforce planning characteristics which failed to reach statistical significance in this study. Further investigations should encompass the entire pandemic trajectory and its post-pandemic aftermath. The study did not delve into the pandemic's impact on staff morale and well-being, a topic that merits exploration in future research. Additionally, studies can explore how technology and telemedicine are integrated into crisis planning to optimize resource allocation and enhance healthcare delivery.

List of abbreviations:

IALCH: Inkosi Albert Luthuli Central Hospital
IQR: Interquartile range
WHO: World Health Organisation
ICU: Intensive care unit
PPE: Personal protective equipment

SARS-Cov2: Severe Acute Respiratory Syndrome Coronavirus 2
COVID: Coronovirus Disease
PAC: Pre-anaesthetic clinic
WFH: Work From Home

Definition of Terms:

COVID ICU: consultants assigned to the COVID intensive care unit due to expertise in airway management and sedation of intubated patients
COVID TEAM: Consultants developed protocols for airway management – COVID intubation and extubation, donning and doffing of PPE, transportations of COVID positive patients around the hospital eg to theatre.These protocols were distributed throughout the KwaZulu-Natal province. They provided departmental and cross-departmental

teaching on Airway management skills and ventilator usage

PAC: Pre-Anaesthetic Clinic. These sessions involve comprehensive patient evaluation and optimization before scheduled surgeries.

LIST: Refers to a scheduled series of planned elective procedures within a specific operating room.

FLOOR: Denotes the provision of emergency care coverage and coordination of workflow within the operating room suite.

PAIN: These sessions involve delivering outpatient care for chronic pain and reviewing acute postoperative pain in in-patients.

ADMIN: These sessions refer to sessions allocated to ensuring hospital functioning while on site.

ACADEMIC: These sessions involved consultant led teaching and research

WFH: These work-from-home sessions was created during covid and allowed consultants to work on an electronic platform to consult from home as well as tend to academic and administrative roles.

1 consultant/1list +registrar: an elective slate being managed by a single consultant alongside one registrar.

1 consultant/2lists: signifies one consultant supervising two concurrent slates, each managed by a registrar.

Solo consultant: Refers to a slate that is conducted by a consultant without the involvement of a registrar.

Upskilling: This session describes a junior consultant partnering with a senior consultant in a specialized list, such as cardiac or paediatric slates.

Conflict of interest:

No conflicts to report.

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Gunseli Malleck-Amode Peerzada (M.D) completed her medical degree at the University of Saskatchewan in Canada, after having graduated from a BSc Physiology . After graduating as a medical doctor, she relocated to South Africa. During her medical internship in the South Coast of KwaZulu-Natal, her enthusiasm for the field of anaesthesia blossomed. At present, she is in her third year as a registrar in training in the department of Anaesthetics at the University of KwaZulu-Natal, with aspirations to enhance perioperative healthcare practices throughout the African.
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