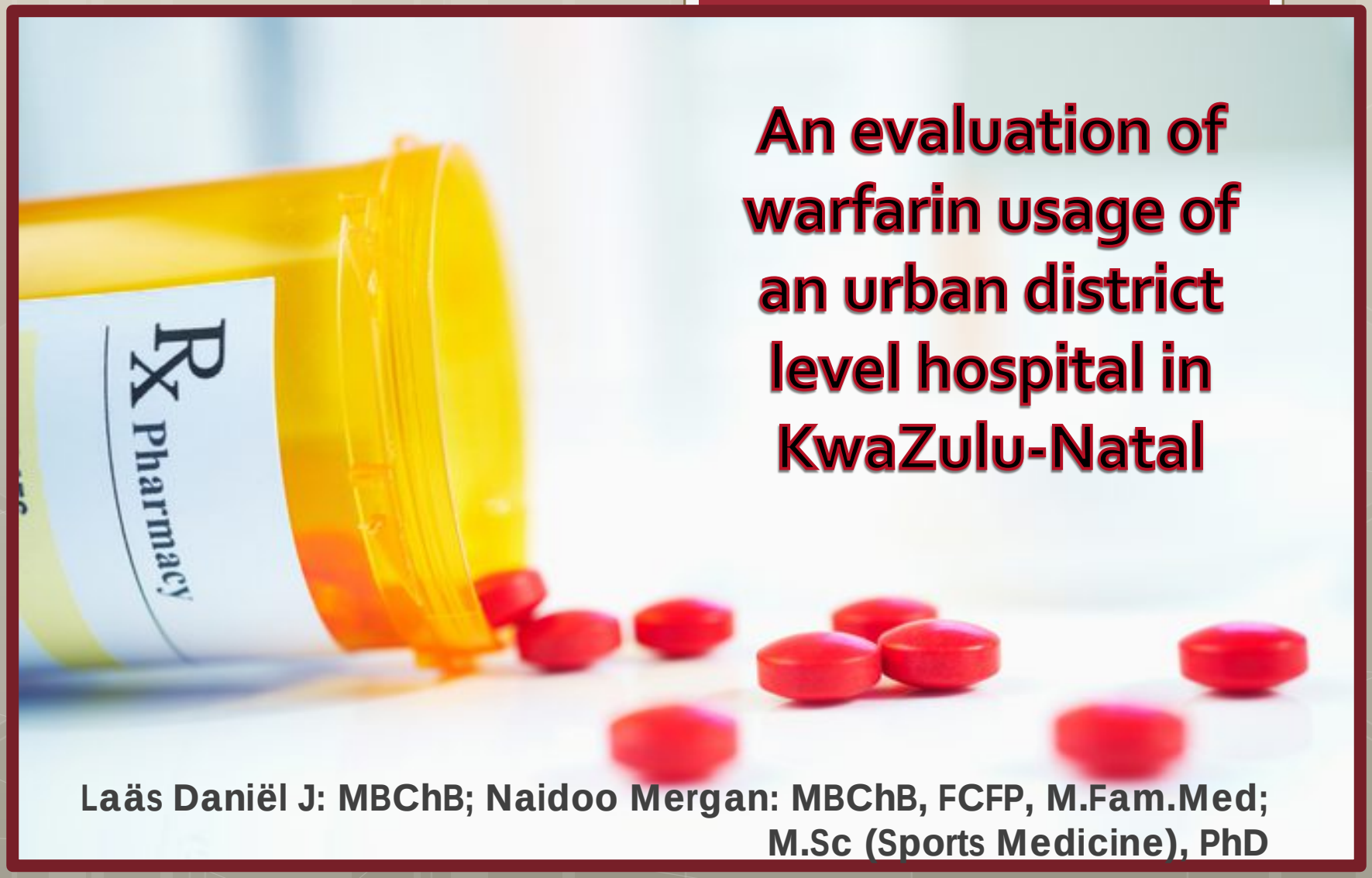

An evaluation of warfarin usage of an urban district level hospital in KwaZulu-Natal

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Background

Introduction

Warfarin is an **inexpensive** and commonly used drug that is **regularly prescribed** in the public healthcare sector

Usage of this drug is **labour intensive** and managing patients on warfarin is complex.

Problems associated with warfarin:

- Drug interactions
- Drug-food interactions
- Life threating complications due to sub therapeutic or excessively elevated INR's
- **Costs**
- **Quality of life**

Study Aim

To evaluate **the quality of care** of patients on warfarin therapy presenting to an urban district hospital in KwaZulu-Natal, by assessing the **financial** and **psychosocial** burden of treatment

Methods

Study Setting:

Wentworth Hospital, eThekwini district, KwaZulu-Natal

Study Design:

Cross sectional, observational, analytical

Methods

Three components:

1. A structured **patient interview**
   - Quality of care, patient expenses and patients' willingness to pay for alternatives

2. Six-month retrospective **outpatient file review**
   - Demographics, clinical profile of the patients, ascertaining outpatient costs and finding objective evidence of warfarin related hospital admissions

3. Six month retrospective **inpatient file review** of any admissions
   - Cost determination

Methods

- The participants' outpatient and inpatient files were retrospectively reviewed for the preceding **six-month period**
- All costs involved with each warfarin related outpatient visit and inpatient stay were calculated.
- The maximum time for a follow up appointment for these patients is four weeks, hence the sampling included all patients currently on warfarin therapy from the hospital.

Methods

Inclusion criteria:

Patients attending the **Friday clinic** were included in the study as well as patients admitted for complications arising out of their warfarin usage. Patients who were **admitted** after hours were also included in the study and their clinical files were retrieved from the admission ward.

Exclusion criteria:

1. Patients presenting for routine INR monitoring to the medical outpatient department on any other day
2. Patients with lost clinical files. A patient's file was deemed to be lost if it could not be found on more than two separate occasions
3. Patients on treatment for less than three months

Results

A total of **135** patients were booked for the clinics for that specific time period

A total of **128** patients were eligible for the study of which 18 (14%) were excluded (nine were on treatment for less than three months and nine patient's files were not found)

Final participant number of **110** patients.

Quality of care

Table 3 Quality of care (N=110)

	Mean (SD)	Median	IQR
Treatment satisfaction	3,89 (1,03)	4	(4-5)
I am often frustrated with having to come to the hospital every month for blood tests	3,75 (1,22)	4	(2-5)
I sometimes wish that I did not have to take warfarin	4 (1,18)	4	(3-5)
Willing to pay for an alternative drug	3,82 (0,84)	4	(2-4)

1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree

Results

Table 1: Relationship between age and variables measured

		Age		Total	P-values
		<60	>60		
		(n = 53)	(n = 57)		
Sex		N (%)	N (%)		
	Male	24 (45,3%)	26 (45,6%)	50	0,9
	Female	29 (54,7%)	31 (54,4%)	60	
Indication					
	AF	9 (17,0%)	33 (57,9%)	42	<0.001
	Prosthetic heart valve	33 (62,3%(	14 (24,6%)	47	<0.001
	DVT	5 (9,4%)	4 (7,0%)	9	0,6
	PE	3 (5,7%)	1 (1,8%)	4	0,4
	Other	4 (7,5%)	5 (8,8%)	9	0,8
Co-Morbidities					
	Diabetes	6 (11,3%)	17 (29,8%)	23	0,02
	Prosthetic heart valve with co-morbid AF	9 (17,0%)	7 (12,3%)	16	0,5
	Hypertension	16 (30,2%)	40 (70,2%)	56	<0.001
	Dyslipidaemia	4 (7,5%)	14 (24,6%)	18	0,02
	Ischaemic heart disease	1 (1,9%)	10 (17,5%)	11	0,009
	Cardiac Failure	3 (5,7%)	15 (26,3%)	18	0,003
	COPD	1(1,9%)	3 (5,3%)	4	0,6
	Asthma	3 (5,7%)	3 (5,3%)	6	0,9
	Other	24 (45,3%(	19 (33,3%)	43	0,2
Number of comorbidities					
	0	17 (32,1%)	6 (10,5%)	23	0,005
	1	14 (26,4%)	12 (21,1%)	26	0,508
	2	17 (32,1%)	15 (26,3%)	32	0,506
	>=3	5 (9,4%)	24 (42,1%)	29	<0.001
Time spent at hospital					
	0 - <5 hours	16 (30,2%)	13 (22,8%)	29	0,38
	≥ 5 - <6 hours	14 (26,4%)	32 (56,1%(	46	0,002
	≥ 6 hours	23 (43,4%)	12 (21,1%)	35	0,012
Willingness to pay					
	Not willing to pay	9 (17,0%)	8 (14,0%)	17	0,669
	R0-R49	16 (30,2%)	28 (49,1%)	44	0,04
	R50-R99	17 (32,1%)	15 (26,3%)	32	0,506
	R100-R199	8 (15,1%)	3 (5,3%)	11	0,086
	> R200	3 (5,7%)	3 (5,3%)	6	0,927

AF= Atrial Fibrillation, DVT= Deep Vein Thrombosis, PE= Pulmonary Embolism, COPD= Chronic obstructive Pulmonary Disease

84,5% willing to pay for alternative drug

Table 2: Costs of prescribing Warfarin

		N	ZAR	IQR/SEM
Total costs per patient per month	Median (IQR)	110	295.05	(283.42 - 333.17)
	Mean (SEM)	110	394.89	(53.03)
Non-valvular AF costs per patient per month	Median (IQR)	42	294.40	(283.85 - 345.10)
	Mean (SEM)	42	430.54	(116.14)
Other Indications per patient per month	Median (IQR)	68	296.13	(279.97 - 330.2)
	Mean (SEM)	68	372.87	(47.69)
Inpatient and emergency department cost per patient	Median (IQR)	4	12 141.00	(5385.13 - 22922.13)
	Mean (SEM)	4	14 153.63	(5866.00)
Outpatient cost per patient	Median (IQR)	110	1 764.80	(1690.83 - 1982.22)
	Mean (SEM)	110	1 854.68	(46.37)

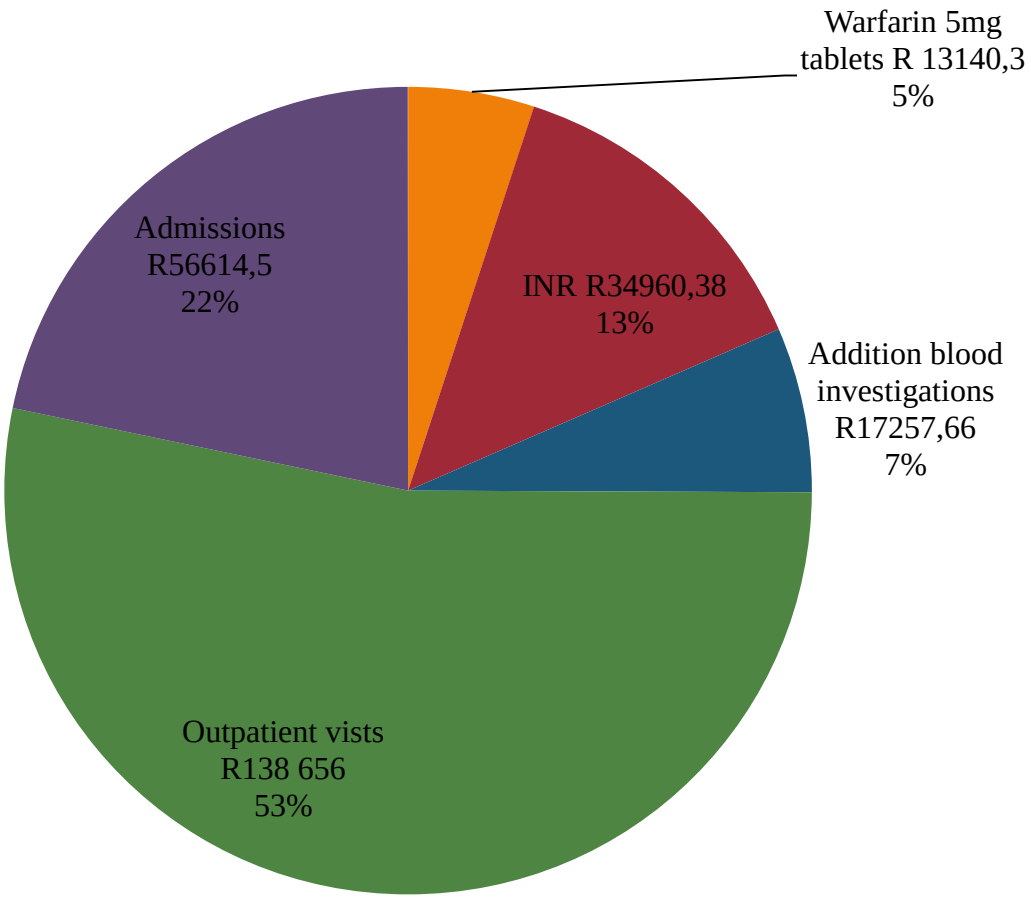

Figure 1: Total Cost of Warfarin

Discussion

Main findings:

1. Warfarin impacts the **quality of life** of our patient population, to the extent that patients would be willing to pay for an alternative drug

2. Warfarin, although expensive, is a **cost effective** treatment option in our setting

Discussion

Additional findings:

1. Having a specific clinic day and a **dedicated warfarin clinic** improves quality of care

2. **Atrial fibrillation** is a disease of the elderly and that prosthetic heart valves are more prevalent in those under **60 years** of age.

3. There is a statistical significant prevalence of **hypertension** in those over 60, which can be linked to the increased incidence of atrial fibrillation in the same age group

Discussion

4. Frequency of clinic visits and admission costs are main drivers of total costs

5. DOACs, although superior, appear to be **too expensive** at this stage

6. Estimated public sector cost:
   - Dabigatran: R673.85 and R700.80 per month
   - Rivaroxaban between R545.96 and R818.94 per month

Discussion

But would the DOACS be worth it?

- **Pro's:**
  - Routine drug monitoring is not recommended
  - More effective
  - +/-Similar major bleeding risk
  - Less drug and food interactions
- **Con's**
  - No regularly available antidote
  - Not suitable in renal failure
  - Contraindicated in mechanical heart valves

Conclusion

Warfarin has an impact on our patient's **quality of life**, but it is still the most **cost effective** anti-coagulant in our setting.

DOACs will only be a cost effective alternative if the current estimated public sector drug **price** for both Rivaroxaban and Dabigatran are approximately **halved**.

Study limitations

- Missing files
- Paper filing system
- Limitations of a cross sectional study design
- Time frame
- Difficulties in standardizing costs

Further recommendations

We suggest a prospective, **head to head trial** that compares both cost effectiveness and quality of life of patients on warfarin and DOACs at a district health level.

Ethical Considerations

Permission for this study was obtained from the University of KwaZulu-Natal's Biomedical Research Ethics Committee, BE364/17, the Department of Health's ethical review board, KZ_2017RP4_664, and the CEO of Wentworth Hospital. Written informed consent was individually obtained from every patient included in this study.

Contributions and Acknowledgements

Author contributions:

Dr Laäs was the principal investigator and Prof M Naidoo was the research supervisor

Conflicts of interests:

None

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ngiyathokoza!

ro livhuwa!

dankie!

ke a leboga!

enkosi!

thank you!

ndo livhuwa!

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ke a leboha!

ngiyabonga!

siyabonga!

Thank you