IMPERIAL

LAIDLAW SCHOLARS

In North-west London, Are There Differences In Prescribing Practices (Polypharmacy) Between Certain Demographic In Those With Chronic Kidney Disease?

Scholar: Lee Fernandes (BSc)
Supervisor: Dr Esther Kwong (MBBS, BSc, MSc, PhD, FFPH)

This is a Summer Project completed by a 5th Year Medical Student attending Imperial College London as part of his LaidLaw Foundation programme (a global leadership programme launched at Imperial College London in 2023).

PROJECT AIMS:

1.What is the prevalence of polypharmacy across renal patients in NWL, against established definitions of polypharmacy.
2. What are the patterns and trends in polypharmacy within the NWL Renal population and sub populations, including:
    2. Demographics
    3. Diagnoses
    4. Health system outcomes
3.What opportunities are there for using WSIC data to inform improvement in overprescribing and deprescribing of medications for patient benefit

BACKGROUND

Chronic Kidney Disease (CKD) is a long-term condition defined based on the presence of either kidney damage or decreased kidney function for three or more months. Globally, there are 6 recognised stages of CKD (1, 2, 3a, 3b, 4, 5), which is based off the estimated glomerular filtration rate (eGFR) calculation and urinary albumin:creatinine ratio (ACR).[1] Together the measures can quantify the extent of kidney damage an individual has.

POLYPHARMACY IN CKD

Polypharmacy is often defined as the use of ≥ 5 medications and has been identified as a significant global public health threat. In CKD:

70.4 - 81% of patients with CKD take ≥ 5 medications.[2]

8 is the median number of different medications taken[2]

FACTORS ASSOCIATED increasing: age, BMI, CKD stages 3-5 and those with a history of diabetes mellitus, cardiovascular disease and smoking. [2]

A scoping review was carried out using Embase and Medline and informed us off the existing research landscape. Numerous studies revealed that potentially inappropriate medications use as well as renally inappropriate medications are commonly prescribed in CKD and often overlooked in medication reviews.[3] The CKD-REIN study revealed that a large proportion of medications prescribed to patients with CKD were contraindicated, suggesting a lack of regular and/or thorough assessment of patients' medication lists as kidney function declined. [4]

PROJECT RATIONALE

Since few studies have looked at the disparities between prescribing practices between different population cohorts and demographics in the presence of renal disease, this project seeks to learn about the trends and patterns within group of patients with known CKD. The information gained can be used to better develop strategies which could identify individuals at high risk of over-prescribed medication which in-tern will improve population health in the NWL.

PROPOSED STUDY PROTOCOL:

1. Filter this existing data-set to produce a new data-set containing patients with known diagnosis (ICD10) and procedures (OPCS4) related to CKD.
2. From there, we will use descriptive statistics to understand patterns of polypharmacy and use regression analysis to understand relationships between polypharmacy within patients with renal diagnosis and patients' demographics such as gender, age, ethnicity.
3. Through looking for differences in patient cohorts we hope to discover the extent to which health inequalities exist in NWL.
4. After looking for any differences based on demographic, a similar approach will explore existing demographic differences in polypharmacy based disease progressions (such as CKD stages), and outcomes (dead or alive).
5. If the data allows, we will also look for variation in polypharmacy across different geographical boundaries within NWL. A statistical analysis will on all relationships deduced to test the significance. Methods such as T-Test and single/multivariate regressions will be used where indicated.
6. Finally, if the data allows, we will explore time-series analysis to identify trends, seasonality, and cyclic patterns in prescription data.

REVISED PROJECT TIMELINE

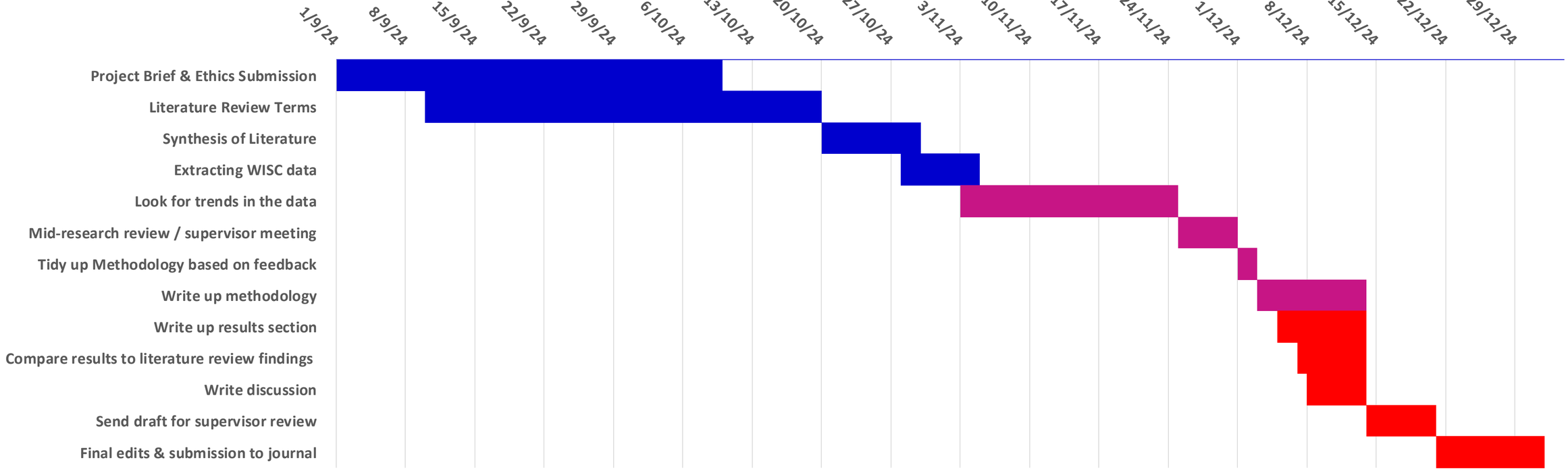

Figure 1 shows the updated Gantt chart, outlining the revised timeline and new expected completion date for the research project. Delays in acquiring data-sharing permission, travel commitments, and unforeseen illnesses have prolonged the project's timeline. Completion is now anticipated by the end of 2024, with the results to be shared on the Laidlaw Foundation website.

References:
1. Vaidya, S.R. (2024) Chronic kidney disease, StatPearls [Internet]. Available at: https://www.ncbi.nlm.nih.gov/books/NBK535404/
2. Schmidt IM, Hübner S, Nadal J, Titze S, Schmid M, Bärthlein B, et al. Patterns of medication use and the burden of polypharmacy in patients with chronic kidney disease: the German Chronic Kidney Disease study. Clin Kidney J. 2019;12(5):663–72. https://doi.org/10.1093/ckj/sfz046.
3. Secora A, Alexander GC, Ballew SH, Coresh J, Grams ME. Kidney function, polypharmacy, and potentially inappropriate medication use in a community-based cohort of older adults. Drugs Aging. 2018;35(8):735–50. https://doi.org/10.1007/s40266-018-0563-1.
4. Laville SM, Metzger M, Stengel B, Jacquelinet C, Combe C, Fouque D, et al. Evaluation of the adequacy of drug prescriptions in patients with chronic kidney disease: results from the CKD-REIN cohort. Br J Clin Pharmacol. 2018;84(12):2811–23. https://doi.org/10.1111/bcp.13738.