The prevalence of hand pathology in regional orthopaedic hospitals in KwaZulu-Natal: a cross sectional study

By

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As the candidate's supervisor I have approved this thesis for submission.

Signed: [redacted] Name: Megan O'Connor Date: 17 August 2023

Declaration

I, Swaleh Hassan Thabit, declare that:

(i) The research reported in this dissertation, except where otherwise indicated, is my original work.

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Overview of the thesis

Statement of purpose

Hand pathology in the international context is common, and contributes to; time off work, loss of income, change or loss of occupation and residual dysfunction. In South Africa, investigation has been performed into *traumatic* and *infective* hand pathology and its ramifications for occupation. The broader burden of hand pathology, other than traumatic and infective pathology, had not been investigated locally. This observational cross-sectional study aimed to quantify the burden of hand pathology on regional hospitals in KwaZulu-Natal (KZN) that offer orthopaedic services, over the course of a single week. In addition, the investigation determined which patients are affected by these pathologies and which pathologies cause the greatest burden, by number, to the KZN health system. The results of which identified focus areas that need more attention and directs future research to address areas of concern.

Hand pathology broadly encompasses infection, degenerative and inflammatory arthropathy, trauma, peripheral neuropathies, tumours, and congenital deformities. We conducted an observational, cross-sectional data collection, from patient and hospital records, for the course of a week at all 10 regional hospitals that offer orthopaedic services in KZN. Data was captured for all patients who presented to the orthopaedic services at these facilities. With this information, we calculated the prevalence of hand pathology at regional health facilities that offer orthopaedic services in KZN. We were able to describe the patients most commonly affected by hand pathology, and determined which pathologies occur most commonly.

This epidemiological study provides important insights. Hand pathology represents around one fifth of the presentations to regional orthopaedic facilities in KZN, and nearly a quarter of trauma cases presenting to these facilities occur in the hand. Resource allocation and training should be directed toward awareness, education and management of these common pathologies.

Table of Contents

Part 1: The Review of Literature

Hand pathology has the propensity to cause functional impairment, loss of income, and present significant costs in the form of expenditure on management, and loss of economic contribution from the affected patients.[1] In the South African context, investigation has been performed to establish the aetiology of occupational hand trauma in the health care system of the Gauteng province.[1] Studies emanating from occupational therapy journals document a high case load of hand trauma in South Africa and the province of KwaZulu-Natal respectively.[2-4] Hand infections have also been investigated in South Africa, specifically, the most common causative organisms and aetiologies have been explored.[5, 6] Internationally, there is an increased trend in the prevalence of hand pathology, particularly occupational injuries, and overuse syndromes.[7] At present there remains limited quantitative data encompassing all pathological conditions of the hand within the South African context.

Hand pathology resulting from trauma is recognised as both a common and a debilitating condition.[8] A study from the US reports 10% of patients with hand trauma never return to their original occupation, either due to permanent disability or due to a change in occupation.[8] Furthermore, residual functional impairment was noted in 59% of patients with hand injuries in this study, despite adequate rehabilitation.[8] Concerning occupational hand injuries in a South African cohort, one third of all hand injuries were attributed to occupational causes.[1] Hand injuries require rehabilitation after management of the initial injury.[1, 2] A study on hand trauma as managed by occupational therapists in KwaZulu-Natal reported that the predominant hand trauma presentations to therapists were flexor or extensor tendon injuries, fractures, and combination injuries.[4] An additional therapy article outlined the challenges to providing hand therapy in South Africa, reporting 'high caseloads and quick turnover' as well as ‘lack of resources’ amongst several challenges to providing hand therapy in the South African setting.[3]

Hand infections similarly contribute toward financial and functional losses for the patient and represent a cost burden to both the global and South African health departments, with respect to management of these conditions.[6, 9] Complications of hand infection can be devastating, occasionally necessitating amputation, with significant associated functional impairment.[9]

Various other common hand pathologies investigated in the international literature include carpal tunnel syndrome (CTS) and other compressive neuropathies, rheumatoid and osteoarthritis, hand tumours, tendinopathies, and congenital deformities.[10-16] CTS, the most frequent compressive neuropathy, has been shown to have a socio-economic impact on the patient.[16] The median number of days away from work as a result of CTS in the US is 27 days.[17] Surgical decompressions of CTS in the US incurs an annual economic cost in excess of $2 billion.[16] Degenerative arthropathies also negatively impact quality of life.[11] Rheumatoid arthritis (RA) of the hand can result in loss of grip strength and pain, impacting hand function.[11] Osteoarthritis (OA) involves the hands in 30% of cases and like RA causes functional deficit.[12] A study from Singapore showed in their region that 15% of soft-tissue tumours occur in the hand, and were reported as a common reason for consultation to hand specialists.[13] Likewise, a review of tendinopathies of the hand and wrist, reported that the commonest of these is stenosing tenosynovitis of the A1 pulley, or trigger finger, which occurs with a prevalence as high as 2-3%.[14] Finally, congenital deformities of the hand are also more prevalent than previously thought, most notably is the case of polydactyly, with a prevalence of 23 per 10 000 live births in a study conducted in New York.[15]

These studies highlight that hand pathology is common. In the international literature various pathologies have been investigated, but in South Africa, epidemiological investigation has been limited to the study of hand trauma and hand infections.[1-6] The reports have emphasised that hand pathology can cause significant functional impairment and are an economic burden.[2, 8] There remains a paucity of quantitative data on hand pathology, especially non-traumatic, in South Africa. The aim of this study was to provide insight into the

burden of all hand pathology in KwaZulu-Natal South Africa, to inform future research focus and allocation of resources in this constrained setting.

1.1 Problem Statement

The purpose of this cross-sectional study was to determine the prevalence of hand pathology presenting to regional hospitals that offer orthopaedic services in KwaZulu-Natal over a single week in June 2022.

1.2 The research question

What is the epidemiology of hand pathology in regional orthopaedic hospitals in KwaZulu-Natal?

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Part 2: Submission ready manuscript.

The prevalence of hand pathology in regional orthopaedic hospitals in KwaZulu-Natal: a cross sectional study

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Abstract

Background

Pathology to the hand causes functional impairment, with downstream effects for patient occupation, and consequently presents a socio-economic burden. Investigation of the epidemiology of hand pathology in KwaZulu-Natal (KZN) is necessary for directed awareness initiatives for patients, medical training, and appropriate allocation of resources, to reduce the burden of disease.

Methods

A cross-sectional investigation of hospital records and charts of patients presenting for orthopaedic care across all ten regional hospitals in KZN that offer orthopaedic services was undertaken for one week duration (June 2022). Patients were categorised into hand pathology (HP) and general orthopaedic pathology (OP) groups, which were each subdivided into trauma and non-trauma subgroups. Demographic details were collected for all patients. For HP patients additional detail was collected regarding diagnosis, mechanism, admission and management. The prevalence of HP was calculated as a factor of all orthopaedic presentations.

Results

During the investigation, 2335 patients presented to orthopaedic services. HP represented 21% of these cases. The majority (17%, 406 of 2335) were related to trauma, and represented 23% of all the traumatic orthopaedic presentations. Distal radius (DR) fractures were the most common injury (46%, 188 of 406) and a large proportion of trauma to the bony elements of the hand were open injuries (23%, 93 of 406). The remainder of HP cases comprised the non-traumatic group (4%, 91 of 2335), were predominantly infections (68%, 62 of 91), and many patients with non-traumatic hand pathology required surgery (60%, 55 of 91) and admission (56%, 52 of 91).

Conclusion

HP represents approximately one fifth of all orthopaedic presentations to regional health facilities in KZN offering orthopaedic care, and close to a quarter of orthopaedic trauma occurs in the hand. Based on these

findings targeted efforts to improve community awareness of precautions against trauma to the hand, osteopaenia, and hand hygiene are suggested as preventative measures. Medical training should emphasise the appropriate management of DR fractures and hand infections, and resources should be differentially allocated to the management of these debilitating HP's to decrease the burden of disease.

Level of evidence: Level 4

Keywords: epidemiology, hand trauma, hand pathology, prevalence, burden

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Background

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Methods

This epidemiological study was conducted by a cross-sectional patient chart and hospital record review, of all orthopaedic presentations to each of the 10 regional hospitals in the KwaZulu-Natal Province that offer orthopaedic services, over a period of one week. The study was conducted primarily to determine the

prevalence of hand pathology amongst all orthopaedic presentations, and secondarily to describe the patient demographics and common hand pathology presentations. The STROBE statement for cross-sectional studies was used for reporting.[18]

Patient charts and hospital records were used to collect patient demographic detail and pathology data at each of the 10 regional hospitals in KwaZulu-Natal that offer orthopaedic services for one week, from midnight Sunday 19th June 2022 until midnight Sunday 26th June 2022. The data was collected by an on-site investigator at each hospital and captured on the secure online pre-designed Google Sheets application (Google 2022). The research protocol was disseminated to all on-site investigators for review. Prior to data collection an online meeting of all the on-site investigators was conducted by author ST, to clarify the procedures and answer any queries. The Google Sheets were collated on an Excel (version 16.67 © 2022 Microsoft) spreadsheet for descriptive summaries and exported to Jamovi (version 2.3. the jamovi project 2022) for analysis. For all patients, basic demographic and diagnostic details were captured including age, gender, date of presentation, whether the pathology was related to trauma, and the diagnosis. In addition to these details, patients with HP had further information regarding handedness, mechanism of injury, management and admissions collected.

For this investigation, HP was defined broadly to include inflammatory or osteoarthropathies of the wrist and hand. Infections, tumours, tendinopathies, compressive neuropathies and congenital deformities were included from the level of the elbow, or any region distal to the elbow. Hand trauma (HT) included bone injury to the distal radius and ulna (up to and including 5cm proximal to the wrist joint) or any bony injury distal to this, tendon injuries distal to the elbow, and nerve injury from the level of the brachial plexus (including root avulsions) or any region peripherally along the course of the nerve. These pathologies would be the typical presentations to a hand unit, or a specialist hand surgeon in KZN.

Description of the patient demographic and pathology detail for categorical variables were summarised as counts and percentages. For continuous data, means with standard deviation (SD) and range were reported if the data were normally distributed, or medians with interquartile range (IQR) and range if data were non-parametric. Prevalence was expressed as a percentage, calculated by the ratio of all hand pathology cases as

compared to the total number of presentations to orthopaedic facilities. Similarly, prevalence's were determined for hand trauma as a function of the total trauma presentations and hand pathology of non-traumatic origin as a function of the total non-traumatic general orthopaedic presentations. Where data were missing, number of missing data were quantified and summary statistics produced with the remaining data points.

Results

During the one-week study period there were a total of 2335 patients who presented with an orthopaedic concern to the 10 regional hospitals that offer orthopaedic services (*Table I)*. Four of the facilities attended to more than 300 patients during this week. The majority (78%, n=1809) of presentations were secondary to trauma (acute or subsequent follow-up visits), 57% (n=1321) were attended to in elective clinics and the remainder were managed in casualty, emergency department or acute room settings. The median patient age (12 missing) was 36 years (IQR 29, 0-102) and 57% (n=1318) were male patients (6 missing).

Table I: Descriptives of all orthopaedic presentations including patient demographics and diagnostic characteristics (n=2335)

	Counts (n)	% of Total	Median	IQR
Age *(12 missing, n=2323)*			36	29
Gender *(6 missing, n=2329)*				
Female	1011	43%		
Male	1318	57%		
Pathology				
General trauma	1399	60%		
Other general orthopaedic pathology	439	19%		
Hand trauma	406	17%		
Other hand pathology	91	4%		
Regional facility				
1	158	7%		
2	328	14%		
3	303	13%		
4	136	6%		
5	293	13%		
6	172	7%		
7	301	13%		
8	145	6%		

9	118	5%
10	380	16%
Classification		
Trauma	1805	77%
Non-trauma urgent/emergent	107	5%
Elective	423	18%
Attended to in clinic or emergency/acute room		
Clinic	1321	57%
Emergency room/casualty/acute room	1014	43%

Continuous variables expressed as medians with interquartile range (IQR). Categorical variables expressed with counts and percentages of total.

The 2335 total patients were then categorised into hand pathology trauma (HPT) (17%, n=406), hand pathology non-trauma (HPNT) (4%, n=91), orthopaedic pathology trauma (OPT) (60%, n=1399) and orthopaedic pathology non-trauma (OPNT) (19%, n=439) groups. The prevalence of all cases of hand pathology amongst all orthopaedic presentations was 21% (497 of 2335), the majority of which were secondary to trauma 82% (406 of 497).

With respect to trauma, the prevalence of HPT amongst all traumatic presentations was 23% (406 of 1807). *Table II* (page 15) compares the variables collected for both HPT and OPT groups. The median age of presentation for patients with HPT was slightly younger than the OPT group, 32 years (IQR 29, 0-88, 2 missing) as compared to 36 years (IQR 27, 0-102, 10 missing) and were the majority male patients in both groups 65% (264 of 405, 1 missing) and 58% (808 of 1398, 3 missing). In both traumatic groups the percentage of polytrauma cases was 2% (8 of 406 in HPT group, and 22 of 1401 OPT group), but compound injuries were more prevalent in the HPT cohort 23% (93 of 406) than the OPT group 4% (57 of 1401).

Specific to the HPT group, a fall onto an outstretched arm was the most common mechanism of injury, 53% (186 of 352, 54 missing), followed by blunt and penetrating trauma in 15% (53 of 352) and 16% of cases (55 of 352) respectively. The majority of injuries were bony, DR fractures accounted for 46% of cases (188 of 406) and fractures or dislocations of the phalanges 13% (52 of 406). Most soft tissue injuries were to the flexor tendons, 7% (28 of 406). In 4% (15 of 406) of cases there was a combination of bony and soft tissue injury.

There were 25% (100 of 406) of hand injuries that required admission for surgery, 31% (31 of 100) for fracture fixation and 44% (44 of 100) needed exploration and repair of either single or multiple nerves and tendons.

Table II: Comparative table of the demographics of patients with traumatic injuries

	Hand Pathology Traumatic (HPT) n=406				Orthopaedic Pathology Traumatic (OPT) n=1401				
	Counts (n)	**% of Total**	**Median**	**IQR**	**Counts (n)**	**% of Total**	**Median**	**IQR**	
Age *(2 missing)*	**404**		32	29	**1391**		36	27	***Age*** *(10 missing)*
Gender *(1 missing)*	**405**				**1398**				***Gender*** *(3 missing)*
Female	141	35%			590	42%			*Female*
Male	264	65%			808	58%			*Male*
Attended to in clinic or									***Attended to in clinic or***
Clinic	143	35%			836	60%			*Clinic*
Acute room	263	65%			565	40%			*Acute room*
Polytrauma									***Polytrauma***
Yes	8	2%			22	2%			*Yes*
No	398	98%			1379	98%			*No*
Compound or closed injury									***Compound or closed injury***
Compound	93	23%			57	4%			*Compound*
Closed	313	77%			1344	96%			*Closed*
Handedness *(61 missing)*	**345**								
Right	303	88%							
Left	40	12%							
Ambidextrous	2	0%							
Side of injury *(46 missing)*	**360**				**1196**				***Side or level of injury*** *(205 missing)*
Left	155	43%			566	47%			*Left*
Right	202	56%			569	48%			*Right*
Bilateral	3	1%			10	1%			*Bilateral*
					33	3%			*Cervical*
					5	0%			*Thoracic*
					13	1%			*Lumbar*
Mechanism of injury *(54 missing)*	**352**								
Fall on outstretched arm	186	53%							
Occupational injury	26	7%							
Blunt trauma / assault	53	15%							
Penetrating trauma / assault	55	16%							
Gunshot wound	3	1%							
Grinder injury	5	1%							
MVA/PVA	22	6%							
Animal / human bite	2	1%							
Diagnosis	**406**				**1401**				***Diagnosis***
Fractures or dislocations									***Fracture or injury***
Phalanx or IP joints	52	13%			332	24%			*Upper limb*
Metacarpal or MCP joint	31	8%			926	66%			*Lower limb*
Carpal or intercarpal and	13	3%			56	4%			*Spine*
Distal radius	188	46%							***Dislocation***
Distal ulna	18	4%			52	4%			*Upper limb*
Nerve injury					9	1%			*Lower limb*
Brachial plexus	2	0%			1	0%			*Spine*
Radial nerve	3	1%			3	0%			***Other*/unknown***
Ulnar nerve	3	1%			22	2%			***Combination injuries***
Tendon injury									
Flexor tendon	28	7%							
Extensor tendon	12	3%							
Amputation	16	4%							

Soft tissue injury	21	5%
Foreign body	4	1%
Combination injuries	15	4%
Management		
Required admission at any visit	100	25%
Discharged during study period	33	8%
Index presentation in study period	282	70%
Follow-up visit	124	30%
Required surgery	100	25%
Surgery required	**100**	
Fracture ORIF	31	31%
Exploration and nerve/tendon	44	44%
Debridement or I&D	23	23%
MUA and cast application	2	2%

Continuous variables expressed as medians with interquartile range (IQR). Categorical variables expressed with counts (n) and percentages (%) of total. MVA – motor vehicle accident, PVA – pedestrian vehicle accident, IP – interphalangeal, MCP – metacarpophalanageal, ORIF – Open reduction and internal fixation, I&D – incision and drainage, MUA – manipulation under anaesthesia *mandible fractures

There were relatively fewer cases of non-traumatic pathology overall, 23% (528 of 2335). The prevalence of hand pathology non-traumatic (HPNT) in this group was 17% (91 of 528) and orthopaedic pathology non-traumatic (OPNT) comprised the remaining 83% (437 of 528), *Table III*. Patients in both non-traumatic groups were older than the patients in the traumatic groups, with a mean age of 38 years (SD 18, 0-84) in the HPNT group and a median 44 years (IQR 41, 0-82) in the OPNT group. Hand infections predominated the HPNT group (68%, 62 of 91), followed by arthropathy (10%, 9 of 91). Whereas in the OPNT group 56% (245 of 437) of diagnoses were attributed to osteoarthritis and 13% (56 of 437) to infection. The majority of HPNT patients, 57% (52 of 91), required admission and 60% (55 of 91) required surgery either as an inpatient or in the outpatient setting. Surgical debridement or incision and drainage was necessitated in 89% (49 of 55) of cases. The limited number of other surgeries that were performed included ganglion excision (4%, 2 of 55), carpal tunnel release (2%, 1 of 55), De Quervain's decompression (2%, 1 of 55), trapeziectomy (2%, 1 of 55), and repair of tendons from attenuation and rupture in a patient with rheumatoid arthritis (2%, 1 of 55).

Table III: Table summarising the hand pathology non-traumatic (HPNT) and orthopaedic pathology non-traumatic groups (OPNT)

	Hand Pathology Non-Traumatic (HPNT) n=91				Orthopaedic Pathology Non-Traumatic (OPNT) n=437				
	Counts (n)	**% of Total**	**Mean**	**SD**	**Counts (n)**	**% of Total**	**Median**	**IQR**	
Age	91		38	18	437		44	41	***Age***
Gender *(2 missing)*	**89**				**437**				***Gender***
Female	38	43%			242		55%		*Female*
Male	51	57%			195		45%		*Male*
Attended to in clinic or									***Attended to in clinic or***
Clinic	27	30%			315		72%		*Clinic*
Acute room	64	70%			122		28%		*Acute room*
Urgent/Emergent or Elective									***Urgent/Emergent or Elective***
Urgent/Emergent	61	67%			46		11%		*Urgent/Emergent*
Elective	30	33%			391		89%		*Elective*
Side of pathology	**91**				**334**				***Side or level of injury*** *(103 missing)*
Left	47	52%			81		24%		*Left*
Right	40	44%			92		27%		*Right*
Bilateral	4	4%			62		19%		*Bilateral*
					19		6%		*Cervical*
					11		3%		*Thoracic*
					69		21%		*Lumbar*
Diagnosis	**91**				**437**				***Diagnosis***
Tumour [a]	8	9%							***Acute/Chronic Infection***
Infection [b]	62	68%			4		1%		*Upper limb*
Congenital hand difference [c]	4	4%			37		9%		*Lower limb*
Tendinopathy [d]	5	6%			15		3%		*Spine*
Arthropathy [e]	9	10%							***Osteoarthritis***
Compressive neuropathy [f]	3	3%			12		3%		*Upper limb*
					133		30%		*Lower limb*
					100		23%		*Spine*
					136		31%		***Other*** [§] ***/unknown***
Management									
Required admission at any visit	52	57%							
Discharged during study period	2	2%							
Index presentation in study period	71	78%							
Follow-up visit	20	22%							
Required surgery	55	60%							
Surgery required	**55**								
Debridement or I&D	49	89%							
Ganglion excision biopsy	2	4%							
De Quervain's/CT release	2	4%							
Tendon repair (Rheumatoid)	1	2%							
Trapeziectomy	1	2%							

Continuous variables expressed as medians with interquartile range (IQR) or medians with standard deviation (SD). Categorical variables expressed with counts (n) and percentages (%) of total. a – ganglia or undiagnosed mass, b – paronychia and eponychia, phelon, tenosynovitis, palmar abscess, web space abscess, cellulitis, osteitis and septic arthritis, c - syndactyly and camptodactyly, d - trigger finger and De Quervain's, e - degenerative osteoarthritis and rheumatoid arthritis, f- Carpal tunnel syndrome, § Blounts, congenital talipes equinovarus, slipped capital femoral epiphysis, chronic pain, gait abnormalities, scoliosis. CT – Carpal tunnel

Discussion

We undertook this study to determine the burden of hand pathology in regional orthopaedic hospitals in KwaZulu-Natal, a province with a limited number of hand specialist units and hand rehabilitative services.

Secondarily, we aimed to identify the most common hand pathologies, and describe the demographics of patients typically presenting with them. We determined that the prevalence of hand pathology in this setting is 21% (497 of 2335) and is predominantly comprised of traumatic injuries (82%, 406 of 497), which equates to 17% (406 of 2335) of all orthopaedic presentations. Patients presenting with hand pathology had a median age of 32 years (IQR 28, 0-88) and the majority (64%, 315 of 494, 3 missing) were male. These figures represent a significant burden of disease, both to regional orthopaedic hospitals in KwaZulu-Natal, and to the local labour force.

Whilst we did not collect disability measures in these patients, extrapolation of the data from Trybus et al. who reported 59% residual impairment following hand trauma despite adequate rehabilitation, would mean that on average 240 patients per week (958 per month) have residual functional impairment following trauma to the hand in KwaZulu-Natal.[8] This is particularly concerning following the Statistics South Africa (Stats SA) disability report in 2014 (the most recent disability report, compiled from the 2011 census).[19] The report stated that KwaZulu-Natal's disability prevalence was 8.4%, higher than the national average of 7.5%, and that KwaZulu-Natal had the second highest percentage of persons with disability who were unemployed.[19]

Regarding the traumatic injury prevalence, a 2017 Global Burden of Disease study analysis determined that high socio-demographic index (SDI) countries (SDI greater than 0.8) have the greatest prevalence of hand injuries.[20, 21] Low-middle (SDI between 0.45 - 0.6) and middle SDI (SDI between 0.6 and 0.68) countries had the greatest increase in prevalence rates over the preceding 27 years, but the authors commented that there was significant geographic variation.[20, 21] For comparison, Warwick et al. in their white paper for the British Society for Surgery of the Hand reported that 20% of patients attending emergency services in Britain (High SDI of 0.85 - 2019) presented with hand Injuries.[21, 22] A Brazilian cohort (Middle SDI of 0.64 – 2019) reported 21% of orthopaedic presentations were for hand injuries, and in our South African cohort (Middle SDI of 0.68 – 2019) the prevalence of hand trauma was 17% of all orthopaedic presentations.[21, 23] A Ugandan (Low SDI 0.4– 2019) report documented a prevalence rate of 4.7%.[21, 24]

On review of the hand trauma within our cohort, 46% of hand injuries were DR fractures. Although the median age in the DR group was 31 years, the data was widely spread. There was a peak in childhood around 10 years, from 30 – 65 years of age there was an even distribution of cases, after which case numbers tapered off. The findings in paediatric patients are consistent with previous investigation.[25] Shah et al. reported that one quarter of all paediatric fractures occur at the DR.[25] By indirect comparison, we were able to determine that in children aged 18 or younger who sustained traumatic injuries (i.e. not only fractures), 17% were distal radius fractures. Furthermore, in Shah's epidemiology investigation of DR fractures, the mean age at injury was 9.9 years, and similar to our findings.[25] In adult patients the epidemiology of DR fractures typically follow a bimodal distribution.[26] Broadly speaking, younger adult males usually sustain DR fractures from high energy mechanisms, and elderly women sustain fragility fractures from low energy mechanisms.[26] This was not true of our patient data, we did not have two distinct peaks in the age distribution for our cohort, and only 7% of patients in whom the mechanism was known, had a high energy mechanism reported such as an MVA. Only one of these patients was a male aged younger than 45. The vast majority (88%) of adults patients sustained DR fractures from low energy falls. This raises the concern that reduced bone mineral density (BMD) may be prevalent locally from a younger age. Both HIV antiretroviral therapy, and the viral infection, are established causes of reduced BMD.[27] Considering the KZN province has the highest prevalence of HIV in South Africa, it could be anticipated that osteopaenia will be more prevalent, with a consequently higher incidence of fragility fractures.[27, 28]

Also in contrast to both a local and an international study, only 7% of cases in our study were documented occupational injuries.[1, 29] In Warsaw, Poland, in a tertiary plastic surgery unit, occupational hand injuries accounted for 46% of traumatic hand injury cases seen.[29] Notably different from our investigation however was the documented exclusion of isolated bony trauma and closed tendon injuries, which were referred to the orthopaedic department of that facility. Occupational injuries occur usually from high energy injuries such as power tools and power machinery, are more likely therefore to result in open fractures and involve multiple

structures, and would have been seen preferentially at the plastic department in this cohort and could at least partially account for this great variation.[1] Irrespective of the true prevalence rate of occupational hand injuries, surgeons responsible for management of hand trauma should be cognisant of the employment status of the patient, the implications of treatment for future work opportunities, and should utilise the interaction to advise patients on precautions with machine operation and safety glove use.

Considering the soft tissue envelope of the hand, it is foreseeable that compound injuries will be more prevalent to the hand. We found 23% of hand trauma cases to be compound, lower than the 37% reported by Frazier et al. from the UK.[30] Nevertheless, this subgroup of patients with trauma to the hand frequently complicate with infection, chronic pain and functional impairment and should be managed expediently to minimise these complications.[8]

Hand infection, of spontaneous onset unrelated to trauma, was the most common presentation in the non-traumatic hand pathology group, representing 62 cases. Greyling et al. reported 66 cases of spontaneous onset hand infection over a six month period at a hospital in Bloemfontein, South Africa.[6] This equates to three cases of hand sepsis a week, approximately half the number of cases seen weekly per hospital in our investigation. What could account for this difference is unclear, although one consideration would again be the high prevalence of HIV in the KZN province (27%).[28] Van der Vyver et al. theorised that immunocompromise could account for the relatively high number of spontaneous onset hand infections (58%) in their local KZN investigation, as compared to international cohorts where infection was more commonly related to trauma.[5, 9] They advocated for hand hygiene awareness initiatives for immunocompromised patients.[5] They also recommended that health care workers be cognisant of the increased risk of complications in hand infections in the immunocompromised cohort, and suggested regular follow-up and attention to wound care for these individuals to prevent morbidity and disability.[5]

This study had several limitations. Firstly, the cross sectional study was conducted for one week. This was a considered decision based on the knowledge that KZN medical records are still largely paper-based and of poor quality, which makes longitudinal data collection very difficult.[31] Due to the short duration however, we were able to extend the investigation to all the regional hospitals that offer orthopaedic services, to get a generalisable 'snapshot' of the burden of hand pathology across the KZN province. It should be born in mind that seasonal variations in infections, trauma, and arthropathies, can be anticipated, and so simple extrapolation of this data for longer durations will not reflect the true epidemiology. Secondly, the investigation was performed exclusively at regional facilities. Whilst this would mean that complex injuries and pathologies seen at referral institutions would not have been included, it was intentional that the burden of hand pathology seen by generalist orthopaedic units be delineated. However, we do recognise that cases managed at primary health care facilities would have been unaccounted for utilising this approach.

Conclusion

HP comprises 21% of all orthopaedic presentations to regional health facilities in KwaZulu-Natal offering orthopaedic care. HPT represents 23% of all the traumatic orthopaedic presentations and a disproportionate number of these injuries are compound, 23% vs 4%. The prevalence of HPNT is 17%, predominated by infections, and often require admission and surgery. Based on these findings targeted efforts to improve community awareness of precautions against trauma to the hand, osteopaenia, and hand hygiene are suggested as a preventative measures. Medical training should focus on appropriate management of DR fractures and hand infections, and resources allocated to the management of these debilitating HP to decrease the burden of disease.

Ethical statement

The author/s declare that this submission is in accordance with the principles laid down by the Responsible Research Publication Position Statements as developed at the 2nd World Conference on Research Integrity in

Singapore, 2010. The study complied with the South African Department of Health ethics guidelines (2015), and the University of KwaZulu Natal policy on research ethics. Prior to commencement of this research the appropriate ethical approval was obtained from the Biomedical Research Ethics Committee of UKZN (BREC/00003774/2022).

Declaration

The authors declare authorship of this article and that they have followed sounds scientific research practice. This research is original and does not transgress plagiarism policies.

Author contributions

ST: Study conceptualisation, data capture, first draft preparation, manuscript revision
MO: Study design, data analysis, manuscript preparation, critical review of final manuscript
WP: data capture, manuscript review
TM: data capture, manuscript review
KM: data capture, manuscript review
AP: data capture, manuscript review
KM: data capture, manuscript review
AD: data capture, manuscript review
OA: data capture, manuscript review
RA: data capture, manuscript review
AR: Study conceptualisation, critical expert review of draft and final manuscript

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Appendices

Appendix 1: The final Study Protocol

University of KwaZulu-Natal

College of Health Sciences

School of Clinical Medicine

Epidemiology of Hand Pathology in KwaZulu-Natal Regional Orthopaedic Hospitals

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11 September 2021

EXECUTIVE SUMMARY

Statement of purpose

Hand pathology in the international context is common, and contributes to; time off work, loss of income, change or loss of occupation and residual dysfunction. In South Africa, investigation has been performed into *traumatic* hand pathology and its ramifications for occupation. The broader burden of hand pathology, other than traumatic pathology, has not been investigated. This observational cross-sectional study aims to quantify the burden of hand pathology on regional hospitals in KwaZulu-Natal (KZN) that offer orthopaedic services, over the course of a week. Furthermore, it purports to ascertain who is affected by these pathologies and which pathologies cause the greatest burden, by number, to the KZN health system. The results of the study would inform focus areas that need more attention, and direct future research to address areas of concern.

Hand pathology broadly encompasses infection, degenerative and inflammatory arthropathy, trauma, peripheral neuropathies, tumours and congenital deformities. These conditions contribute to financial losses to the patient, due to time off work and loss of employment. There are also costs to the state in managing these cases. International reports note that hand pathology is ubiquitous, however in South Africa, the majority of investigation has focused on traumatic presentations only. There is a paucity of quantitative data on other aetiologies. In this study, we aim to determine the prevalence of hand pathology presenting to regional health facilities that offer orthopaedic services in KwaZulu-Natal. We propose to do this using observational, cross-sectional data collection, from patient and hospital records, for the course of a week. Data will be captured for all patients who present to the orthopaedic services at these facilities. With this information, we will determine the proportion of patients with hand pathology, their demographic characteristics, and the most frequent presentations.

This project will provide insight into the burden of hand pathologies to health services in KwaZulu-Natal and provide direction for future investigation by identifying the most common conditions. The data emanating from the study will be submitted for publication in an appropriate medical journal for dissemination to the relevant stakeholders.

TABLE OF CONTENTS

1. BACKGROUND AND LITERATURE REVIEW

1.1 Defining the Clinical Problem

Hand pathology has the propensity to cause functional impairment, loss of income, and present significant costs to the government in the form of expenditure on management and loss of economic contribution from the affected patients.[2] In the South Africa context, investigation has been performed to establish the burden of occupational hand trauma on the health care system in the Gauteng province.[2,4] Studies emanating from occupational therapy journals document a high case load of hand pathology in South Africa and KwaZulu-Natal respectively, however, at present there remains a deficit of quantitative data encompassing all hand conditions.[1,4,5]

1.2 The literature review

Various terms in the literature are used to describe hand pathology. Upper extremity disorders can include any disorder causing pain or disability from the neck, extending to the fingertips.[16] Alternatively, hand disorders can be confined exclusively from the wrist to the phalanges.[16] For the purpose of this study hand pathology broadly encompasses infection, trauma, degenerative and inflammatory arthropathies, tendinopathies, neuropathies, tumours and congenital deformities of the hand and forearm.

Pathology to the hand affects both the patient and the economy negatively.[1,2,16] There are opportunity costs to the patient, namely, time off work and potential loss of income and occupation.[1,2,16] This in turn decreases patients' capacity to contribute to the economy.[2,16] Internationally, reports show a general increasing trend in the prevalence of hand pathology, particularly occupational injuries and overuse syndromes.[16]

Hand trauma is recognised as both a common and a debilitating condition. A study from the USA reports 10% of patients never return to their original occupation, either due to permanent disability or due to a change in occupation.[3] 58.5% of hand injuries in this study had residual functional impairment despite adequate rehabilitation.[3] In the South African context, several

studies highlight the burden of hand trauma. A study emanating from Gauteng province delineated the common aetiologies of occupational hand injuries.[2] Two occupational therapy studies investigated challenges to providing hand therapy (most often cited as 'high case load' of injuries) and the prevalence of hand trauma presenting to occupational therapy practice in KZN respectively.[1,5]

Similarly, hand infections contribute toward financial losses for the patient and represent a burden to the South African health department, concerning the cost of managing these conditions.[6] Complications of hand infection can be devastating and have at times resulted in amputation.[7]

Various other common hand pathologies investigated in the international literature include carpal tunnel syndrome (CTS),[8] rheumatoid and osteoarthritis, hand tumours, tendinopathies and congenital deformities of the hand. CTS, the most frequent entrapment neuropathy, has been shown to have a huge socio-economic impact on the patient.[9] The median number of days away from work quoted in one UK study, was on average 27 days.[9] In the USA, surgical decompression equates to an economic cost in excess of $2 billion.[10] Degenerative arthropathies also impact negatively on quality of life. Rheumatoid arthritis (RA) of the hand can result in loss of grip strength and pain, impacting hand function.[11] Osteoarthritis (OA) involves the hands in 30% of cases and like RA causes functional deficit.[12] Studies show that 15% of soft-tissue tumours occur in the hand, and are a common reason for consultation to hand specialists.[13] Likewise, a review of tendinopathies of the hand and wrist, reported the frequency of these presentations.[15] Finally, congenital deformities of the hand are also more prevalent than previously thought, most notably is the case of polydactyl.[14]

These studies highlight that hand pathology is common. In the international literature various pathologies have been investigated, but in South Africa, studies have been limited to the investigation of hand trauma.[1,2,4,5] These studies also emphasise that hand pathology can cause significant functional impairment and are an economic burden.[2,4] There remains, however, a paucity of quantitative data on hand pathology, especially non-traumatic, in South Africa. The

goal of this study is to provide insight into the burden of hand pathology, to inform future research focus and allocation of resources in our constrained setting.

1.3 The research question

What is the epidemiology of hand pathology in regional orthopaedic hospitals in KwaZulu-Natal?

2. AIMS AND OBJECTIVES

2.1 Aims

The purpose of this study is to quantify the burden of hand pathology on regional hospitals offering orthopaedic services in the province of KZN, South Africa. Secondary aims include ascertaining in whom these pathologies occur and which pathologies occur most commonly, thereby causing the greatest burden to the KZN health system.

2.2 Objectives

1. To calculate the prevalence of hand pathology cases seen by orthopaedic doctors in emergency and outpatient departments at regional health facilities in KwaZulu-Natal.
2. To describe the demographics of patients with hand pathology.
3. To identify the common hand pathologies presenting to regional hospitals offering orthopaedic services.

3. METHODS

An observational, cross-sectional study design will be utilised following the STROBE guidelines. Patient charts and hospital records will be used to capture patient demographic and pathology data in a proforma document, for all patients presenting with hand pathology over the course of one week. This will be performed in all regional hospitals in KZN that offer orthopaedic services, within the orthopaedic outpatient departments or emergency departments, where patients are attended to by orthopaedic doctors. All of the remaining patients who do not present with hand pathology, but are attended to by orthopaedic doctors, will comprise the comparative group. Basic demographic data and diagnosis will be captured for these remaining

patients. With this information we will be able to calculate the prevalence of hand pathology at regional orthopaedic facilities, as well as determine the most common presentations and demographics of these patients.

3.1 Study design

Quantitative, observational, descriptive, cross-sectional study

3.2 Study setting

The study will take place in all the hospitals in the Kwazulu-Natal province that offer regional orthopaedic services (ten in number). Namely: Addington Hospital, Edendale Hospital, General Justice Gizenga Mpanza Hospital, King Edward VIII Hospital, Ladysmith Hospital, Madadeni Hospital, Ngwelezane Hospital, Port Shepstone Hospital, Prince Mshiyeni Hospital and R.K. Khan Hospital.

3.3 Participants selection and sampling strategy

Hospital records or patient charts of all patients that are assessed in orthopaedic clinics and emergency departments by orthopaedic doctors over one week will be required for this study. The *study* group will be those patients with documented hand pathology and the *comparison* group will comprise the remaining patients. Non-probability, convenience sampling, will be exercised in this study.

Hand pathology will be defined as inflammatory or osteoarthritis of the wrist and hand. Bony trauma will include the distal radius and ulna and any other bony injury distal to this. Infections, tumours, tendinopathies and congenital deformities will include those distal to the elbow. Nerve pathology will include nerves arising from the plexus (including avulsions or injury at root, trunk, division or cord level) or injury/compression anywhere along the peripheral nerve course.

3.3.1 Inclusion criteria

- Data collection will be from clinic records and chart reviews, patients of any age, gender and mental capacity will be eligible for inclusion.
- Hand pathology for the study will include infection, inflammatory and degenerative disorders, congenital deformities, tumours and tendinopathies of the forearm, distal to the elbow.
- For hand trauma, distal radius or ulna fractures (occurring 5cm proximal to the wrist joint) or injury to any bone distal to this point.
- All peripheral nerve pathology of the upper limb will be included. Specifically, this will include pathology to the brachial plexus; its roots, trunks, divisions, cords, or peripheral nerves anywhere along the course.

3.3.2 Exclusion criteria

- Forearm fractures involving the proximal and middle aspects of the radius and ulna, and fractures of the humerus or elbow.
- Infection, tumours, tendinopathy, congenital deformities, arthropathies of the shoulder, arm and elbow will be excluded.

3.4. Measurements

Demographic data and data pertaining to the hand pathology will be collected from the hospital records and patient charts on a proforma document and later captured in a computerised form. Keeping both a paper and computerised record is to ensure accuracy and to cross-reference if discrepancies are detected. A co-investigator has been identified at each of the hospitals and will perform the data capture at their respective institutions.

The data capture form will include each patient's age, hospital number (to prevent duplicate entry and removed before capture on the electronic form), gender, occupation, diagnosis, mechanism of injury and date of injury (for trauma), or date of

pathology/symptom onset (non-traumatic cases). The comparison group, the patients without hand pathology, will have only age, hospital number, gender and diagnosis captured. With this data, we will be able to calculate the prevalence of hand pathology at regional hospitals offering orthopaedic services, as well as determine the most common pathologies seen, and the demographics of the affected patients.

3.5. Data collection and statistical analysis

To ensure reliability all the investigators, responsible for the capture of the data at the various regional hospitals, will meet before data collection to work through the proforma document and clarify any questions or confusion that may arise.

In each of the 10 regional facilities, a co-investigator has been identified. These co-investigators will be issued with the proforma template in paper and electronic form, to be populated. (Appendix A) The hard copy will be kept in the possession of the investigator, for later capture to the electronic format. The electronic form will be completed on a password-protected, personal computer of each investigator. The proforma design is a Microsoft Excel document (Microsoft ® Excel for Mac – version16.48 (21041102)) comprising three spreadsheets. One sheet will tally the details of the total number of patients attended to by the respective orthopaedic departments. The second sheet is to capture traumatic hand pathology, and the third sheet captures all other hand pathology case details. The patients' hospital numbers will be captured initially, this will be necessary to ensure there are no duplicate entries. No other personally identifying information will be captured on the proforma. Upon assimilation of the 10 hospitals' data, the duplicates will be removed and the hospital numbers codified using the 'VLOOKUP' function in excel.

This is a descriptive study aimed at determining the prevalence of hand pathology. This analysis will be performed with the use of Microsoft Excel and will be performed by the principal investigator and assisted by the supervisor and co-supervisor. Prevalence will be expressed as a percentage, calculated by the ratio of hand pathology cases as compared to the total number of presentations to orthopaedic facilities. Summation of the various hand pathologies as

categorical (nominal) variables will be expressed as percentages for each group. Description of the demographic details of the patients categorical (nominal) variables such as gender and occupation will be expressed in counts or percentages. Numerical (discrete) data such as duration and age will be expressed as means with standard deviations (if normally distributed) or as medians with interquartile range (if non-parametric).

3.6 Sample size, statistical power and variable selection

This epidemiological study is descriptive and not analytical. The study aims to determine the prevalence of hand pathology as opposed to detecting a statistically significant relationship, and as such, a sample size calculation was not performed.

4. ETHICAL CONSIDERATIONS

This study will comply with the South African Department of Health research ethics guidelines (2015) and the University of KwaZulu-Natal (UKZN) policy on research ethics. Each of the investigators and co-investigators will be required to perform ethics certification, and a South African module, before the commencement of the study. This is however an observational, descriptive, cross-sectional study looking at patient charts and hospital records and as such poses no physical or psychological risk to patients. To ensure patient confidentiality, the only identifier collected will be the hospital number of the patient. This will be necessary to ensure there are no duplicate entries. No other personally identifying information will be captured on the proforma, and these numbers will be removed after all the records have been combined and duplicates removed.

4.1 Community participation

Community engagement has not been undertaken for this present chart and hospital record review.

4.2 Social value

This study will delineate the contribution of hand pathology to orthopaedic

presentations at health facilities offering regional orthopaedic services in KwaZulu-Natal, which has not previously been established. This could be used to guide resource allocation for the most prevalent entities and guide future investigation to focus on the most common disorders.

4.3 Scientific validity

The validity of the study will be ensured with the inclusion of both a study and a comparative group to calculate prevalence. Thus, it will be important to capture the total number of patients attending orthopaedic clinics and emergency departments that are attended to by orthopaedic doctors, as well as to accurately capture the study group cases according to the clearly defined inclusion and exclusion criteria. By including all the regional hospitals in KZN, it will broaden the generalisability of the data and will improve the applicability of the results to the KZN population.

4.4 Fair selection of participants

There is no benefit to the patient from this cross-sectional study and so fair selection of participants does not apply.

4.5 Risk/benefit balance

There are no direct benefits to the patient in this study, there are indirect social benefits in understanding the extent of hand pathology burden on society and focusing research and resources on the more common pathologies.

The social risk to the patient is a potential breach of confidentiality by using their hospital number in the initial data capture. As explained previously however, this information will be de-identified on amalgamation and stored without identifiers. We don't foresee any data to be captured being of a sensitive nature.

4.6 Independent ethics review

Ethics approval is sought from UKZN, as well as the National Health Research Ethics

Committee and the 10 Hospitals with regional orthopaedic services where the research will take place.

4.7 Informed consent

Not applicable.

4.8 Ongoing respect for participants

Hard and electronic copies of the data will be destroyed 5 years after completion of the research project. After the data from the 10 hospitals has been collected, only the principal investigator and the supervisors will have access to the de-identified combined data during write-up. Thereafter, the electronic data will be kept on the principal investigator's password protected personal computer only. The data will be shared with the scientific community in the form of a research article published in a relevant journal, with no identifying information.

5. METHODOLOGICAL CHALLENGES AND STUDY LIMITATIONS

Several limitations and methodological limitations can be identified:

The study will focus on hospitals offering regional orthopaedic services, and not district or tertiary hospitals. This is because the majority of hand pathology cases are primarily seen in the regional hospital setting, however various complex cases that present to tertiary facilities, or simpler cases that are managed by general practitioners or district facilities will not be accounted for by sampling in this manner.

Collecting data will rely on the orthopaedic doctors' and co-investigators', working at the selected regional hospitals, understanding of hand pathology and the quality of records at the respective institutions. To minimise the variability of the data, we would like to engage the

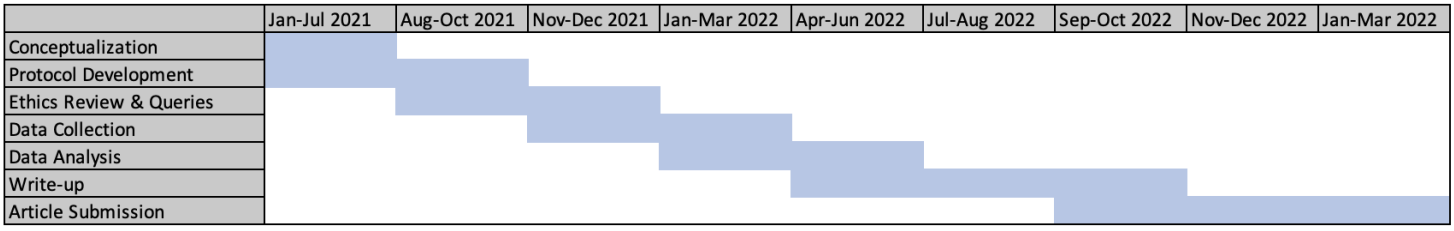
investigators with a tutorial, before data collection, to address any areas of confusion and to prevent data collection errors.

Some hand pathologies have seasonal presentations, such as degenerative arthropathy and infections. The selection of the week on which data collection will occur is important so as not to obtain data skewed to these various pathologies. A more lengthy period of observation across these seasonal boundaries could yield additional important information, but is beyond the scope of this study.

Finally, of similar interest but also beyond the scope of this study, would be the investigation of the associated cost of management that these pathologies incur. This is a consideration for a future research proposal to investigate.

6. FEASIBILITY

6.1 Timelines and project management.



6.2.Study team, contributors and authorship.

Name	Department	Contribution	Author or acknowledgement
Swaleh Thabit	Orthopaedics, UKZN	Principal Investigator, data amalgamation, data analysis, drafting of protocol and article	Author
Antoine Rocher	Orthopaedics, UKZN	Supervisor, conceptualisation, data analysis, drafting of protocol and article	Co-Author
Megan O'Connor	Orthopaedics, UKZN	Co-supervisor, data analysis, drafting of protocol and article	Co-Author
Ridwaan Aboobaker	Orthopaedics, Edendale Hospital	Co-investigator, data acquisition	Co-Author
Waseem Parker	Orthopaedics, Port Shepstone Hospital	Co-investigator, data acquisition	Co-Author
Tumelo Mashishi	Orthopaedics, General Justice Gizenga Mpanza Hospital	Co-investigator, data acquisition	Co-Author
Olaulo Adewusi	Orthopaedics, Ladysmith Provincial Hospital	Co-investigator, data acquisition	Co-Author
Adriaan de Villiers	Orthopaedics, R.K. Khan Hospital	Co-investigator, data acquisition	Co-Author

Ahmed Peer	Orthopaedics Addington Hospital	Co-investigator, data acquisition	Co-Author
Kaya Matanzima	Orthopaedics, Prince Mshiyeni Memorial Hospital	Co-investigator, data acquisition	Co-Author
Sicelo Mkize	Orthopaedics King Edward VIII Hospital	Co-investigator, data acquisition	Co-Author
Mantame Mandilakhe	Orthopaedics Madadeni Hospital	Co-investigator, data acquisition	Co-Author
Kehlin Moodley	Orthopaedic Ngwelezane Hospital	Co-investigator, data acquisition	Co-Author

6.3. Participating Centres

The study will take place in all the hospitals in the Kwazulu-Natal province offering regional orthopaedic services (10 in number). Namely: Addington Hospital, Edendale Hospital, General Justice Gizenga Mpanza Hospital, King Edward VIII Hospital, Ladysmith Hospital, Madadeni Hospital, Ngwelezane Hospital, Port Shepstone Hospital, Prince Mshiyeni Hospital and R.K. Khan Hospital. Gatekeeper approval will be sought from each of these facilities.

6.4 Study Funding and Progress

Item Description	**Cost**	
Paper copies of proforma documents for each facility Other stationary estimate	80c per copy x 50 (for 10 facilities) = R400 R100	Will be carried by the PI and Supervisors
Data costs for e-mail communication between the investigators and supervisors	R0	Negligible
Total Project Cost	R500	

7. STUDY SIGNIFICANCE

This study will provide information on the prevalence of hand pathology in Kwa-Zulu Natal, the first study of this nature performed in KZN of which we are currently aware.

8. REFERENCES

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Appendix 2: The Guidelines for Authorship for the SAOJ selected for submission of the manuscript

Abbreviated Information For Authors from the South African Orthopaedic Journal Website

Authors submitting articles for consideration for publication by the journal are required to familiarise themselves with the journal Ethics and Malpractice policy prior to submission. The policy is available on the journal website: https://www.saoj.org.za

Some specific guidelines applicable to the SAOJ:

- Consistency is one of the most important factors in presenting a well-formatted, professional manuscript.
- The nature of the measurements and variables reported on will often dictate the amount of precision required. Report numbers - especially measurements? with an appropriate degree of precision. For ease of comprehension and simplicity, round to a reasonable extent.
- The recommendation is to report the number of decimals that have both clinical and statistical meaning and consistently reporting all other variables in the same manner.
- Note: Generally, for descriptive purposes, percentages are reported as whole numbers except when dealing with really large sample sizes
- At least for the primary outcomes, report a measure of precision (a confidence interval).
- Although not preferred to confidence intervals, if desired, *p* values should be reported as equalities to three decimal
- places (e.g., $p = 0.031$ and not as inequalities: e.g., $p < 0.05$). Do NOT report NS; give the actual *P-value*. The smallest *P*-value that needs to be reported is $P < 0.001$.
- Report numerators and denominators for all percentages
- Summarize data that are approximately normally distributed with means and standard deviations (SD). Use the format: mean (SD)
- Summarize data that are not normally distributed with medians and interpercentile ranges, ranges, or both.
- Do NOT use the standard error of the mean (SE) to indicate the variability of a data set. Use standard deviations, inter-percentile ranges, or ranges instead.

Formatting examples:

- $p = 0.028$ or $p < 0.001$
- (43% vs 21%; p = 0.002)
- (odds ratio (OR) 0.38; 95% confidence interval (CI) 0.71 to 1.82; $p = 0.822$) or after first use (OR 1.62; 95% CI 1.41 to 1.86; $p < 0.001$)
- *Descriptive stats normal distribution:* mean age 36 years (SD 4 years) or 36 years (SD 4; range 40 to 97 years)
- *Descriptive stats non-normal distribution:* median age 36 years (IQR 44 to 88 years) or 36 years (IQR 44 to 88 years; range 40 to 97 years)
- *Descriptive stats percentage:* (149 of 202; 74%)

Formatting of submissions

Text formatting

- Use Helvetica or Arial font, size 11.
- Use double line spacing throughout the document.
- Number the pages of the blinded manuscript consecutively.
- Use italics for emphasis.
- When referring to an article with multiple authors, please use the following format: Rabinowitz et al. published their retrospective review.
- Do not use field functions.
- Use tab stops or other commands for indents, not the space bar.[23]
- Use the table function, not spreadsheets, to make tables.

- Use the equation editor or MathType for equations.
- Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

Headings

- Use no more than three levels of displayed headings.

Abbreviations

- Define abbreviations and acronyms at first mention and use consistently thereafter.

Units

- Follow internationally accepted rules and conventions: use the international system of units (SI). If other units are mentioned, please give their equivalent in SI.

Figures

- Figures should be numbered consecutively with illustration Arabic numbers 1, 2, 3, etc.
- The figure should be listed in the text as follows: … wound irrigation and splinting (*Figure 1*).
- Figures should be clear and easily understandable with a full descriptive legend stating any areas of interest and explaining any markings, letterings or notations. All figures and figure legends should be understandable as a stand-alone item, without having to read the main body of the text.
- For radiographs, please ensure you state the view used and the time point at which it was taken, as well as the demographic details of the patient if applicable.
- Please submit the original JPEG (300 dpi) or TIFF of all photographs, as well as the figure saved as a Word document. The Word version of the figure should be complete with the legend and any necessary markings such as letters or arrows.
- Figures such as graphs and algorithms should be in Word or PowerPoint in order to be editable.
- Figures should not be imbedded in the text file but should be submitted as separate individual files. Each figure should be a separate file, entitled Figure 1, Figure 2, etc.
- Remove all markings, such as patient identification, from radiographs before photographing. Clinical photos must be adequately anonymised.
- A statement of patient consent for clinical photographs must be provided on the title page.
- In images depicting X-rays of children there should exhibit adequate shielding of radiation.
- All line or original drawings must be done by a professional medical illustrator.
- We accept a maximum of six figures. You may apply to the Editor-in-Chief for permission to include more figures if considered critical to the clarity and completeness of the submission.
- Do not submit any figures, photos, tables, or other works that have been previously copyrighted or contain proprietary data unless you have obtained and can supply written permission from the copyright holder to use that content.

Tables

- Tables should carry uppercase Roman numerals, I, II, III, etc.
- Tables should always be cited in the text in consecutive numerical order.
- The table should be identified in the text as follows: Details of results are listed in *Table I*. Or, alternatively,? high-energy trauma that is often associated with these fractures (*Table II*).
- Tables should be used to present information in a clear and concise manner. All tables should be understandable without the main text.
- For each table, please supply a table heading explaining the components of the table.

- Identify any previously published material by giving the original source in the form of a reference at the end of the table heading.
- Footnotes to tables should be indicated by superscript lower-case letters and included beneath the table body.
- Please submit tables as editable text and not as images. They should be created using the Table tool in Word.
- Do not embed tables in the text file but submit them as separate individual files. Each table should be a separate file, entitled Table I, Table II, etc.
- We accept a maximum of eight tables.
- Do not duplicate information given already in the text.
- Do not submit any figures, photos, tables or other works that have been previously copyrighted or contain proprietary data unless you have obtained and can supply written permission from the copyright holder to use that content.

References

- References should be numbered consecutively in the order that they are first mentioned in the text and listed at the end in numerical order of appearance.
- Identify references in the text by Arabic numerals in superscript after punctuation.
- References should not be a listing of a computerised literature search but should have been read by the authors and have pertinence to the manuscript.
- Accuracy of references is the authors' responsibility, and the author is to verify the references against the original documents.
- Manuscripts in preparation, unpublished data (including articles submitted but not in the press) and personal communications may not be included in the reference listing. They may be listed in the text in parentheses only if absolutely necessary to the contents and meaning of the article.
- The titles of journals should be abbreviated according to the style used in Index Medicus, obtainable through the website http://www.nlm.nih.govshould
- The following format should be used for references:

Journal article:
Sidhu GS, Ghag A, Prokuski V, Vaccaro AR, Radcliff KE. Civilian gunshot injuries of the spinal cord: a systematic review of the current literature. *Clin Orthop Relat Res* 2013;**471**:3945-55.
Ideally, the names of all authors should be provided, but the usage of *et al*. in long author lists (more than six authors) will also be accepted: Fong K, Truong V, Foote CJ, *et al*. Predictors of nonunion and reoperation in patients with fractures of the tibia: an observational study. *BMC Musculoskelet Disord* 2013;**14**:103.
Online journal article:
Caetano-Lopes J, Lopes A, Rodrigues A, *et al*. Upregulation of inflammatory genes and downregulation of sclerostin gene expression are key elements in the early phase of fragility fracture healing. *PLoS One* 2011;**6**:e16947.

Structure and content of submission

Title
Abstract

- A structured abstract (maximum of 350 words) summarising the most important points in the article is required.
- The abstract consists of four paragraphs with the subheadings:
  - Background (must include the aim of the study)
  - Patients and methods
  - Results
  - Conclusion
- References should be avoided. Avoid uncommon abbreviations. If essential, they must be defined at their first mention in the abstract itself.

Keywords

- Immediately after the abstract, provide a maximum of six keywords using standard searchable terms. These keywords will be used for indexing purposes.

Level of evidence

- Level 1 to 5.

- Please follow the level of evidence guidelines provided by the Oxford Centre for Evidence-Based Medicine (OCEBM); version 2.1.
- Available from: OCEBM Levels of Evidence Working Group. 'The Oxford Levels of Evidence 2'.Oxford Centre for Evidence-Based Medicine. http://www.cebm.net/index.aspx?o=5653

Introduction

- The introduction should contextualise the study by providing the background to the research; explain the problem that is to be addressed, and provide the rationale for the study.
- Briefly outline the relevance of the study with respect to the current literature. Avoid a detailed literature survey or a summary of the results.
- The last sentence should outline the research question or hypothesis.

Patients (or Materials) and methods

- State the methods, outcome measures, and selection criteria. The following aspects need to be described:
    - The study design and research methodology
    - Whether randomisation (with methods) was applied
    - If case-controlled, how the controls were selected
    - The time period under review
    - Number of patients/subjects under investigation and why this number was chosen
    - Inclusion and exclusion criteria
    - Case and outcome definitions
    - A description of the procedure or intervention, including post-operative protocol
    - The outcome measures or scores used
    - The minimum follow-up period
    - Statistical analysis paragraph. This should be included at the end of this section to detail statistical tests and package used, the reasons why these tests were used, and what p-value was considered statistically significant. A power analysis is recommended for studies comparing two or more groups.
- Provide sufficient detail so that another researcher can replicate the study.
- The reader should understand from this description all potential sources of bias such as referral, diagnosis, exclusion, recall or treatment bias. This includes the manner in which investigators selected the patients. Consecutive inclusion implies all patients with a given diagnosis are included, while selective implies patients with a given diagnosis but selected according to certain explicit criteria (e.g., state of disease, choice of treatment).
- Do not describe standard procedures for common operations. Only include new procedures or adaptations to standard procedures.
- If you name any specific product, it requires the manufacturer's name, city and state/country.
- Present information in the narrative format and use the past tense.
- Where relevant, tables or figures may be included to provide information more clearly.
- Generally, no data should be presented in this section.

Results

- Describe the relevant results and analysis thereof.
- Provide details of the number of patients included and excluded, as well as the reason for exclusion.
- It is important to state the follow-up period (mean and range).
- The results can be broken down into separate sections, e.g. Treatment, Functional outcome, Complications, etc.
- Tables may be used but avoid repeating data reported in the text in the tables.
- All appropriate data should be presented as means with ranges, not with standard deviations (SDs). Medians should only be used when the data is skewed,

accompanied by an interquartile range (IQR).
- Avoid using percentages in studies involving well under 100 subjects.
- All results must be backed up with p-values or survivorship analysis. All Kaplan-Meier data should be presented with confidence intervals. Always present exact absolute p-values, whether significant or not, unless $p<0.001$.
- However, *P-values* do not always convey the entire picture and where relevant, the confidence interval will also be required (in addition to the power of the study reported in the methods section).

Discussion

- The question or hypothesis stated at the end of the introduction should be discussed and either supported or rejected.
- The results must be interpreted clearly, and any deficiencies expressed. All possible confounding factors, sources of bias or weaknesses in the study should be identified.
- Explore the significance of the results of the work rather than repeating the results.
- The discussion must point out the relevance of the work described in the paper and its contribution to current knowledge.
- Explain what can be deduced from the results and how will it affect clinical practice.
- Include a review of the relevant literature, placing the results of the study in the context of previous work in this area.
- Discussion of relevant prior research and references must be concise. Avoid extensive citations and discussion of published literature emphasize previous findings that agree (or disagree) with those of the present study.
- Do not repeat the introduction.
- Present the limitations of the study and suggest how the study could have been improved for a future study.
- Avoid making inferences from non-significant trends unless you believe your study is adequately powered to answer the question; in that case, provide a power analysis.

Conclusion

- Provide a summary statement that conveys the conclusions of the findings.
- Do not draw conclusions not supported by the data obtained from the specific study presented.

Ethics statement

- For studies involving human subjects, please include an ethics statement as follows: 'All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.'
- For animal studies, please include the following ethical statement: 'All applicable international, national, and/or institutional guidelines for the care and use of animals were followed.'
- If the study did not involve human or animal subjects, state that: 'This article does not contain any studies with human participants or animals performed by any of the authors.'
- Please also include an informed consent statement: 'Informed consent was obtained from all individual participants included in the study.'
- Alternatively, for retrospective studies, please add the following sentence: 'For this study formal consent was not required.'
- If identifying information about participants is available in the article, the following statement should be included: 'Additional informed consent was obtained from all individual participants for whom identifying information is included in this article.'

Acknowledgements

- Acknowledgements should be placed at the end of the discussion and before the references.
- In this section, persons who were involved but did not earn authorship can be acknowledged.
- Statements should be brief. A person can be thanked for assistance or comments.
- Do not include contributions by editors or referees.

Author contributions

- Please state the contributions of each author
- For example: 'A.B contributed to the study conceptualisation, design, data analysis and manuscript preparation. C.D. contributed to data collection and manuscript preparation. E.F. contributed to ….'
- The types of contributions are:
    - Conceptualisation and design
    - Data collection or contribution
    - Data analysis
    - Manuscript preparation
    - Other contributions (please specify)

References

- Please refer to the section on Formatting of submissions.

<u>Tables and figures</u>

- Tables and figures should not be imbedded in the text file but should be submitted as separate individual files. Each table should be a separate file, entitled Table I, Figure 2, etc.
- Each table and figure should be provided with a heading or legend.
- Please refer to the 'Formatting of submission' section for further guidelines.

L

Appendix 3: Ethical approvals

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

20 May 2022

Dr Swaleh Hassan Abdalla Thabit (218000074)
School of Clinical Medicine
Medical School

Dear Dr Thabit,

Protocol reference number: BREC/00003774/2022
Project title: The Epidemiology of Hand Pathology in Regional Hospitals offering Orthopaedic Services in KwaZulu-Natal (KZN), South Africa.
Degree: MMed

EXPEDITED APPLICATION: APPROVAL LETTER

A sub-committee of the Biomedical Research Ethics Committee has considered and noted your application.

The conditions have been met and the study is given full ethics approval and may begin as from 20 May 2022. Please ensure that any outstanding site permissions are obtained and forwarded to BREC for approval before commencing research at a site.

NOTE TO PI: Amendment application must be submitted separately on RIG along with CV's and current TRREE RSA certificates for the two new co-PIs.

This approval is subject to national and UKZN lockdown regulations, see (http://research.ukzn.ac.za/Libraries/BREC/BREC_Amended_Lockdown_Level_1_Guidelines.sflb.ashx). Based on feedback from some sites, we urge PIs to show sensitivity and exercise appropriate consideration at sites where personnel and service users appear stressed or overloaded.

This approval is valid for one year from 20 May 2022. To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2015), South African National Good Clinical Practice Guidelines (2020) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be noted by a full Committee at its next meeting taking place on 14 June 2022.

Yours sincerely,

[redacted]

Prof D Wassenaar
Chair: Biomedical Research Ethics Committee

Biomedical Research Ethics Committee
Chair: Professor D R Wassenaar
UKZN Research Ethics Office Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Email: BREC@ukzn.ac.za
Website: http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

Physical Address: 330 Langalibalele Street, Pietermaritzburg
Postal Address: Private Bag X9051
Tel: 033 395 2805/ 3189/ 3123 Fax: 033 394 3782
Email: [redacted]
www.kznhealth.gov.za

DIRECTORATE:
Health Research & Knowledge Management

NHRD Ref: KZ_202202_012

Dear Dr SHA Thabit
(UKZN)

Approval of research

1. The research proposal titled '**Epidemiology of Hand Pathology in KwaZulu-Natal Regional Orthopaedic Hospitals**' was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

   The proposal is hereby **approved** for research to be undertaken at Addington, General Justice Gizenga Mpanza, Harry Gwala Regional, King Edward VIII, Ladysmith, Madadeni, Ngwelezane, Prince Mshiyeni, RK Khan and Port Shepstone Hospital.

2. You are requested to take note of the following:
   a. *All research conducted in KwaZulu-Natal must comply with government regulations relating to Covid-19. These include but are not limited to: regulations concerning social distancing, the wearing of personal protective equipment, and limitations on meetings and social gatherings.*
   b. *Kindly liaise with the facility manager BEFORE your research begins in order to ensure that conditions in the facility are conducive to the conduct of your research. These include, but are not limited to, an assurance that the numbers of patients attending the facility are sufficient to support your sample size requirements, and that the space and physical infrastructure of the facility can accommodate the research team and any additional equipment required for the research.*
   c. *Please ensure that you provide your letter of ethics re-certification to this unit, when the current approval expires.*
   d. *Provide an interim progress report and final report (electronic and hard copies) when your research is complete to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za*
   e. *Please note that the Department of Health shall not be held liable for any injury that occurs as a result of this study.*

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

[redacted]

Dr E Lutge
Chairperson, Health Research Committee
Date: 03/05/2022

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

ADDINGTON HOSPITAL

e Terrace, South Beach, DURBAN 4001
Address: P.O. Box 997, DURBAN 4000
31 3272970 Fax: 031 3683300

OFFICE OF THE CHIEF EXECUTIVE OFFICER

Reference: *9/2/3/R*

Date: 04/03/2022

Principal Investigator:
- **Dr SHA Thabit**

PERMISSION TO CONDUCT RESEARCH AT ADDINGTON HOSPITAL: "THE EPIDEMIOLOGY OF HAND PATHOLOGY IN REGIONAL HOSPITALS OFFERING ORTHOPAEDIC SERVICES IN KWAZULU-NATAL (KZN), SOUTH AFRICA "

I have pleasure in informing you that permission has been granted to you by Addington Hospital Management to conduct the above research.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure this office is informed before you commence your research.
4. Addington Hospital will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to Addington Hospital.

[redacted]

DR M NDLANGISA
CHIEF EXECUTIVE OFFICER
ADDINGTON HOSPITAL

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:
MEDICAL SERVICES

Harry Gwala Regional Hospital
Lot 89, Selby Msimang Road, Plessislaer, 3216
Tel: 033 395 4005 Fax: 033 395 4167

Enquires: Miss NF Mbele
Tel No. 033 3954042
Date: 13 April 2022

Dr Swaleh Thabit
University of KwaZulu-Natal
College of Health Sciences
School of Clinical Medicine

Dear Dr Swaleh

RE: EPIDEMIOLOGY OF HAND PATHOLOGY IN KWAZULU-NATAL REGIONAL ORTHOPAEDIC HOSPITALS

Your request dated 12 February 2022 is acknowledged and refers.

I have pleasure in informing you that permission has been granted by Harry Gwala Regional Hospital to conduct research in the form of filming a documentary program.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. The Hospital will not provide any resources for this research.
3. You will be expected to provide feedback on your findings to Harry Gwala Regional Hospital.
4. You will also be expected to notify the Medical Manager's office prior start date of the research.

Yours Sincerely,

[redacted]

DR [redacted]
SENIOR MANAGER - MEDICAL
HARRY GWALA REGIONAL HOSPITAL
033 395 4005

GROWING KWAZULU-NATAL TOGETHER

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

KING EDWARD VIII HOSPITAL
CLINICAL MANAGER

Corner of Sydney and Rick Turner Roads, Umbilo, Durban
Private Bag x02, Congella 4013
Tel: 031 360 3854 Fax: 031 206 1457 E-mail: KE8.MedicalManagerSecretary@kznhealth.gov.za
www.kznhealth.gov.za

Ref : KE 2/7/19/(04/2022)
Enq: Mr. W.P Kubheka
Research Programming

19 April 2022

University of KwaZulu-Natal
School of Clinical Medicine
Medical school

Dear Dr Thabit

PROTOCOL REFERENCE NUMBER: BREC/00003774/2022
Project Title: "The Epidemiology of Hand Pathology in Regional Hospitals offering Orthopedic Services in KwaZulu-Natal (KZN), South Africa ."

Permission to conduct research at King Edward VIII Hospital is provisionally granted, pending approval by the Provincial Health Research Committee, KZN Department of Health.

Kindly note the following:-

- The research will only commence once confirmation from the Provincial Health Research Committee in the KZN Department of Health has been received.
- Signing of an indemnity form at Room 8, CEO Complex before commencement with your study.
- King Edward VIII Hospital received full acknowledgment in the study on all Publications and reports and also kindly present a copy of the publication or report on completion.

The Management of King Edward VIII Hospital reserves the right to terminate the permission for the study should circumstances so dictate.

Yours faithfully

[redacted]

SUPPORTED/NOT SUPPORTED

DR. V. KALALA
CLINICAL MANAGER

19/04/2022
DATE

GROWING KWAZULU-NATAL TOGETHER

LV

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:

Postal Address: Private Bag X9928
Physical Address: 36 Malcom Road, Ladysmith, 3370L::
Tel: 036 637 2111 Fax: 036 631 4221 Email address: Mokhethi.Pule@kznhealth.gov.za
www.kznhealth.gov.za

LADYSMITH REGIONAL HOSPITAL
ACTING CHIEF EXECUTIVE OFFICER

Date:23/02/2022	File No:
To: Dr Swaleh Hassan Abdalla Thabit School of Clinical Medicine Medical School	From: Dr M Pule Acting Chief Executive Officer

RE: Permission to undertake Research on The Epidemiology of Hand Pathology in Regional Hospitals offering Orthopaedic Services in KwaZulu-Natal in Ladysmith Hospital.

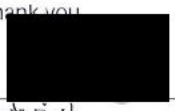
Dear Dr Thabit,

I have pleasure in informing you that permission has been granted to you by the hospital to conduct research on the "The Epidemiology of Hand Pathology in Regional Hospitals Offering Orthopaedic Services in KwaZulu-Natal in Ladysmith Hospital"

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regard to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN DOH.
3. Please ensure this office is informed before you commence your research.
4. The hospital will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to the hospital.

Thank you



Dr M Pule
Acting Chief Executive Officer
Ladysmith Regional Hospital

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

DIRECTORATE: office of the Medical Manager

Physical Address:
Postal Address: Private bag x6642 Newcastle 2940
Tel: 034 3288169 Fax: 034 3291959 Email: Elizabeth.lodewick@kznhealth.gov.za
www.kznhealth.gov.za

Enquiries: Mrs. HSL Khanyi
Date: 17/03/2022

To: Whom it may concern

Re: Request for Gate Keeper's Permission

Your request to conduct the research at Madadeni is supported pending the approval by KZNHealth Research unit.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure this office is informed before you commence your research.
4. The District Office/Facility will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to the District Office/Facility.

[redacted]

Department:
Health
PROVINCE OF KWAZULU-NATAL

Mrs. HSL Khanyi
Chief Executive Officer
Madadeni Hospital

Fighting Disease, Fighting Poverty, Giving Hope

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE:
MEDICAL SERVICES
SENIOR MANAGER : MEDICAL SERVICES

Postal Address: Private Bag x 20021 Empangeni 3880
Physical Address: Thanduyise Road- Empangeni 3880
Tel:035-9017273 Fax: 0865196873 Email address : tobias.gumede@kznhealth.gov.za
www.kznhealth.gov.za

Enquiries: Mr TB Gumede
Date: 02.03.2022

To: Dr S.H. Abdalla Thabit
School of Medicine
Medical School

Dear Sir / Madam

RE: PERMISSION TO CONDUCT RESEARCH AT NGWELEZANA TERTIARY HOSPITAL

I have pleasure in informing you that permission has been granted to you by Ngwelezana Tertiary Hospital Ethics and Research Committee to conduct research titled **"The Epidemiology of Hand Pathology in Regional Hospitals offering Orthopaedics Services in KwaZulu-Natal (KZN) South Africa"**

Please note the following:-

1. Please ensure that you adhere to all policies, procedure, protocols and guidelines of the Department of Health with regards to research.
2. Confidentiality of hospital information, including staff and patients or contact information must be kept confidential at all times, patient records are not to be removed from the hospital premises nor you are not allowed to photocopy/ photograph them.
3. This Facility will not provide any resources for this research.
4. You will be expected to provide feedback on your findings to the facility.
5. The Department of Health and hospital's staff will not be held responsible for any negative incidents and or consequences including injuries and illness that may be contracted on site.
6. You are requested to make contact with **Dr RS Moeketsi, Senior Manager: Medical Services** at Ngwelezana Tertiary Hospital once you are ready to commence your study.

We would like to take this opportunity to wish you all the best in your future endeavours.

Thank you,

Recommended/Not recommended by:

[redacted]

DR RS MOEKETSI
SENIOR MANAGER: MEDICAL SERVICES
CHAIRPERSON, ETHICS AND RESEARCH COMMITTEE
NGWELEZANA TERTIARY HOSPITAL

DATE 02/03/2022

Approved/Disapproved by:

[redacted]

MRS C.N.N. MKHWANAZI
ACTING CHIEF EXECUTIVE OFFICER
NGWELEZANA TERTIARY HOSPITAL

DATE 03/03/22

KWAZULU-NATAL PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

DIRECTORATE: Senior Manager: Medical

Postal Address : Mangosuthu Highway, Private Bag X 07, Mobeni
Name of Directorate: Prince Mshiyeni Memorial
Physical Address
Tel: 0319078317 Fax: 0319061044 Email address: myint.aung@kznhealth.gov.za
www.kznhealth.gov.za

Enquiry: Dr M AUNG
Ref No: 02/RESH/2022
Date: 08/03/2022

TO: Dr.S.H.Thabit,

RE: LETTER OF SUPPORT TO CONDUCT RESEARCH AT PMMH

Dear researcher;

I have pleasure to inform you that PMMH has considered your application to conduct research on **"The Epidemiology of Hand pathology in KZN regional hospitals. "** in our institution.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure this office is informed before you commence your research.
4. The institution will not provide any resources for this research.
5. You will be expected to provide feedback on you finding to the institution.

Should the following requirements be fulfilled, a Permission/ Approval letter will follow.

- Full research protocol, including questionnaires and consent forms if applicable.
- Ethical approvals from a recognized Ethic committees in South Africa

The management of Prince Mshiyeni Memorial Hospital reserves the right to terminate the permission for the study should circumstance so dictate.
Thank you.

[redacted]

MYINT AUNG
Senior Medical Manager & specialist in Family Medicine
MBBS, DO(SA), PGDip in HIV (Natal), M.Med.Fam.Med (natal), PhD
Tel: 031 9078317
Fax: 031 906 1044
myint.aung@kznhealth.gov.za

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

PORT SHEPSTONE REGIONAL HOSPITAL
Private Bag X5706, PORT SHEPSTONE, 4240
11 Bazley Street, PORT SHEPSTONE 4240
Tel: 039-6886208 Fax: 039-6821514

KWAZULU-NATAL DEPARTMENT OF HEALTH
PORT SHEPSTONE REGIONAL
HOSPITAL

Reference: HRKM140/15
Enquiries: Mr. LI Hlabe
Date: 2022/02/24

Chairperson: Research Committee
KZN Department of Health
Private Bag 9051
PIETERMARITZBURG
3200

PROJECT TITLE: THE EPIDEMIOLOGY OF HAND PATHOLOGY IN REGIONAL HOSPITALS OFFERING ORTHOPAEDICS SERVICES IN KWAZULU- NATAL (KZN) SOUTH AFRICA TO BE CONDUCTED BY DR. THABIT

OBJECT

To grant permission to Dr. Thabit to conduct the above mentioned research at Port Shepstone Regional Hospital.

SUPPORTING DOCUMENTS

Appended hereto is documentation received.

OFFER OF SUPPORT

This office wishes to inform that the proposed research to be conducted by Dr. Thabit is wholly supported. There are no financial implications.

RECOMMENDATION

In view of the above request I recommend the necessary authority be granted by the Research Committee for Dr. Thabit to continue with the research.

Submitted for your attention and further action.

Yours sincerely

[redacted]

Dr. PB Dlamini
Acting Chief Executive Officer
Port Shepstone Regional Hospital

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

Physical Address : R.K. Khan Circle
Physical Address : CHATSWORTH
Tel: [031] 4596001 Fax:[031] 4011247 Email:Dianne.naicker@kznhealth.gov.za
www.kznhealth.gov.za

DIRECTORATE:
R.K. KHAN HOSPITAL
OFFICE OF THE SENIOR
MANAGER: MEDICAL SERVICES

ENQUIRIES: DR B.S. MADLALA

22 FEBRUARY 2022

Dr Adriaan de Villiers
School of Clinical Medicine
Medical School

Dear Dr Villiers

RE: PERMISSION TO CONDUCT RESEARCH STUDY: THE EPIDEMIOLOGY OF HAND PATHOLOGY IN REGIONAL HOSPITALS OFFERING ORTHOPAEDIC SERVICES IN KWAZULU-NATAL, SOUTH AFRICA

Permission is granted to conduct the research study at this institution.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures protocols and guidelines of the Institution with regards to this research.

2. Please ensure this office is informed before you commence your research and your University's Ethics approval must be attached.

3. **You will be expected to provide feedback on your findings to this institution.**

4. You will be liaising with: Dr J. Rajpaul
   Head: Clinical Unit
   Orthopaedics Department
   Tel: 031-4596232/6244

Yours faith[redacted]

DR B.S. MADLALA
SENIOR MANAGER: MEDICAL SERVICES

health

Department:
Health
PROVINCE OF KWAZULU-NATAL

GJGM REGIONAL HOSPITAL
Postal Address: Private Bag x10609, Stanger 4450

Tel: 0324376015 Fax. 0867567812
Email.gustavo.lopez@kznhealth.gov.za
www.kznhealth.gov.za

OFFICE OF THE SENIOR MANAGER: MEDICAL SERVICES

Enquiries: Dr. G. Lopez
EXT: 6015
DATE: 28 /03/2022

Dr Swaleh Thabit

RE: PERMISSION TO CONDUCT RESEARCH AT STANGER HOSPITAL.

Dear Thabit;

I have pleasure in informing you that permission has been granted to you by Stanger Hospital to conduct research on: **Epidemiology of Hand Pathology in KwaZulu-Natal Regional Orthopaedic Hospitals**

Please note the following:

1. Please ensure that you adhere to all policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure this office is informed before you commence your research.
4. GJGMR Hospital will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to GJGMR Hospital.

Thanking you.

[redacted]

Senior Manager: Medical Services
Stanger Hospital

Appendix 4: Data collection tools and data examples

Three screenshots representing the three spreadsheets used for data capture during the project:

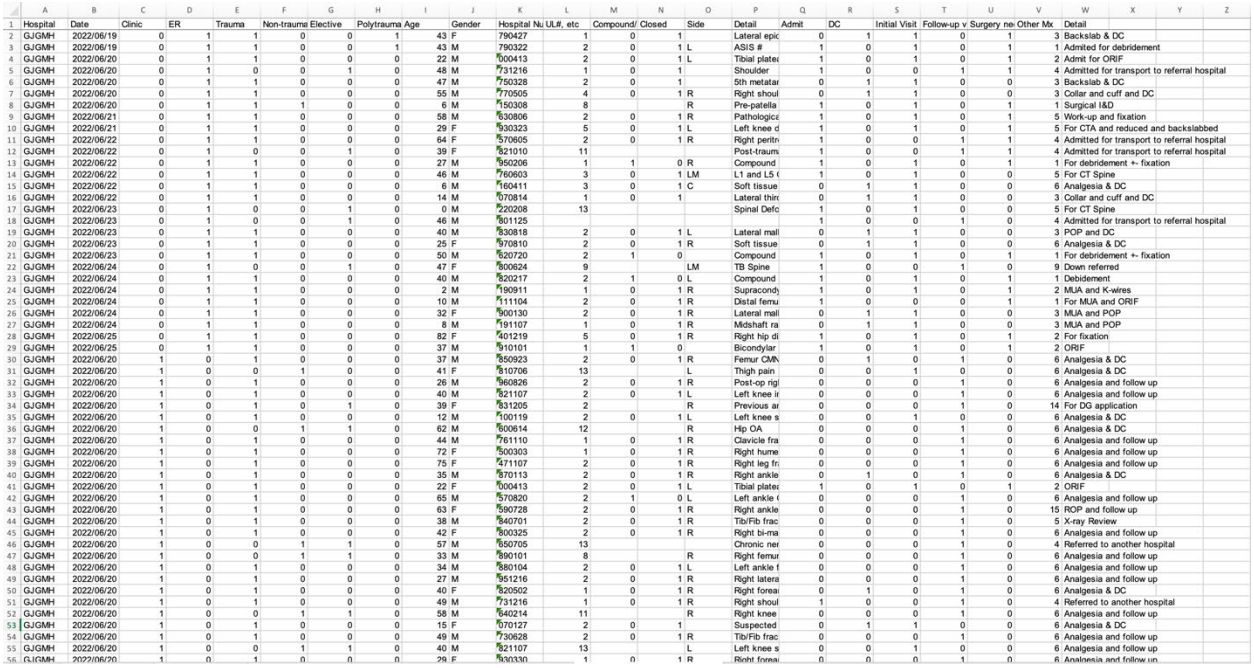
1. Hand pathology spreadsheet (other than trauma)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	Hospital	Date	Clinic	ER	Trauma	Non-trauma	Elective	Polytrauma	Age	Gender	Hospital Nu	1=tumour, 1	Compound/	Closed	Side	Detail	Admit	DC	Initial Visit	Follow-up vi	Surgery	Other Mx	Detail			
2	GJGMH	2022/06/22	0	1	0	0	1	0	49	M	720910	1			R	Right hand	1	0	0	1	1	4	For transfer/referral to another hospital			
3	GJGMH	2022/06/21	1	0	0	1	0	0	33	M	890618	2			R	Right hand	0	0	0	1	0	6	Wound inspection and analgesia for follow up re			
4	GJGMH	2022/06/23	1	0	0	1	1	0	6	M	161105	3			R	Congenital	0	0	0	1	0	6	Follow-up			
5	GJGMH	2022/06/23	1	0	0	1	1	0	5	F	171011	3			B	Congenital	0	0	1	0	0	6	Anangesia and follow up			
6	GJGMH	2022/06/23	1	0	0	1	0	0	45	M	770203	2			R	Right hand	0	1	0	1	0	6	Analgesia and DC			
7	GJGMH	2022/06/24	1	0	0	1	0	0	69	M	530326	2			R	Septic inde	0	0	0	1	0	6	Anangesia and follow up			
8	PMMH	2022/06/22	1	0	0	1	0	0	14	M	080904	2			R	Septic Righ	1	0	1	0	1	1	For debridement/I&D			
9	PMMH	2022/06/22	0	1	0	1	0	0	35	M	850508	2			R	Right thumb	1	0	1	0	1	1	For debridement/I&D			
10	PMMH	2022/06/24	1	0	0	1	0	0	64	F	580602	2			R	Septic right	0	1	0	1	0	6	Analgesia, ABx & DC			
11	PMMH	2022/06/24	1	0	0	1	0	0	78	F	431020	2			R	Swelling of	0	0	1	0	0	6	Analgesia, ABx & DC			
12	PMMH	2022/06/25	1	0	0	1	0	0	84	F	380728	2			L	Necrotising	1	0	1	0	1	1	For debridement/I&D			
13	PMMH	2022/06/25	0	1	0	1	0	0	20	M	011108	2			R	Septic right	1	0	1	0	1	1	For debridement/I&D			
14	PMMH	2022/06/26	1	0	0	1	0	0	47	M	750516	2			L	Left hand c	1	0	1	0	0	1	Abx			
15	RKK	2022/06/19	1	0	0	1	0	0	49	F	730409	2			R	R MF paron	0	0	1	0	0	3	I&D in clinic and F/U			
16	RKK	2022/06/22	1	0	0	1	1	0	51	F	700905	5			B	L + R hand	0	0	0	1	0	6	F/U			
17	RKK	2022/06/22	1	0	0	1	1	0	59	F	621011	5			B	L + R hand	0	0	0	1	0	6	F/U			
18	RKK	2022/06/23	0	1	0	1	0	0	22	M	000722	2			L	L index finç	1	0	1	0	1	3	I&D in clinic and F/U			
19	RKK	2022/06/23	0	1	0	1	0	0	21	M	11005	2			L	L ring finge	1	0	1	0	1	1	I&D in clinic and F/U			
20	RKK	2022/06/20	1	0	0	1	1	0	52	F		2			L	Left hand C	0	0	0	1	0	6	F/U			
21	RKK	2022/06/20	1	0	0	1	1	0	54	F	681012	5			L	Left thumb	0	0	0	1	0	6	F/U			
22	RKK	2022/06/23	0	1	0	1	0	0	30	M	900307	2			L	Left hand a	1	0	1	0	1	1	I&D &F/U			
23	RKK	2022/06/19	0	1	0	1	0	0	53	F	690914	2			R	R MF paron	1	0	1	0	1	1	I&D &F/U			
24	RKK	2022/06/24	0	1	0	1	0	0	21	M	10208	2			R	R hand abs	1	0	1	0	1	1	I&D &F/U			
25	RKK	2022/06/24	0	1	0	1	0	0	47	F	740712	2			L	L MF Absc	1	0	1	0	1	1	I&D &F/U			
26	RKK	2022/06/19	0	1	0	1	0	0	27	M	950617	2			R	R thumb ab	1	0	1	0	1	1	I&D &F/U			
27	RKK	2022/06/19	1	0	0	1	0	0	28	M	940303	2			R	R hand abs	0	0	0	1	0	6	F/U			
28	RKK	2022/06/24	1	0	0	1	1	0	51	F	710103	4			R	De Quervai	0	0	1	0	0	3	LASI			
29	RKK	2022/06/24	1	0	0	1	0	0	40	F	820612	2			R	R index fing	0	0	1	0	0	3	I&D in clinic and F/U			
30	EDH	2022/06/19	0	1	0	1	0	0	25	M	961201	2			R	Left websp	1	0	1	0	1	1	Debridement			
31	EDH	2022/06/19	0	1	0	1	1	0	17	M	140427	1			L	left wrist cy	1	0	1	0	1	2	Excision			
32	EDH	2022/06/20	0	1	0	1	1	0	3	M	190628	1			L	Left hand d	0	0	1	0	1	1	Debridement			
33	EDH	2022/06/21	0	1	0	1	0	0	82	F	380512	2			L	Lt index fin	0	0	1	0	1	1	Debridement			
34	EDH	2022/06/21	0	1	0	1	0	0	27	F	818	2			L	Lt index fin	1	0	1	0	1	1	Debridement			
35	EDH	2022/06/22	0	1	0	1	0	0	39	M	590404	2			L	Lt index fle	1	0	1	0	1	1	Debridement			
36	EDH	2022/06/23	0	1	0	1	1	0	52	F	700403	1			L	Lt wrist gar	0	0	1	0	1	1	Debridement			
37	EDH	2022/06/23	0	1	0	1	0	0	41	M	800823	2			L	Lt webspac	1	0	1	0	1	1	Debridement			
38	EDH	2022/06/25	0	1	0	1	0	0	33	F	891222	5			L	Inflammato	1	0	1	0	1	1	Debridement			
39	KEH	2022/06/19	1	0	0	1	0	0	31	M	375725	2			L	Left Hand a	0	0	0	1	0	6	Follow-up			
40	KEH	2022/06/19	1	0	0	1	1	0	66	F	376362	5			L	Left Thumb	0	0	0	1	0	6	Follow-up			
41	KEH	2022/06/19	0	1	0	1	0	0	30	M	303199	2			L	Left Septic	1	0	1	0	1	1	Debridement			
42	KEH	2022/06/20	1	0	0	1	1	0	42	F	375224	6			R	Right Hand	0	0	0	1	0	6	Follow-up			
43	KEH	2022/06/22	0	1	0	1	0	0	26	F	376918	2			R	Right Hand	1	0	1	0	1	1	Debridement			
44	KEH	2022/06/22	0	1	0	1	0	0	32	F	315163	2			L	Left MF Ter	1	0	1	0	1	1	Debridement			
45	KEH	2022/06/22	0	1	0	1	0	0	25	F	377156	2			L	Left Hand S	1	0	1	0	1	1	Debridement			
46	KEH	2024/06/23	0	1	0	1	0	0	48	F	237080	2			R	Right Hand	1	0	1	0	1	1	Debridement			
47	KEH	2022/06/24	0	1	0	1	0	0	38	F	379307	2			R	Right Hand	1	0	1	0	1	1	Debridement			
48	KEH	2022/06/24	0	1	0	1	0	0	17	M	336747	2			L	Left Thumb	1	0	1	0	1	1	Debridement			
49	KEH	2022/06/26	0	1	0	1	0	0	45	M	377514	2			L	Left Hand S	1	0	1	0	1	1	Debridement			
50	LRH	2022/06/20	0	1	0	1		0	57	F	650711	5			R	OA R Wrist	0	0	1	0	0	6	Follow-up			
51	LRH	2022/06/22	0	1	0	1		0	63	F	610523	1			L	Ganglion L	0	0	1	0	0	3	Aspirate & F/U			
52	LRH	2022/06/23	0	1	0	1		0	56	F	651226	2			L	TB Wrist	0	0	1	0	0	6	Follow-up			
53	LRH	2022/06/23	1	0	0	1		0	36	F	851029	4			L	Dequevain	0	0	0	1	0	6	Follow-up			
54	LRH	2022/06/23	0	1	0	1		0	50	M	710912	1			L	L wrist gan	1	0	1	0	1	2	Tendon repair			
55	LRH	2022/06/23	0	1	0	1		0	37	L	860809	6			L	carpal tunn	1	0	1	0	1	2	Tendon repair			
56	LRH	2022/06/24	0	1	0	1		0	40	M	821225	5			R	Rheumatoic	1	0	1	0	1	2	Tendon repair			
57	LRH	2022/06/24	0	1	0	1		0	1/0		20220414	2			L	osteomelitis	0	0	1	0	0	4	Referral to specialist clinic			

2. Hand trauma spreadsheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	Hospital	Date	Clinic	ER	Trauma	Non-trauma	Elective	Polytra	Age	Gender	Hospital I	Dx: DR	Compour	Closed	Side	Detail	Admit	DC	Initial Visit	Follow-up v	Surgery	Other Mx	Detail	MOI 1=Fall/	Hand domin
2	LRH	2018/06/20	0	1	1	0	0	0	15	F	900412	AMP	1	0	R	Traumatic amputation of rig	1	0	1	0	1	1	Debridemer	4	R
3	RKK	2022/06/22	0	1	1	0	0	0	25	F		Amp	1	0	R	L MF TRAUMATIC AMPUTA	1	0	1	0	1	2	ORIF	4	R
4	ADD	2022/06/25	0	1	1	0	0	0	36	M	860122	Amp	1	0	R	R LF traumatic amputation	0	0	1	0	1	3	formalisatic	4	R
5	EDH	2022/06/22	0	1	1	0	0	0	13	M	81101	Amp	1	0	R	Traumatic amputation rt inc	1	0	1	0	1	1	Formalizatic	7	R
6	KEH	2022/06/25	0	1	1	0	0	0	25	M	37441	AMP	1	0	R	Right Little Finger traumatic	1	0	1	0	1	1	Formalizatic	4	R
7	KEH	2022/06/19	0	1	1	0	0	0	33	M	376027	Amp	0	1	L	Left Thumb Distal Phalange	1	0	1	0	1	1	Formalizatic	4	R
8	KEH	2022/06/25	0	1	1	0	0	0	25	M	377444	AMP	1	0	R	Right traumatic ring finger	1	0	1	0	1	1	Formalizatic	4	R
9	LRH	2022/06/19	1	0	1	0	0	0	19	M	2E+07	AMP	1	0		traumatic amputation of thu	0	0	0	1	0	6	Follow-up	4	R
10	LRH	2022/06/19	1	0	1	0	0	0		M		AMP	1	0	R	Amp R Little finger	0	0	0	1	0	6	Follow-up	8	R
11	MDH	2022/06/25	1	0	1	0	0	0	59	M	630404	AMP	1	0	R	Right middle finger traumat	0	0	0	1	0	6	Follow-up	4	R
12	NGW	2022/06/20	0	1	1	0	0	0	13	M	90504	AMP	1	0	L	left LF traumatic amputatio	0	0	1	1	0	3	Wound R/V	4	R
13	NGW	2022/06/24	0	1	1	0	0	0	32	M	900104	AMP	1	0		Mangled Right IF	1	0	1	0	1	1	Debridemer	2	R
14	RKK	2022/06/22	0	1	1	0	0	0	58	M	640225	AMP	1	0	R	LEFT INDEX TRAUMATIC D	1	0	1	0	1	1	Debride and	2	R
15	RKK	2022/06/25	0	1	1	0	0	0	52	M	700125	amp	1	0	R	Traumatic digit amputation	0	0	1	0	1	3	Formalized	8	R
16	RKK	2022/06/19	1	0	1	0	0	0	28	M		AMP	1	0	R	LEFT TRAUMATIC HAND A	0	0	0	1	0	6	F/U	6	R
17	GJGMH	2022/06/23	1	0	1	0	0	0	49	F	730613	Amputa	1	0	L	Left traumatic finger amput	0	1	0	1	0	6	Analgesia and D/C		
18	PMMH	2022/06/26	0	1	1	0	1	0	17	F	050512	BPI	0	0	L	Brachial plexus injury	1	0	0	1	0	4	IALCH Hands		
19	ADD	2022/06/25	0	1	1	0	0	0	59	F		C#	0	1	L	Left scaphoid fracture	0	0	1	0	0	3	MUA and p	1	R
20	LRH	2022/06/19	0	1	1	0	0	0	19	F	30507	C#	0	1	R	Right Scaphoid fracture	1	0	1	0	1	2	ORIF	1	R
21	LRH	2022/06/22	0	1	1	0	0	0	54	F	851029	C#	0	1		Scaphoid fracture .	1	0	1	0	1	2	ORIF	1	R
22	EDH	2022/06/21	0	1	1	0	0	0	20	M	20910	C#	0	1	R	R scaphoid fracture	0	0	1	0	0	3	MUA & pop	1	R
23	GJGMH	2022/06/20	1	0	1	0	0	0	35	M	870914	C#	0	1		Suspected scaphoid fractu	0	0	1	0	0	3	Backslab and DC		
24	KEH	2022/06/24	0	1	1	0	0	0	60	M	377095	C#	0	1	L	Left scaphoid fracture	1	0	1	0	1	2	ORIF	1	R
25	KEH	2022/06/23	0	1	1	0	0	0	42	M	377110	C#	0	1	L	Left scaphoid fracture	1	0	1	0	1	2	ORIF	1	R
26	MDH	2022/06/24	0	1	1	0	0	0	41	M	810226	C#	0	1	R	Right scaphoid #	0	0	1	0	0	3	MUA & spic	3	R
27	MDH	2022/06/24	0	1	1	0	0	0	16	M	2E+07	C#	0	1	L	Left scaphoid fracture	1	0	1	0	1	2	ORIF	1	R
28	KEH	2022/06/21	0	1	1	0	0	0	42	F	375275	CD	0	1	R	Right Perilunate Dislocatio	1	0	1	0	1	2	ORIF	1	R
29	GJGMH	2022/06/20	1	0	1	0	0	0	29	F	930907	CI	0	1	R	Right peri-lunate dilocation	0	0	0	1	0	6	Analgesia and follow up		
30	GJGMH	2022/06/21	1	0	1	0	0	0	29	F	930907	CI	0	1	L	Peri-lunate injury	0	0	0	1	0	6	Analgesia and follow up		
31	KEH	2022/06/21	0	1	1	0	0	0	74	M	37959	DISLO(	0	1	R	Right Thumb Dislocation	0	0	0	1	0	3	MUA & POI	1	R
32	ADD	2022/06/22	0	1	1	0	0	0	64	F	308322	DR	0	1	R	R distal radius fracture	0	0	1	0	0	3	MUA and p	1	R
33	ADD	2022/06/22	0	1	1	0	0	0	33	F	708463	DR	0	1	L	L distal radius fracture	0	0	1	0	0	3	MUA and p	1	R
34	EDH	2022/06/23	0	1	1	0	0	0	6	F	170312	DR	0	1	R	Rt distal radius fracture	0	0	0	1	0	3	MUA & pop	1	F
35	EDH	2022/06/21	1	0	1	0	0	0	83	F	391121	DR	0	1	R	Rt distal radius fracture	0	0	0	1	0	5	X-ray follow	1	R
36	EDH	2022/06/25	0	1	1	0	0	0	64	F	580416	DR	0	1	R	Rt distal radius fracture	0	0	1	0	0	3	MUA & pop	1	R
37	EDH	2022/06/21	1	0	1	0	0	0	60	F	591221	DR	0	1	L	Lt distal radius fracture	0	0	0	1	0	6	Follow up	1	R
38	EDH	2022/06/21	1	0	1	0	0	0	58	F	631212	DR	0	1	R	Rt distal radius fracture	0	0	0	1	0	6	Follow up	1	R
39	EDH	2022/06/26	0	1	1	0	0	0	57	F	651006	DR	0	1	R	Rt distal radius fracture	0	0	1	0	0	3	MUA & pop	1	L
40	EDH	2022/06/22	1	0	1	0	0	0	56	F	660415	DR	0	1	L	Lt distal radius fracture	0	0	0	1	0	6	Follow up	1	L
41	EDH	2022/06/24	0	1	1	0	0	0	46	F	760211	DR	0	1	R	Rt distal radius fracture	0	0	1	0	0	3	MUA & pop	1	r
42	EDH	2022/06/21	1	0	1	0	0	0	42	F	800416	DR	0	1	R	Rt distal radius fracture	0	0	0	1	0	6	Follow up	1	R
43	EDH	2022/06/29	0	1	1	0	0	0	41	F	810503	DR	0	1	R	Rt Distal Radius Fracture	0	0	1	0	0	3	MUA & pop	1	R
44	EDH	2022/06/26	0	1	1	0	0	0	7	F	1500117	DR	0	1	L	Lt distal radius fracture	0	0	1	0	0	3	MUA & pop	1	R
45	EDH	2022/06/22	0	1	1	0	0	0	48	F	7301018	DR	0	1	R	Rt distal radius fracture	0	0	1	0	0	3	MUA & pop	1	R
46	GJGMH	2022/06/25	0	1	1	0	0	0	19	F	030808	DR	0	1	R	Distal radius fracture dislo	0	1	1	0	0	3	MUA & POP		
47	GJGMH	2022/06/22	1	0	1	0	0	0	60	F	520909	DR	0	1		Distal radius	0	0	0	1	0	6	Analgesia and follow up		
48	GJGMH	2022/06/22	1	0	1	0	0	0	63	F	590101	DR	0	1	R	Right colles	0	1	0	1	0	6	Removal of POP and DC		
49	GJGMH	2022/06/20	1	0	1	0	0	0	61	F	610103	DR	0	1	R	Right distal radius and ulna	0	0	1	0	0	3	MUA & POP		
50	GJGMH	2022/06/21	0	1	1	0	0	1	60	F	620523	DR	0	1	R	Right segmental humerus a	1	0	1	0	1	3	Admited with backslab		
51	GJGMH	2022/06/25	0	1	1	0	0	0	40	F	731023	DR	0	1	L	Distal radius and Ulna	0	1	1	0	0	3	MUA & POP		
52	GJGMH	2022/06/20	1	0	1	0	0	0	47	F	750607	DR	0	1	R	Right distal radius and ulna	0	0	0	1	0	6	Analgesia and follow up		
53	GJGMH	2022/06/21	1	0	1	0	0	0	48	F	760825	DR	0	1	L	Left distal radius and ulna	0	0	0	1	0	6	Analgesia and follow up		
54	GJGMH	2022/06/24	1	0	1	0	0	0	33	F	890714	DR	0	1	L	Distal radius	0	1	0	1	0	6	Analgesia and D/C		
55	GJGMH	2022/06/24	1	0	1	0	0	0	30	F	920327	DR	0	1	L	Left distal radius and ulna	0	0	0	1	0	6	Follow-up		
56	KEH	2022/06/19	0	1	1	0	0	0	57	F	376186	DR	0	1	L	Left Distal radius fracture	0	0	1	0	0	3	MUA & POI	1	L

3. General pathology spreadsheet (including general trauma and non-trauma cases)



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	Hospital	Date	Clinic	ER	Trauma	Non-trauma	Elective	Polytrauma	Age	Gender	Hospital Nu	UL#, etc	Compound/	Closed	Side	Detail	Admit	DC	Initial Visit	Follow-up v	Surgery ne	Other Mx	Detail			
2	GJGMH	2022/06/19	0	1	1	0	0	1	43	F	790427	1	0	1		Lateral epic	0	1	1	0	1	3	Backslab & DC			
3	GJGMH	2022/06/19	0	1	1	0	0	1	43	M	790322	2	0	1	L	ASIS #	1	0	1	0	1	1	Admited for debridement			
4	GJGMH	2022/06/20	0	1	1	0	0	0	22	M	000413	2	0	1	L	Tibial platea	1	0	1	0	1	2	Admit for ORIF			
5	GJGMH	2022/06/20	0	1	0	0	1	0	48	M	731216	1	0	1		Shoulder	1	0	0	1	1	4	Admitted for transport to referral hospital			
6	GJGMH	2022/06/20	0	1	1	0	0	0	47	M	750328	2	0	1		5th metatar	0	1	1	0	0	3	Backslab & DC			
7	GJGMH	2022/06/20	0	1	1	0	0	0	55	M	770505	4	0	1	R	Right shoul	0	1	1	0	0	3	Collar and cuff and DC			
8	GJGMH	2022/06/20	0	1	1	1	0	0	6	M	150308	8			R	Pre-patella	1	0	1	0	1	1	Surgical I&D			
9	GJGMH	2022/06/21	0	1	1	0	0	0	58	M	630806	2	0	1	R	Pathologica	1	0	1	0	1	5	Work-up and fixation			
10	GJGMH	2022/06/21	0	1	1	0	0	0	29	F	930323	5	0	1	L	Left knee d	1	0	1	0	1	5	For CTA and reduced and backslabbed			
11	GJGMH	2022/06/22	0	1	1	0	0	0	64	F	570605	2	0	1	R	Right perito	1	0	0	1	1	4	Admitted for transport to referral hospital			
12	GJGMH	2022/06/22	0	1	0	0	1	0	39	F	821010	11				Post-trauma	1	0	0	1	1	4	Admitted for transport to referral hospital			
13	GJGMH	2022/06/22	0	1	1	0	0	0	27	M	950206	1	1	0	R	Compound	1	0	1	0	1	1	For debridement +- fixation			
14	GJGMH	2022/06/22	0	1	1	0	0	0	46	M	760603	3	0	1	LM	L1 and L5 (	1	0	1	0	0	5	For CT Spine			
15	GJGMH	2022/06/22	0	1	1	0	0	0	6	M	160411	3	0	1	C	Soft tissue	0	1	1	0	0	6	Analgesia & DC			
16	GJGMH	2022/06/22	0	1	1	0	0	0	14	M	070814	1	0	1		Lateral thir	0	1	1	0	0	3	Collar and cuff and DC			
17	GJGMH	2022/06/23	0	1	0	0	1	0	0	M	220208	13				Spinal Defo	1	0	1	0	0	5	For CT Spine			
18	GJGMH	2022/06/23	0	1	0	0	1	0	46	M	801125						1	0	0	1	0	4	Admitted for transport to referral hospital			
19	GJGMH	2022/06/23	0	1	1	0	0	0	40	M	830818	2	0	1	L	Lateral mall	0	1	1	0	0	3	POP and DC			
20	GJGMH	2022/06/23	0	1	1	0	0	0	25	F	970810	2	0	1	R	Soft tissue	0	1	1	0	0	6	Analgesia & DC			
21	GJGMH	2022/06/23	0	1	1	0	0	0	50	M	620720	2	1	0		Compound	1	0	1	0	1	1	For debridement +- fixation			
22	GJGMH	2022/06/24	0	1	0	0	1	0	47	F	800624	9			LM	TB Spine	1	0	0	1	0	9	Down referred			
23	GJGMH	2022/06/24	0	1	1	0	0	0	40	M	820217	2	1	0	L	Compound	1	0	1	0	1	1	Debidement			
24	GJGMH	2022/06/24	0	1	1	0	0	0	2	M	190911	1	0	1	R	Supracondy	1	0	1	0	1	2	MUA and K-wires			
25	GJGMH	2022/06/24	0	1	1	0	0	0	10	M	111104	2	0	1	R	Distal femu	1	0	0	0	1	1	For MUA and ORIF			
26	GJGMH	2022/06/24	0	1	1	0	0	0	32	F	900130	2	0	1	R	Lateral mall	0	1	1	0	0	3	MUA and POP			
27	GJGMH	2022/06/24	0	1	1	0	0	0	8	M	191107	1	0	1	R	Midshaft ra	0	1	1	0	0	3	MUA and POP			
28	GJGMH	2022/06/25	0	1	1	0	0	0	82	F	401219	5	0	1	R	Right hip di	1	0	1	0	1	2	For fixation			
29	GJGMH	2022/06/25	0	1	1	0	0	0	37	M	910101	1	1	0		Bicondylar	1	0	1	0	1	2	ORIF			
30	GJGMH	2022/06/20	1	0	1	0	0	0	37	M	850923	2	0	1	R	Femur CMN	0	1	0	1	0	6	Analgesia & DC			
31	GJGMH	2022/06/20	1	0	0	1	0	0	41	F	810706	13			L	Thigh pain	0	0	1	0	0	6	Analgesia & DC			
32	GJGMH	2022/06/20	1	0	1	0	0	0	26	M	960826	2	0	1	R	Post-op rigl	0	0	0	1	0	6	Analgesia and follow up			
33	GJGMH	2022/06/20	1	0	1	0	0	0	40	M	821107	2	0	1	L	Left knee ir	0	0	0	1	0	6	Analgesia and follow up			
34	GJGMH	2022/06/20	1	0	1	0	1	0	39	F	831205	2			R	Previous ar	0	0	0	1	0	14	For DG application			
35	GJGMH	2022/06/20	1	0	1	0	0	0	12	M	100119	2	0	1	L	Left knee s	0	0	1	0	0	6	Analgesia & DC			
36	GJGMH	2022/06/20	1	0	0	1	1	0	62	M	600614	12			R	Hip OA	0	0	0	1	0	6	Analgesia & DC			
37	GJGMH	2022/06/20	1	0	1	0	0	0	44	M	761110	1	0	1	R	Clavicle fra	0	0	0	1	0	6	Analgesia and follow up			
38	GJGMH	2022/06/20	1	0	1	0	0	0	72	F	500303	1	0	1	R	Right hume	0	0	0	1	0	6	Analgesia and follow up			
39	GJGMH	2022/06/20	1	0	1	0	0	0	75	F	471107	2	0	1	R	Right leg fr	0	0	0	1	0	6	Analgesia and follow up			
40	GJGMH	2022/06/20	1	0	1	0	0	0	35	M	870113	2	0	1	R	Right ankle	0	1	0	1	0	6	Analgesia & DC			
41	GJGMH	2022/06/20	1	0	1	0	0	0	22	F	000413	2	0	1	L	Tibial platea	1	0	1	0	1	2	ORIF			
42	GJGMH	2022/06/20	1	0	1	0	0	0	65	M	570820	2	1	0	L	Left ankle (	0	0	0	1	0	6	Analgesia and follow up			
43	GJGMH	2022/06/20	1	0	1	0	0	0	63	F	590728	2	0	1	R	Right ankle	0	0	0	1	0	15	ROP and follow up			
44	GJGMH	2022/06/20	1	0	1	0	0	0	38	M	840701	2	0	1	R	Tib/Fib frac	0	0	0	1	0	5	X-ray Review			
45	GJGMH	2022/06/20	1	0	1	0	0	0	42	F	800325	2	0	1	R	Right bi-ma	0	0	0	1	0	6	Analgesia and follow up			
46	GJGMH	2022/06/20	1	0	0	1	1	0	57	M	650705	13				Chronic ner	0	0	0	1	0	4	Referred to another hospital			
47	GJGMH	2022/06/20	1	0	0	1	1	0	33	M	890101	8			R	Right femur	0	0	0	1	0	6	Analgesia and follow up			
48	GJGMH	2022/06/20	1	0	1	0	0	0	34	M	880104	2	0	1	L	Left ankle f	0	0	0	1	0	6	Analgesia and follow up			
49	GJGMH	2022/06/20	1	0	1	0	0	0	27	M	951216	2	0	1	R	Right latera	0	0	0	1	0	6	Analgesia and follow up			
50	GJGMH	2022/06/20	1	0	1	0	0	0	40	F	820502	1	0	1	R	Right forea	0	1	0	1	0	6	Analgesia & DC			
51	GJGMH	2022/06/20	1	0	1	0	0	0	49	M	731216	1	0	1	R	Right shoul	1	0	0	1	0	4	Referred to another hospital			
52	GJGMH	2022/06/20	1	0	0	1	1	0	58	M	640214	11			R	Right knee	0	0	0	1	0	6	Analgesia and follow up			
53	GJGMH	2022/06/20	1	0	1	0	0	0	15	F	070127	2	0	1		Suspected	0	1	1	0	0	6	Analgesia & DC			
54	GJGMH	2022/06/20	1	0	1	0	0	0	49	M	730628	2	0	1	R	Tib/Fib frac	0	0	0	1	0	6	Analgesia and follow up			
55	GJGMH	2022/06/20	1	0	0	1	1	0	40	M	821107	13			L	Left knee s	0	0	1	0	0	6	Analgesia and follow up			
56	GJGMH	2022/06/20	1	0	1	0	0	0	29	F	930330	1	0	1	R	Right forea	0	0	0	1	0	6	Analgesia and follow up			