A retrospective population-based cohort study describing the clinical and demographic characteristics of adult patients requiring ambulance care for Non-Traumatic Back Pain (NTBP) in Scotland.

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Background

NTBP is perceived as a common low acuity condition presenting to UK ambulance services. Recent evidence suggests that NTBP (dorsalgia) may be safely treated in an out-of-hospital setting, avoiding Emergency Departments. However, there is little published evidence on this patient population's demographic and clinical characteristics, essential to inform future clinical practice.

Aims

1. To establish the patient demographic for NTBP 999 calls.

2. To determine the accuracy of aMPDS in identifying true clinical acuity in NTBP.

3. To describe medications used by ambulance clinicians to treat patients presenting with NTBP.

Methods

A retrospective cross-sectional observational study of calls recorded as NTBP by ambulance clinicians 2018-2019.

Results

Patient demographics

During 2018 the Scottish Ambulance Service (SAS) responded to 649,399 emergency calls. 615,251 of these calls were in patients ≥ 16 years of age. Of these calls, 307,625 (50%) were recorded as female and 301,473 (49%) as male. Gender was not recorded in 6153 (1%) of the calls. From the 615,251 calls, **8824 (1.4%) were coded as NTBP (code 05)** (see Table 1). The median age for all those presenting with NTBP was 60 years (IQR 43-77).

Table 1: Demographic Characteristics of Patients Presenting with NTBP

Age groups	Male Frequency (Within group %)	Male Overal l %	Female Frequency (Within group %)	Female Overall %	Total frequency 999 calls (%)
16-19	219 (43.1%)	2.4%	289 (56.9%)	3.2%	508 (5.7%)
20-29	516 (47.4%)	5.8%	573 (52.6%)	6.4%	1089 (12.2%)
30-39	597 (49.1%)	6.7%	618 (50.9%)	6.9%	1215 (13.6%)
40-49	727 (47.2%)	8.1%	812 (52.8%)	9.1%	1539 (17.2%)
50-59	747 (50.5%)	8.3%	733 (49.5%)	8.2%	1480 (16.5%)
60-69	632 (38.6%)	7.1%	1006 (61.4%)	11.2%	1638 (18.3%)
70-79	458 (34.0%)	5.1%	888 (66.0%)	9.9%	1346 (15%)
80-89	1 (11%)	0.00%	8	0.1%	9 (0.1%)
90-99	0		0		0
100	0		0		0
Total	3897 (44%)	44.2%	4927(56%)	55.8%	8824 (100%)
Total patients					8824 (1.4%)

Accuracy of aMPDS in identifying clinical acuity of NTBP presentations (Positive Predictive Value)

NEWS scoring was used as a proxy measure for clinical acuity. A NEWS ≥ 7 is associated with higher clinical risk, which in hospital, would trigger immediate referral to a critical care team. Evidence from prehospital care suggests 48-hour mortality rates of around 70% for this patient population; these patients would benefit from rapid ambulance response.

To measure accuracy of aMPDS we classified a NEWS ≥7 as high clinical acuity, aligned to aMPDS of purple [critical] and red [serious illness] and a NEWS <7 moderate/low clinical acuity aligned to aMPDS amber [requires diagnosis and conveyance] and green [no serious illness/injury]). The breakdown/calculation are presented in Table 2 below along with Sensitivity/specificity and PPV:

Table 2: Sensitivity/Specificity/PPV of aMPDS on Clinical Acuity

	aMPDS predicts high clinical acuity	aMPDS predicts moderate to low clinical acuity
Actual clinical acuity NEWS ≥ 7	True Positive Triaged by C3 aMPDS high acuity/ NEWS ≥ 7. n=5	False negative Triaged by C3 aMPDS as low acuity/ NEWS ≥ 7. n=186
Actual clinical acuity NEWS <7	False Positive Triaged by C3 aMPDS high acuity/NEWS < 7 n=232	True Negative Triaged by C3 aMPDS as low acuity/ NEWS < 7 n=7802

Outcome of testing

- Sensitivity = TP/ (TP+FN) = 5/ (5 + 186) = 2.6%
- Specificity = TN/ (TN + FP) = / (7802+232) = 97.11%
- **Positive Predictive Value (PPV) = TP/ (TP + FP) = / (5+232) = 2.1 %**
- Negative Predictive Value (NPV) = TN/ (FN+TN) = 7802(186+7802) = 97.6%

Clinical Interventions

Clinical interventions, specifically pharmacological methods of pain relief, were identified and reported. These were categorised by conveyance status (Table 3)

Table 3: Pharmacological Interventions by conveyance status

List of medications for 05 NTBP	Total number of medications used by ACs & GPs to treat 05 NTBP	Transported to ED with analgesia (single drug or in combination therapy)	Remaining in community provided with analgesia (single drug or in combination therapy)
Entonox	2409	2226	183
Morphine	1055	1024	31
Paracetamol	568	148	420
Ibuprofen	278	118	160
Diazepam	31	24	7
Oramorph	2	0	2
Codeine	7	3	4
Co-codamol	25	5	20
Diclofenac	34	34	0
Gabapentin	1	1	0
Naproxen	2	1	1
Tramadol	2	2	0
Voltarol	1	1	0
Solpadol	1	1	0
Totals	4416	3588	828

Conclusion

Calls for NTBP span all age groups in the adult population however, proportionately more females required SAS support. The median age of callers for NTBP was 60 years (IQR 43-77). The PPV of aMPDS suggests it ability to identify clinical acuity in NTBP is low. The most commonly used pharmacological intervention was Entonox, followed by Morphine (a drug therapy not recommended for management of pain in dorsalgia by JRCALC Guidelines). This identified some priority areas for further research.

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