Evaluation of Allied Health Professional-Led Keratoconus Management Service in the United Kingdom: The Birmingham and Midland Eye Centre (BMEC) Study

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Parameters	N (%)
Age, years	30.88 (10.6)
Gender	
Female	69 (40.6)
Male	101 (59.4)
Nature of Visit	
New	53 (31.2)
Follow-up	117 (68.8)
Diagnosis	
Bilateral KC	142 (83.5)
Unilateral KC + normal fellow eye	23 (13.5)
Unilateral KC + suspected KC in fellow eye	4 (2.4)
Bilateral suspected KC	1 (0.6)
Presenting CDVA, logMAR	
Right eye	
≥0.3	130 (76.5)
<0.3 to 0.6	27 (15.9)
<0.6 to 1.0	10 (5.9)
<1.0	3 (1.8)
Left eye	
>= 0.3	123 (72.4)
<0.3 to 0.6	32 (18.8)
0.6 to 1.0	5 (2.9)
<1.0	10 (5.9)
K1 (Flat keratometry), D	
Right eye	46.3 (5.5)
Left eye	51.0 (5.0)
K2 (Steep keratometry), D	
Right eye	49.5 (6.9)
Left eye	50.3 (8.1)
Kmax, D	
Right eye	53.3 (9.6)
Left eye	54.8 (11.3)
Thinnest pachymetry, microns	
Right eye	465.9 (53.8)
Left eye	457.5 (60.8)

Table 1. Summary of the baseline characteristics of patients with suspected keratoconus (KC) in Birmingham and Midland Eye Centre, United Kingdom.
CDVA = Corrected-distance-visual-acuity

Introduction

Keratoconus is the most common corneal ectatic disorder, affecting 1:375 to 1:2000 people globally. In view of improved community screening, ophthalmic units across the UK are seeing a significant increase in community-to-hospital referrals for keratoconus management.

To cope with the increased workload, several innovative pathways/services have been established, including the setup of virtual keratoconus clinics and CXL services led by nurses and optometrists [collectively known as allied health professionals (AHPs)].[4,5] This cross-sectional study aimed to examine the effectiveness and safety of AHP-led keratoconus service in Birmingham and Midland Eye Centre (BMEC), one of the UK largest ophthalmic tertiary referral centres that provides regionwide CXL service for the entire Birmingham.

Methods

We included 170 patients with suspected/confirmed keratoconus from AHP-led keratoconus clinics at BMEC, run by two nurses (SB, RS) and two optometrists (EK, UP) with 3-9 years of corneal experience, in June-October 2023.

Progression of keratoconus was defined by the presence of ≥2 following parameters over the past year:[1]

- Subjective/objective decrease in CDVA ≥1 Snellen line
- ≥1D increase in cylinder on manifest refraction
- ≥1D increase in K2
- ≥1D increase in Kmax
- Progressive thinning of corneal thickness

The decision was first made by AHPs independently and was recorded as either observe, list for CXL, discharge, or uncertain. This was then compared to the decision made independently by the cornea consultant ophthalmologists. The main outcome measure was the concordance of the clinical decision made between AHPs and corneal consultants.

Results

53 (31.2%) and 117 (68.8%) were of new and follow-up visits, respectively. AHPs made decisions to observe in 141 (82.9%), list for CXL in 11 (6.5%) cases, discharge in 8 (4.7%) cases, and expressed uncertainty in only 10 (5.9%) cases. An excellent agreement (91.8%) was observed between AHPs and consultants. Of the 10 (5.9%) cases with uncertainty, the consultant recommended observation in 5 cases, CXL in 4 cases and discharge in 1 case. For the four remaining cases with disagreement, AHPs made the decision to observe but the consultant made the decision to discharge. Six cases were correctly listed for CXL at the first visit, and no cases were incorrectly listed for CXL or discharge by the AHPs.

		Allied Health Professionals			
		Observe	CXL	Discharge	Uncertain
Cornea Consultants	Observe	137 (80.6%) (43 N, 94 F)	0 (0.0%) -	0 (0.0%) -	5 (2.9%) (2 N, 3 F)
	CXL	0 (0.0%) -	11 (6.5%) (6 N, 5 F)	0 (0.0%) -	4 (2.4%) (1 N, 3 F)
	Discharge	4 (2.6%) (0 N, 4 F)	0 (0.0%) -	8 (4.7%) (0 N, 8 F)	1 (0.6%) (1 N, 0 F)

Table 2. Concordance of the clinical decision made for the management of keratoconus between the allied health professionals and the corneal consultants in Birmingham and Midland Eye Centre.
CXL = Corneal cross-linking; N = New patients; F = Follow-up patients

Discussion

This study highlights an excellent concordance in clinical decision-making between AHPs and consultant ophthalmologists for managing new and follow-up cases of suspected keratoconus, highlighting the effectiveness, safety and feasibility of AHP-led keratoconus services (with minimal consultant support).

With a standardised protocol, similar AHP-led keratoconus service models can be replicated in other UK ophthalmic units to help alleviate the pressure of current ophthalmic services.

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