UNIVERSITI PUTRA MALAYSIA

TOWARDS PAPERLESS OPERATION AT THE OUTPATIENT DEPARTMENT OF THE KUALA LUMPUR HOSPITAL

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TOWARDS PAPERLESS OPERATION AT THE OUTPATIENT DEPARTMENT OF THE KUALA LUMPUR HOSPITAL

By

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Thesis Submitted in Fulfilment of the Requirements for the
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Dedicated to my parents and my mother-in-law.

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LIST OF ABBREVIATIONS

BAM	:	Business Activity Map
CARS	:	Computer Assisted Retrieval System
CAT	:	Computer Axial Tomography
CPR	:	Computer-based Patient Record
ENT	:	Ear, Nose And Throat
FOPD	:	Female Outpatient Department
IMIA	:	International Medical Informatics Association (New York State University, Buffalo)
IOM	:	Institute Of Medicine (Washington D.C.)
IT	:	Information Technology
KLH	:	Kuala Lumpur Hospital
MOPD	:	Male Outpatient Department
MRI	:	Magnetic Resonance Imaging
OPD	:	Outpatient Department
OSCAR	:	On Site Clerical Assisted Registration
QA	:	Quality Assurance
UKM	:	Universiti Kebangsaan Malaysia
UNMC	:	University of Nebraska Medical Centre (Nebraska)
WHO	:	World Health Organisation (Geneva)
WMH	:	Wishard Memorial Hospital (Indiana)

Abstract of thesis submitted to the Senate of University Putra Malaysia in fulfilment of the requirements for the degree of Master of Science.

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Patient care service is one of the most rapidly growing segments of the healthcare industry. It deals with the proper care of patients in a medical institution. The admission of a patient, restoring the patient to an acceptable health status and discharging the patient can be a very complex process. The trail of paperwork left is almost always overwhelming. This trail of paperwork tends to reduce the quality of care especially provided to the expecting patient. The erosion of the quality of care and efficiency becomes worse during readmissions or referrals to other departments.

The Outpatient Department is one of the busiest in the Kuala Lumpur Hospital. It is also KLH's earliest tenant. That being so, it can be expected that the patient management would have been computerised or at the very least mechanised.

The methodology employed seeks to clearly understand the current business processes, the complexity of the system and the underlying forces dictating the situation. Literature reviews on related subject matter formed the initial framework, concept and general direction. Surveying the Kuala Lumpur Hospital (KLH) landscape results in the Business Activity Map and used as a basis to identify suitable candidate for innovation. Within the confines of the Outpatient Department (OPD), understanding current process would expose the communication linkages between treatment, patient and other servicing centres. This is then followed by problem formulation, quantifying the delays, data sampling and development of the prototyped model. A comparison is also made between the methodology undertaken and established methodologies available.

The data gathered indicated a high degree of inconsistencies although the recording protocol and reminders are available. This is to be expected in a predominantly manual data gathering environment where individual interpretation governs what is important and what is not.

Results on data analysis reveals slight improvement in patient waiting time compared to the Quality Assurance 1994 report. This is attributed to differences in methodology employed and supporting structures available then. However on the whole, the average waiting time is still lengthy and therefore the need arises to identify the contributing factors thus bringing all processes in the OPD delivery service under detailed scrutiny.

The application prototype was developed with the retention of core tasks in mind. All non-core activities are either removed or when still required are delegated as IT by-products.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia bagi memenuhi keperluan untuk Ijazah Master Sains.

PENGOPERASIAN TANPA PENGGUNAAN KERTAS DI JABATAN PESAKIT LUAR HOSPITAL KUALA LUMPUR

oleh

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Perkhidmatan rawatan pesakit merupakan salah satu daripada segmen industri kesihatan yang paling cepat berkembang. Ianya adalah berkaitan dengan penyediaan khidmat rawatan yang sempurna kepada pesakit. Proses kemasukan, pemulihan (dengan mencapai tahap kesihatan yang bersesuaian) dan discaj boleh bertukar menjadi suatu pros yang kompleks. Rentetan beban kertas kerja ekoran daripada usaha menyediakan perkhidmatan tadi adalah keterlaluan. Rentetan kertas ini mengakibatkan penurunan kualiti rawatan kesihatan yang disediakan khas untuk pesakit. Penurunan kualiti dan kemerosotan keberkesanan menjadi ketara semasa kemasukan semula atau apabila merujuk pesakit kepada jabatan-jabatan lain.

Jabatan Pesakit Luar (JPL) adalah merupakan sebuah jabatan yang paling sibuk di Hospital Kuala Lumpur (HKL). Ianya juga merupakan salah satu daripada penghuni terawal di situ. Memandangkan kepada keadaan ini, sepatutnya sistem pengurusan pesakit telah pun dikomputeriskan atau sekurang-kurangnya telah diotomasikan.

Kaedah yang telah digunakan adalah bertujuan untuk memahami perjalanan proses kerja semasa dan kerumitan pada sistem serta tekanan-tekanan dasar yang telah menentukan keadaan. Sorotan literatur ke atas subjek yang berkaitan telah membentuk rangka-kerja awal, konsep dan hala kajian. Tinjauan ke atas lanskap HKL menghasilkan Peta Aktiviti Urusniaga yang kemudiannya telah digunakan sebagai asas untuk mengenalpasti calon yang sesuai untuk pembaharuan. Di dalam batasan JPL, pemahaman ke atas proses kerja semasa akan memperlihatkan hubungan komunikasi di antara rawatan, pesakit dan lain-lain pusat yang menyediakan perkhidmatan. Ini kemudiannya disusuli dengan huraian masalah, pengiraan kelewatan, pengumpulan data-data contoh serta pembangunan model prototaip. Satu perbandingan di antara kaedah yang telah digunakan dengan kaedah-kaedah kukuh yang sedia ada telah juga dilakukan.

Dapat diperlihatkan daripada data-data yang dikutip, bahawa wujud ketidakseimbangan data yang tinggi, sungguhpun telah ada protokol (untuk merekod data pesakit) dan peringatan. Keadaan ini boleh dijangkakan di dalam prasarana

pengumpulan data secara manual di mana tafsiran individu mempengaruhi mana yang penting dan mana yang tidak penting.

Keputusan di atas analisis data menunjukkan terdapat sedikit kemajuan di dalam masa menunggu pesakit berbanding dengan laporan jaminan kualiti 1994. Ini boleh dianggap sebagai disebabkan oleh perbezaan kaedah yang digunakan dan struktur sokongan yang ada. Walau bagaimanapun, purata masa menunggu masih terlalu lama dan oleh kerana itu, wujud keperluan untuk mengenalpasti faktor-faktor penyumbang di mana semua proses-proses kerja JPL dikaji dengan teliti.

Aplikasi prototaip telah dibangunkan dengan mengambilkira aktiviti-aktiviti asas. Kesemua aktiviti yang bukan asas samada telah disingkir atau jika masih ada kegunaan, dipindahkan sebagai produk sampingan teknologi maklumat.

CHAPTER I

INTRODUCTION

The principal role of the Kuala Lumpur Hospital (KLH) is to provide and deliver primary, secondary and tertiary healthcare to the public. The KLH also acts as a training institution for housemen and post graduates, and is a venue for doctor sub-specialty training and post basic training for paramedics. The KLH is the Government National Referral Centre with 25 clinical departments, 15 supportive departments, 7 training schools, 13 polyclinics, 81 wards and 2528 beds (KLH Annual Statistics, 1995).

Located on 60 hectares of prime land in the Federal Territory of Kuala Lumpur, the KLH is bounded by Jalan Pahang on the west, Jalan Tun Razak on the north and Jalan Raja Muda on the south. Historically, KLH developed as a district hospital in 1870 comprising of three ethnically identifiable wards then known as The Tai Wah, Choudry and Malay wards. In 1920, it was upgraded to 25 wards with second and third class differentials. In 1962, the maternity wing was completed, and in 1973, KLH was converted into a teaching hospital for the National University Malaysia (Universiti Kebangsaan Malaysia UKM) medical students.

It was between 1962 to 1988 that the bulk of continuing physical infrastructure development took place. Those years saw the completion of the North Ward Blocks, Radiotherapy Department, staff hostels, South Ward Blocks, Neurology Institute, Surgical Block, National Blood Transfusion Centre, Specialists Clinics, Hostels for doctors and nurses, Orthopaedic Institute, Urology Institute, Artificial Limb Centre, Radiology Block and finally The Paediatrics Institute. The KLH's vision is to provide fast, effective and quality patient care using the appropriate technology.

Paperless Concept

The main concept behind a paperless office is electronic document management (Williamson, 1997) or in simpler terms to replace the use of paper. In the KLH OPD environment, paper documents have to be physically transported to the servicing centres before a service action can be initiated. The paperless concept transcends another level whereby required information can be transferred via electronic means. To be meaningful, similar information should no longer have to be rekeyed. Due to the complexity of restoring a patient to an acceptable health status and the inevitable paperwork trail generated, paperless in the OPD also means rapid access to information across the entire OPD network (Mansell-Lewis, 1996). This has the added prerequisite of "information accountability" where the data depositor is responsible for information accuracy. According to Bisby (1997), the paperless concept should be the turning point between information flexibility, manageability

and accessibility. Conceptually, being paperless implies a change in conducting business at the OPD by peeling away redundant intermediaries leaving only the core deliverables, which should result in entire servicing units becoming transparent. The success of this innovation depends entirely upon how fast the change is accepted.

Paperless in the OPD is important because it represents a paradigm shift towards a more organised institution in terms of patient information which forms the basic building block of patient care delivery systems. It can also be the platform for case in point for the future inpatient care delivery systems. Paperless OPD acts in providing an avenue for the professionals to concentrate on what they were originally trained for. In a sense, by the creation of extra cumulative free time, it provides an opportunity by releasing professionals for more creative work. However on the whole, the paperless OPD should be recognised as a viable alternative for possible transformation of the very essence of the work culture from islands into work groups.

The Outpatient Department

Definition

The outpatient service of the Outpatient Department (OPD) KLH provides and delivers healthcare without the need for patients to be hospitalised. As distinct from

inpatients, outpatients do not "stay" in the hospital. Hence the compound "outpatient" word coined by linking "out" to the word "patient". The service is synonymous to primary care when no referral is required.

The Primary Care Computing Group of the International Medical Informatics Association, New York State University, Buffalo (IMIA) workshop in 1990 defined outpatient care as ambulatory care or care at first point of contact, not an inpatient, no fixed diagnoses and not necessarily involving a doctor. Viviani (1980) gave a similar definition "… a medical facility where only non-hospitalised patients are seen where the facility may be located in a solo private office, group practice or within a hospital." Vallbona (1980) gave a shorter definition "… the first contact point between an individual and the health professional."

Background To The Problem

There are a number of salient factors contributing to the problem faced in the KLH. In order to identify its exact nature, it is necessary to explain the current system the KLH operates in, for only then can reform be suggested. To achieve reform, one should clearly understand the complexity of the system and of underlying forces that brought it to crisis level. These factors are interrelated and are as follows:

i. *National referral centre* - In over 126 years of existence the KLH has been transformed into a premier Referral Centre. Facilities offered include 25 clinical departments ranging from medicine, neurosurgery, plastic surgery & reconstruction to artificial limb centre, 15 supportive departments and 7 training schools all located within the KLH compounds. No other hospital in the country offers such a mix of services under one complex. Figure 1 depicts the National Referral Hierarchy where a patient from the lowest level can be referred for treatment at KLH.

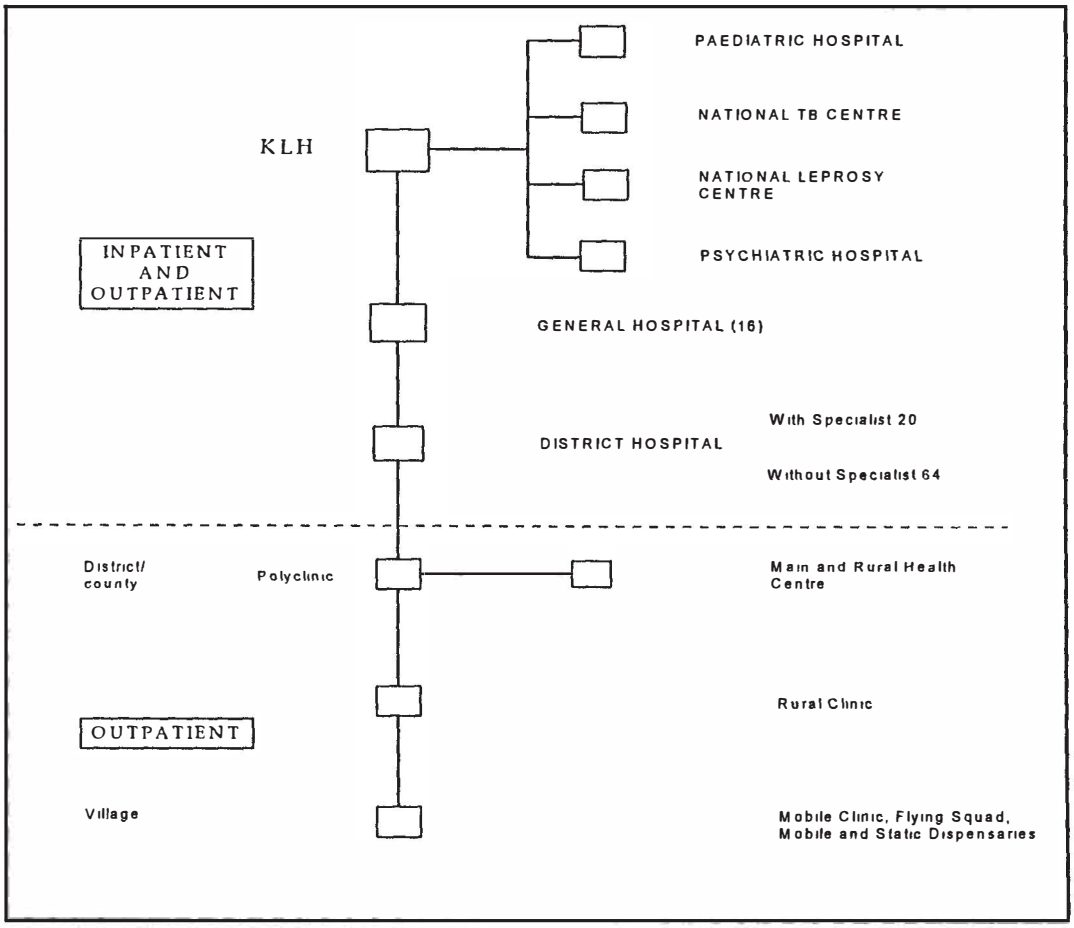

Figure 1 - **The National Referral Hierarchy**

As a hospital, the KLH serves as a district hospital to the neighbouring states of Selangor, Negri Sembilan, Pahang and Wilayah Persekutuan (Federal Territory Kuala Lumpur) thus ensuring a continual supply of clients.

ii. *Centralised Services* - Virtually all ancillary functions - blood bank, pharmacy, radiology, physiotherapy, occupational therapy, EEG are centralised. As a result, an elaborate scheduling, transport and despatch system is required to perform the functions rendered centrally. Figure 2 illustrates the operating structure.

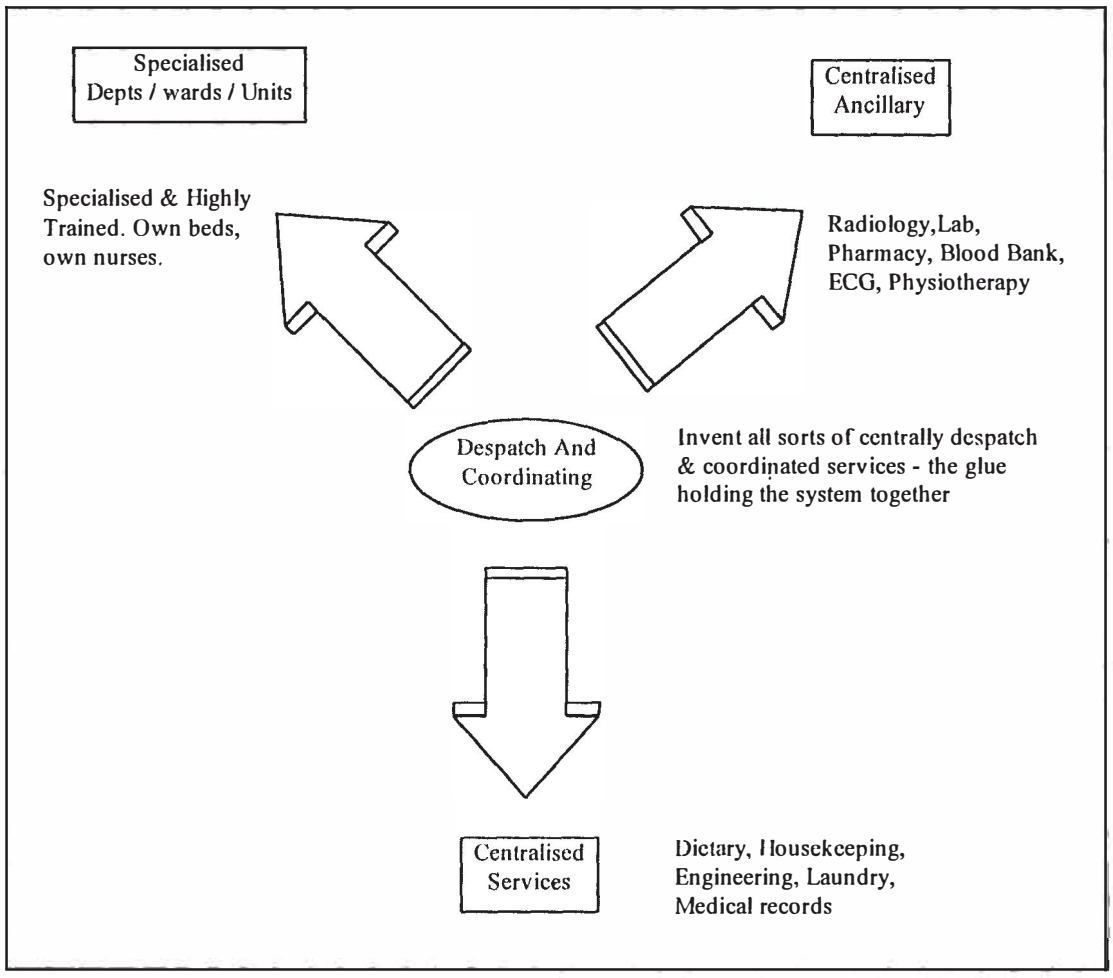

Figure 2 – **The KLH Operating Structure**

iii. *Capital Assets Procurement* - Actual expenditure figures between 1993 and 1996, indicated that between 50% - 56% of total operating expenditure was spent on emolument leaving 40% - 45% for transport, utility, food, medicine and maintenance. The remainder 1% - 4 % was spent on capital assets and 1% - 2% for fixed charges and grants.

In the United States (US) similarities can be observed where hospitals spend between 1 and 3 percent of their gross operating budgets on information technology (Anderson,1996). George Huntzinger, President of Computer Science Corporation Healthcare Systems Division Michigan said "The healthcare industry has grossly underinvested in information technology and overinvested in administrative personnel". On the other hand, industries such as banking and insurance are spending up to 15 percent of annual revenues on information technology (Anderson, 1996; DePompa, 1996; Endoso, 1996). Table 1 illustrates the annual expenditure breakdown in the KLH expressed in percentage. The assets column is inclusive of computer equipment procurement and computer services.

Table 1 - **Assets Procurement Breakdown**

YEAR	EMOLUMENT	TRANSPORT,UTILITY, FOOD,MAINT. & MEDICINE	GRANTS & FIXED CHARGES	ASSETS
1996	52.06	44.28	2.08	1.55
1995	50.43	45.75	1.76	2.05
1994	53.10	41.00	1.80	4.20
1993	56.00	40.00	1.00	3.00

Source: KLH Annual Expenditure Statistics

iv. *Large Customer Based* - Since 1981, the OPD reported over a million annual visits (Appendix D). Factors that may explain this outcome are as follows:

a. Minimal payment for services rendered - Under the Fees Act 1982, all and any services provided at OPD shall be chargeable at RM 1.00 per visit. The service may vary from a simple visit with or without prescription to one that requires medication, sophisticated diagnostic tests, repeat visits, second opinion and or referrals.

b. Easy access - The KLH is located centrally, serviced by public transport system and surrounded by commercial complexes, government offfices, schools and a multitude of housing estates.

c. Nature of business - Fortunately or unfortunately, the KLH has evolved into a one-stop primary, secondary and tertiary healthcare facility.

d. Government policy - To a smaller extent, government policy dictates that no hospital in the public sector shall turn away a patient.