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Extemporaneous Preparations from the Past

Angelique Camilleri, Anthony Serracino-Inglott, Lilian M. Azzopardi

Department of Pharmacy, Faculty of Medicine and Surgery, University of Malta

Compounding involves the preparation, packaging and labelling of a drug specifically for a particular patient according to a medical prescription.[1]

Until the mid-1900s, the compounding of such 'on-demand' pharmaceutical preparations, also known as extemporaneous preparations, was the basis of pharmacy. In Italy, in 1580, descriptive catalogues and standards for quality and uniformity of pharmacy formulas for pharmaceutical preparations were compiled. These became known as the 'pharmacopoeia'.[1] In the 1930s and 1940s, about 60% of all drugs were compounded. However, in the 1960s, manual preparation declined.[2]

The objectives of the study were to demonstrate different methods of preparations of various drug formulations irrespective of the active ingredients used and to compile a list of extemporaneous preparations that were compounded between the years 1955 to 1965.

Methodology

Dosage forms, including liniments, ointments, suppositories, mixtures, creams and sachets and their corresponding ingredients were identified and the necessary active ingredients according to the *British Pharmaceutical Codex 1934*,[3] apparatus and materials were obtained. Preparatory sessions, were attended to, in which with the help of a pharmacy compounder with experience in the preparation of the identified products, the compounding of the selected dosage forms was practised. The re-enactment activities were promoted at the University of the Third Age (U3A). The re-enactment activities were further promoted through an advert on a health professionals portal Facebook page and eNews and published in one issue of the printed journal of the same entity. A leaflet and a questionnaire in English were formulated, validated and checked for grammatical mistakes. The aim of the questionnaire was to evaluate the quality of the re-enactment activities and the leaflet given to each participant. The test-retest method was used to test the questionnaire's reliability where 10 lay persons completed the questionnaire twice with a 2=week interval.

Re-enactment activities, in which 220 participants attended, were organised at *Aula Magna* Valletta during the Annual Pharmacy Symposium 2012 Campus, *Santo Spirito Hospital* in Rabat, and Department of Pharmacy at University of Malta. Participants came from secondary schools and the University of the Third Age.

A list of extemporaneous prearations was compiled using Microsoft Excel. The 1955-1965s timeframe was chosen and extemporaneous preparations were obtained from Pharmacy Drug registers found at the former *Santo Spirito Hospital* in Rabat, Malta. The Excel sheet formed consisted of 5 columns;

A. Number – each extemporaneous preparation was noted with a number.
B. Medicament – the extemporaneous preparation name.
C. Ingredients – all the ingredients used, active ingredients followed by inert ingredients, to produce such an extemporaneous preparation.
D. Use – the indication and/or the properties of the extemporaneous preparation where applicable.
E. Dosage form – drug formulation of the extemporaneous preparation.

Results

The 11 re-enactments activities were attended by 65 males and 155 females, none of whom had a medical profession.

A total of 192 complete questionnaires were collected, resulting in a response rate of 87.3%. The presentation was graded from 1 to 5, with 1 being the least satisfactory and 5 being the most satisfactory; none was graded least

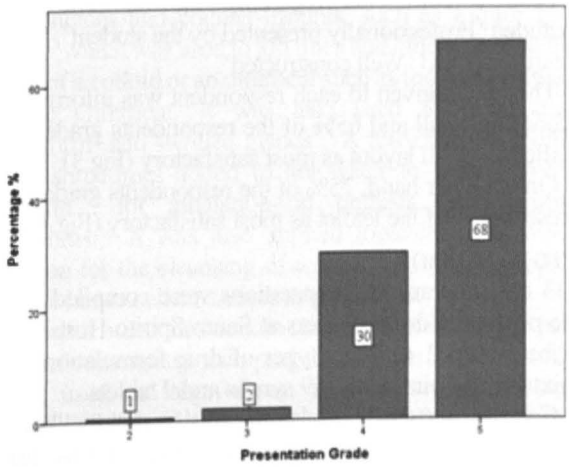

Figure 1: Grade of presentation (n=192).

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satisfactory and 68% graded the presentation as most satisfactory.

Only 19 respondents thought that the activity was either short or long (Table 1).

Table 1: Timing of the Presentation (n=192).

Time	Frequency	Percentage
Short	10	5.2
Satisfactory	173	90.1
Long	9	4.7
Total	192	100

16 of the 192 participants did not agree with the location chosen, the main reason being it was a small place.

Three-quarters of the respondents thought there was no room and need for improvement. However 25% thought that the sound, leaflet provided and the demonstration display needed to be improved.

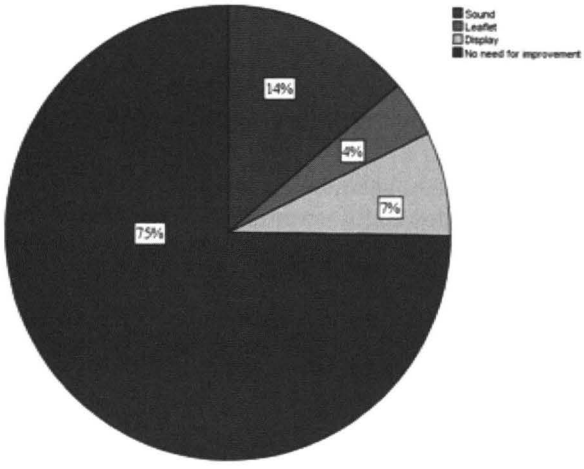

Figure 2: Any Need for Improvement? (n=192).

Only 2 of the 192 respondents thought that the activity was not worth the time and effort of the student organising it.

Positive comments regarding the demonstrations included 'Professionally presented by the student', 'Very interesting' and 'Well constructed'.

The leaflet given to each respondent was informative according to all and 65% of the respondents graded the leaflet's overall layout as most satisfactory (Fig.3).

On the other hand, 75% of the respondents graded the presentation of the leaflet as most satisfactory (Fig.4).

Preparations

133 extemporaneous preparations were compiled from the pharmacy drug registers at Santo Spirito Hospital in Rabat, with 31 different types of drug formulations: 22 mixtures; 18 ointments; 19 syrups and 9 tablets.

Capsule, ear drop, emulsion, infusion, linctus, liquor, paint and suspension were the dosage forms least encountered during the compilation of the extemporaneous preparations.

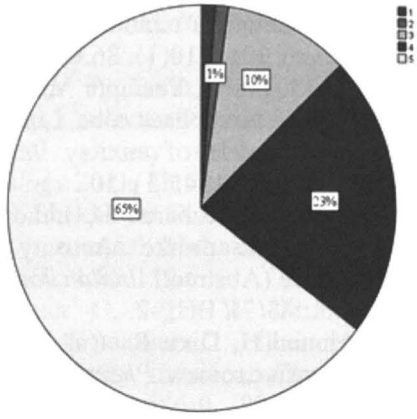

Figure 3: Grade of Leaflet's General Layout (n=192)

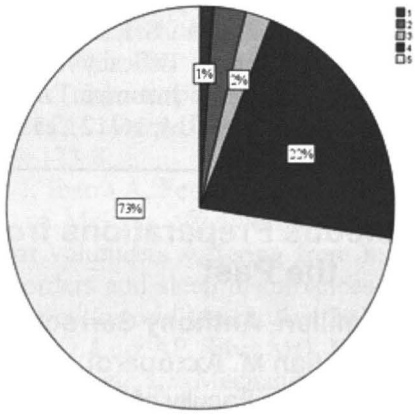

Figure 4: Grade of Leaflet's Presentation (n=192).

Discussion

It may be impossible to determine exactly when human beings first began to mix substances and compounded preparations that they perceived to exert a therapeutic effect on administration. However, the compounding of medicinal products of materia medica of plants and animals was practised since ancient times.[4]

Ancient Egyptians, Greeks, Romans, and Arabs all developed medical knowledge resulting in the integration of various aspects of pharmacy and compounding.[4]

Medicines were concocted with a mixture of empiricism and prayer. Trial and error, inherited lore and mystical theories were the basis of pharmacopoeias. In the 1960s, the technology of making drugs was crude at best; medicaments were mainly of herbal origin.[5] They were generally made with water or alcohol-based extracts of freshly ground or dried herbs or animal products.

The re-enactments, which were targeted to all age groups, were all well attended and proved to be fruitful, as tremendous interest shown by both the secondary students and the third age students was evident. Eager secondary students were allowed to participate in the compounding of the chosen extemporaneous preparations where they weighed the active ingredients using the the weighing balances, hence gaining first-hand experience, especially for those who had not yet attended

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Table 2: Section from the Compiled List of Extemporaneous Preparations (n=133)

Number	Medicament	Ingredients	Use	Dosage Form
1	Canellae	Cinnamon distillate	Antipyretic, tonic	Solution
2	Acriflavine glycerin	Acriflavine, glycerin	Disinfectant, reduce swelling	Solution
3	Compound Tincture of Rhubarb	Rhei, Simple Syrup (1 part sugar and 2 parts water), Cardamom	Flatulent colic, dyspepsia, constipation.	Mixture
4	Mistura Potassium Citrate	Pottasium citrate, citric acid, syrupus aurantis, Aqua Chloroform	Cystitis – decreasing urine acidity	Mixture
5	Hamech	Thyme, anise, ginger, absinthe, scammony	Venereal disease	Mixture
6	Diacatholicon	Cassia, tamarind, rhubarb, violets, aniseed, sugar.	Analgesic – pain relief	Syrup
7	Jera	Aloe, spikenard, honey, mastic, agaric	Blood purifier	Syrup
8	Senna Aromaticus	Senna, jalap, rhubarb, aromatics	Constipation	Syrup
9	Galbanum pill[5]	Asafetida, galbanum, myrrh	Digestion problems, flatulence, poor appetite, cough, spasms.	Pill
10	Foetidae Pillulae	Turpeth, sagapenumand, myrrh	Constipation, stomach ache, cough	Pill

any chemistry practicals. This enhanced the need for appreciation of the way pharmacists had to compound drugs accurately and in a meticulous way.

What was of much concern was the fact that the interest shown was not by pharmacists or by people with a medical profession but by laypersons. Hence healthcare professionals do not show much interest in the way medicines were compounded in the past and do not appreciate much how the pharmacy profession evolved through the years. This was evident from the number of demonstrations organised since the publication of the advert in the healthcare professionals journal. One may argue that healthcare professionals have a hectic lifestyle and were not able to attend these activities although the activities were relatively short. Some Third Age students showed so much interest that they even asked whether they could attend the next re-enactment activites in order to recall the older ways of compounding in their younger times.

Dosage forms chosen to be compounded during the re-enactment activities, including creams, sachets, mixtures and ointments, are still compounded nowadays in a clinical or community setting hence making the study beneficial by advancing the pharmacist position in today's society. On the other hand, these demonstrations should also pave the way to indulge in the many obsolete or near obsolete extemporaneous preparations that were compounded long ago by pharmacists.

After compilation of the list of extemporaneous preparations, it was evident that a vast range of drug formulations existed in the past. However, apart from this, the need to discuss certain important ingredients considered to be essential for human health is of importance, since some ingredients tend to be found in more than one extemporaneous preparation. Some imparted more than one therapeutic property and hence were indicated for several conditions. Among others, the following ingredients were of utmost importance.

Boric acid was administered in the form of cachets, pastilles and orange-flavoured mixtures[6] to sooth irritation and as hot applications for the treatment of boils, carbuncles, ulcers and whitlows, hence imparting its antiseptic property by being bacteriostatic.[7]

Iodine was administered in the form of a liquor for the treatment of chronic rheumatism, hypothyroidism and for preparation for surgery in hyperthyroidism.[8] Iodine was also present in preparations applied externally as parasiticides and counter-irritants, such as Liquor Iodi Fortis[7] which was used to kill tinea and other fungi. In the form of a colloid or an ointment such as the Non-staining Iodine Ointment. It was also used for chilblains, ringworm[9] and swollen glands .[7] A few drops of iodine were sometimes added to hot water to form a weak solution for inhalation in phthisis and chronic bronchitis.[10] It was also applied topically as a weak solution for the cleansing of wounds[11] to prevent sepsis since it has excellent antiseptic properties.

Rhubarb contains certain anthraquinone derivatives[12] as chief constituents with purgative properties, especially when used in large doses. A purgative effect was generally followed by an astringent effect from the tannin constituent. Hence, rhubarb preparations were employed as occasional aperients but not in chronic constipation. It

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was also employed in diarrhoea[7] and as a stomachic in dyspepsia and as a laxative.[13]

This study can pave way to further research to disseminate knowledge on traditional formulations used in pharmacy and also to identify most prominent ingredients preferred by prescribers at the time for the preparation of extemporaneous preparations. Trends in changes in the use of ingredients throughout the years could be identified.

Correspondence: Angelique Camilleri, email: acam0060@um.ed.mt

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The Anglo-American Pharmaceutical Company Limited

Norma Cox BPharm, MSc, MRPharmS

While researching British pharmacy for the period around World War I, I came across an advert in the *Chemist and Druggist Diary* for a pharmaceutical manufacturing company that I didn't know. The company was the Anglo-American Pharmaceutical Company Limited of Croydon; it offered a list of interesting products and had won gold medals at London, Bombay, Buenos Aires and Sao Paulo, Fig 1.[1]

The founder of the company was Mr Hubert Huxley Mason, Fig 2.[2] He came from a family of chemists going back to Aaron Huxley, his grandfather, 'a distinguished practitioner of the art and science of his day,' who pioneered bone phosphate manufacture at Newport (Shropshire) in 1850. Mr Hubert Huxley Mason passed his Minor examination in 1883[3] and soon after opened a pharmacy at Parsons Green, London. SW.[4] He formed a company in 1892 with his brother. In 1898 Mr Hubert Huxley Mason ventured into the wholesale manufacture of medical preparations, notably those of the glycerol-phosphate type, and introduced Huxley's Syrup

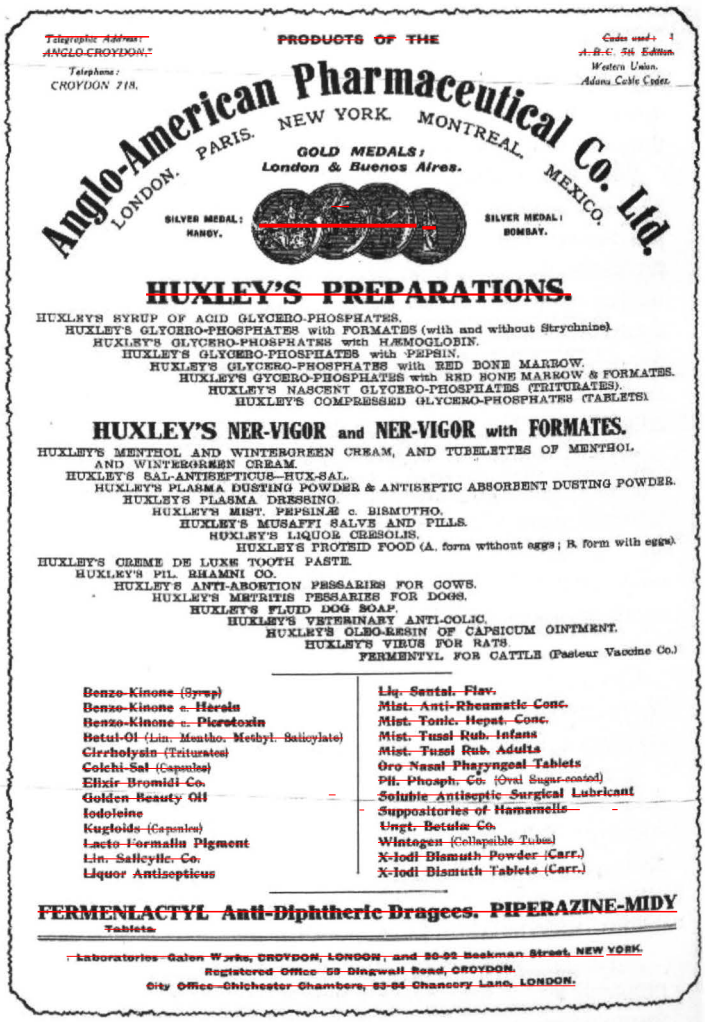

Figure 1. Advertisement for Anglo-American Pharmaceutical Co. Ltd, 1911.[1]

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