“Development of Smartphone Applications to Aid Safe Prescribing in Mental Health”

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How it all began...

- Nurse Prescriber Conference Presentation
- High Dose Antipsychotic Calculations
- That would make a great App!
HELP!!!!

Thank you to;

- Dr Michael Schukat (NUI Galway): Tutor
- Siobhan Moran (NUI Galway);
- Padraig Flood (NUI Galway);
- Richard McCormack (NUI Galway).

(Postgraduate software design students)
Three Smartphone Applications

- Antipsychotic dose calculator
- Clozapine passport
- Lithium safety smartphone app.
“Safe Drug” Antipsychotic Calculator

- When calculating antipsychotic doses there are two ways of determining if a regimen is classified as “High Dose” (1) and will require extra monitoring and record keeping (or a dose reduction) (2).
- In the UK the Prescribing Observatory for Mental Health provide a paper ready-reckoner for calculating antipsychotic doses using the BNF equivalents method (3) and there are paper charts available with lists of chlorpromazine equivalent doses (1).
- Paper versions may go out of date and still require a calculation if more than one antipsychotic is prescribed.
Aim

- To design a smart phone application to quickly and accurately calculate doses of combinations of antipsychotics.
Objectives

- Ensure the application was accurate and up to date with the latest data from Irish Summaries of Product Characteristics for each antipsychotic.
- Enable the application to calculate doses for oral, IM and long acting IM antipsychotics.
- Flag any dose combinations that are classed as “High Dose” and link to local, national or international guidelines.
- Allow use on Android or Apple smart phones.
Requirements

It was decided by the clinical pharmacist that the App must have the following functions;

- 1. The licence origin of each drug needed to be shown
- 2. The prescribed drug amount, as a % of the daily allowed maximum, needed to be displayed
- 3. The sum of all the totals, showing the combined daily % also needed to be displayed. This was the most important element of the app design.
- 4. A warning should be shown if the Total Daily % exceeded 100%
Android or iOS?

- There was a discussion amongst the group on whether our Safe-Drug should be constructed for Android or iOS (iPhone Operating System).
- Due to limited time we decided that an Android app was the more feasible to design and learn, as it just involved a plug-in to the existing Java Development Kit, Eclipse. The next phase of the project would involve creating an iOS application.
Prototype for Android

- The team have produced a prototype application for an Android smart phone. The application can calculate BNF maximums for single doses or combinations of up to seven antipsychotics. If a dose goes above the 100% BNF maximum a warning sign appears which alerts prescribers to refer to high dose antipsychotic guidelines.
Discussion

• Useful tool for prescribers who are choosing combinations of antipsychotics for patients. It could prevent the unintentional use of high doses of antipsychotics and alert prescribers to relevant guidelines if high doses are needed.

• The next step in the design process is to include high dose guidelines as a “tab” on the application for immediate reference. It is intended to produce and test an Apple application for use on iPhones and also to produce a version with UK SPC data.

• With further funding it is hoped the application will be freely available for use by pharmacists and prescribers.
Clozapine Patient Passport

- The software design students needed a second project.
- We started work on a tool for patients who are prescribed clozapine. The tool may also be useful for patients prescribed other medicines that need physical monitoring across multiple healthcare providers.
Background

- Patients who are prescribed clozapine require regular full blood count monitoring.
- It is also standard practice to monitor blood pressure, pulse and body mass index as well at each visit to the clozapine clinic. Other physical monitoring including liver function, blood sugar and urea and electrolytes should take place at least every six months. (4)
Clozapine Passport on Paper

- A paper version of a “clozapine passport” was designed by a team in London led by Ms Dawda. The paper passport requires that the patient brings it with them to each visit to the clozapine clinic, GP and other healthcare professional. If the paper passport is lost it is time consuming to recover the information as it is from several different sources. There is also a confidentiality issue as the passport contains the patients name, medication and physical monitoring results.
Aims and Objectives

- **Aim**: To design an online version of the clozapine passport, to enable access through a smartphone or personal computer.

**Objectives:**
- To ensure the software could be accessed by any healthcare professional and the patient themselves.
- To make confidentiality a priority.
- To enable easy recovery of data by the patient or healthcare professional.
- To expand the capacity of the passport to enable use with other medicines requiring physical monitoring.
Method

- Java "JQuery UI" is used throughout the website to help reduce large amounts of text and detail into just several quite basic looking pages. The homepage uses a basic 'JQueryUI' tab so as to only have one log in form on the screen at any given time. This allowed us to cycle from Prescriber to Patient logins with great ease.

- The home-pages for both the Prescriber and Patient aspects of the website use 'accordions' to store a variety of data. On the Prescriber’s side, this included several forms which could reload the current page in the event of erroneous information being entered. As accordions open on the top section by default, a mixture of PHP and JavaScript code was used to ensure the right one remained open by a simple conditional statement which outputted the correct JavaScript code for the client side to process.
Result

- A prototype website is now available for testing in the “real world.” It is available for viewing on a university webpage.
- The passport is designed for use by patients on a variety of medicines which need ongoing physical monitoring. Examples of these could include lithium, warfarin or sodium valproate. The project timescale did not allow the development of a mobile phone application, but the website can be viewed on any smartphone which has internet access.
Future

The next step in the process is to find a host server for the website. Industry or NHS sponsorship will be needed to fund a launch of the website, which will be free to users.
NHS App for Lithium Patients

- A new lithium monitoring app is available for free (within the UK) to help with the safe prescribing, administering and monitoring of lithium.
- Although the app is focused on lithium medicine management, the wider aim is to develop a framework which can be adapted for a broad range of medicines. Pharmacy Services are hoping this will aid patients and health teams administer and monitor additional medicines and be a useful tool for other healthcare Trusts with similar needs or for further development and enhancement.
The app was developed with the support of Bipolar UK members, and will:

- Record lithium treatment & levels
- Set health check reminders using the calendar function
- Record health check results at recommended intervals
- Record mood and sleep using the diary function
- Email GP or Specialist prescriber test results
- Store emergency information & contacts
- Have a learning section with frequently asked questions, Dos and Don’ts and a section on side effects
The app is:

- Free to download
- Password protected
- Has no in-app purchases
- Available for Apple and Android devices for use in the UK

Funding for the development of the app was provided by South West London Academic, Health and Social Care system.


MSc Neuropharmacology 2016

- Student from NUI Galway planning a feasibility study regarding use of NHS app in Ireland.
- Cannot download directly onto Irish smartphones at current time (NHS UK licence).

Investigating;
- Number of patients with smartphones
- Availability of WiFi and broadband particularly in rural areas
- Information on App matches Irish guidelines?
- Potential uptake of App if launched in Ireland.
Which App Do You Like?

- Antipsychotic Calculator
- Clozapine Passport
- Lithium Patient App
References