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A Comparative Study of Computerised Medical Records Usage Among General Practitioners in Australia and Sweden

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Abstract

This article is based on a major empirical study of the state of adoption of Computerised Medical Records (CMRs) among General Practitioners (GPs) in Australia and Sweden. Responses were gained from a mail out questionnaire to random samples of GPs in both countries (n=600/country). This paper will report on the main findings gained emphasising some of the various similarities and differences between the two sample groups. This comparative study adds to the existing body of CMR literature by way of providing a cross cultural perspective on GP adoption states. As a result, some concluding comments are offered for understanding high and low diffusion rates of CMRs among GPs and the implications for health policy and technology adoption strategies.

Keywords

Computerised Medical Records; General Practitioners; Australia; Sweden

Introduction

A high adoption rate of computers and CMR usage has been common among GPs in such countries as the UK [1], Sweden [2], Germany [3] and the Netherlands [4]. Low adoption rates exist for Australia, New Zealand and Singapore amongst others [5]. Why is this the case? Literature does provide for some illumination of the situation as to how some countries have achieved a higher adoption rate, for example in the Netherlands [6] and Sweden [2]. This has primarily been achieved through a range of co-ordinated programs between government, the various representative professional bodies and GPs by way of direct financial incentive and reimbursement schemes for the purchase of software and/or hardware as well as grants for research and pilot programs.

Also worth noting is the high diffusion rate of computers and CMRs among Scottish GPs. Scotland can be considered unique in that it has a national standard software program known as the General Practice Administration System for Scotland (GPASS) and hence it would appear to be placed in a favourable position to collect primary health care data on a national scale [7, 8]. The Scottish experience may offer some valuable insight and learning experiences into not only how a higher diffusion rate can be achieved but also the challenges faced once a higher diffusion rate has been achieved i.e the quality or completeness and accuracy of computerised patient data. Results from a Scottish study into morbidity data indicated that only 75% of the highly computerised general practices surveyed were found to of kept what were regarded to be complete and highly accurate data records [9]. Although there is always the danger of generalising these results, this finding may have implications for medical informatics thought generally in terms of the positive correlation between CMRs and the improvement in the quality of health care data as compared to traditional paper record keeping practices. It becomes obvious that such concepts as quality and improvement are relative terms and are dependent upon how they are interpreted. Albeit to say that CMRs will not miraculously solve all the existing patient record keeping problems, it needs to be acknowledged that different problems will present themselves with the implementation of computers and CMRs as well as the resurfacing of old problems in different ways. Hence, the adoption or lack of adoption of CMRs are both an acknowledgment of the benefits as well as the problems faced with implementing and using this technology.

Strategies and projects for increasing the rates of adoption have also been offered by various other authors [10, 11, 12]. Barriers to the diffusion of technology can be many, ranging across a spectrum of issues from social, economic, technical, political to organisational [13]. More recently, Berg (1997) has argued that failure to diffuse or stabilise a technology can be attributable to the failure to localise a particular technology within an organisational setting [14].

This would indicate that there is great scope for the application of a more broader socially oriented joint stakeholder explanation for understanding CMR diffusion among primary health care practitioners.

Medical informatics, essentially views CMRs as the centre piece for all else to follow. This is the vision advocated in the landmark study by the Institute of Medicine (IOM) in 1991, as such the IOM's definition of CMRs is adopted and defines CMRs as being: "an electronic patient record that resides in a system specifically designed to support users by providing accessibility to complete and accurate data, alerts, reminders, clinical decision support systems, links to medical knowledge, and other aids." [15]. Hence, since CMRs are seen to be the

basic foundational building block for all else to follow, it makes sense that close attention needs to be given to research into CMR diffusion in health care.

Materials and Methods

Research Objectives

The aims of the survey were primarily to investigate the state of adoption of CMRs among GPs in Australia and Sweden in order to establish and verify the reasons for high and low diffusion rates. Secondary aims of the study were to try and gain a deeper understanding of the process of CMR diffusion among GPs so as to try and link existing technology diffusion theory with practice. Finally, to offer some comments about understanding high and low diffusion rates of CMRs among GPs and the implications for health policy and technology adoption strategies.

Questionnaire

The questionnaire was developed from preliminary research and interviews, both in Australia and with various medical practitioners in Sweden [2]. This process involved several iterations of refinement and trialing before a satisfactory questionnaire was developed for distribution. Responses were sought for demographic data, educational background and training, computer use/non use, adoption barriers, computer security awareness, software/hardware platforms, as well as present and possible future trends in the use of CMRs. The questionnaire comprised of a common section for all respondents and then two nested sections, one for those GPs who were CMR users and another for those who were non computerised. Both open ended and closed questions were included to elicit information with space available for comments where needed. The design of the questionnaire included a coding schema for easier transcription of response data into a spreadsheet for further analysis. All mail out questionnaires were accompanied by suitable covering letters and prepaid return address envelopes to encourage the response rate. The questionnaire itself was originally drafted in English and then painstakingly translated into Swedish. Informal discussions with GPs during the piloting stage indicated that Swedish GPs would be more inclined to respond in their own native language rather than in English despite the fact that English is common among Swedish professionals.

Sample

The survey was sent to a random sample (n=600/country) of GPs in Sweden and Australia. The Swedish mailing list was made available courtesy of the Department of Family Medicine, Uppsala University. The first and only mailing in Sweden was conducted in November 1994 for return before mid December. A 50% (n=302) response was gained and there were no follow up or reminder notices to increase the response rate.

The Australian mailing list was made available courtesy of the Commonwealth Department of Human Services and Health. The state of New South Wales was randomly chosen for sampling. As with the Swedish survey, the first, and only mailing, was carried out a year later in November 1995 for return before mid December. A 49% (n=293) response rate was gained and there were no follow up or reminder notices to increase the response rate.

These return rates of 50% and 49% respectively are above the 20 to 30% range required to validate survey findings [16].

Results and Discussion

The main findings of the survey indicate that there has been a high rate (72%) of diffusion of CMRs among GPs in Sweden and a low rate (14%) of diffusion among GPs in Australia. The high rate of diffusion has mainly been achieved by direct financial funding schemes from the Swedish Government and County Councils. Furthermore, 80% of the Swedish respondents indicated having a strong belief that CMRs are an essential technology for healthcare in the future as compared to 55% of the Australian respondents. Good health and equal access to health services for everyone are the goals of both the Australian and Swedish health care systems as articulated through national policy and a range of legislations; the National Health Act, the Health Insurance Act, the Medicare Levy Act in Australia and the Health and Medical Services Act in Sweden. A fundamental principle of both the Australian and Swedish health care systems is that it is seen as a public sector responsibility to provide and finance health services for the entire population. In Sweden, the responsibility and operational management for health care services rests primarily with the local County Councils who have the power to levy taxes to raise the finances required to run these services. Hence, this is a reflection upon the Swedish Welfare State ideology and also the reason for the generally high tax regime used to fund social services. The Australian Health Care system is administered by both the Federal Government in conjunction with the respective State Governments (responsible for public hospitals) through funding grants and the Medicare Levy. The history of Australian welfare programs has been targeted welfare rather than universal social programs as in Sweden. Hence, GPs in Sweden operate mainly under a public umbrella health care system funded by the County Councils while GPs in Australia mainly operate as private businesses within a public system and thus receive minimal direct financial assistance with CMRs.

Furthermore, of the CMR users, results do tend to support the claim that CMRs are helping to improve the way GPs work as indicated in both samples (Australia 81% and Sweden 68%) but the consensus on this can be interpreted as being somewhat gradual rather than overwhelming. As supporting evidence both samples cited the following as being improvements: having increased quality control over patient information as opposed to hand written notes, faster access to patient records in comparison to paper files and easier access to patient information when dealing with telephone enquiries.

Based on the respondents, the male to female ratio (as a percentage) in Australia was 72:28 while the Swedish ratio

was 60:40. Hence, GPs tend to be male, in their forties and cluster together in greater numbers to form a practice, more so in Sweden than Australia, where GPs predominantly operate in solo practice. Results can be seen to support the claim that both in Australia and Sweden the future trend is towards the cluster-

ing of GPs with other allied practitioners in one centre or practice. In Sweden this is seen to aid cooperation and the sharing of medical resources among primary care practitioners while in Australia this move is not just for mere cooperation but paramount to the idea of forming super clinics for greater economies of scale, throughput and returns. In this scenario, over servicing by GPs can become a problem, especially under the publicly funded Medicare system in Australia. The Australian GP respondents indicated seeing a lot more patients per week than GPs in Sweden. This can further be seen as a reflection upon the mentality that primary health care is treated more as a business and throughput becomes a measure of financial return as opposed to public sector GPs in Sweden who have a set list of patients for their area and who are predominantly paid a set amount from the public purse irrespective of the number of patient visits.

The non computerised samples provide for some distinct differences in GP attitudes. In the Australian sample, of the overall non computerised respondents (86%), 63% believe CMRs will improve the way GPs work but 67% do not plan to implement CMRs within the next 3 years. Follow up questions indicated that 65% did not feel that they had a problem managing patient health records thus possibly (if answered truthfully) accounting for why non computerised GPs felt that they did not need to computerise. This represents a significant number of GPs who are obviously still not convinced of the benefits of CMRs over paper records. It is not surprising then that 77% indicated that they have taken no planning steps towards implementing CMRs whatsoever. Respondents indicated that they were concerned over lack of software standards and data portability between software systems. These further add to the reasons why GPs are reluctant to computerise, fear of choosing software that may become obsolete or incompatible with other systems. In contrast, of the Swedish non computerised sample (28%), 72% believe that CMRs will improve the way GPs work and 90% plan to implement CMRs within the next 3 years. Follow up questions indicated that 68% did feel that they had some existing problems managing patient health records and CMRs were perceived to help in resolving these problems.

Overall, in both samples there were respondents who indicated that they kept no backup records or had no disaster recovery plan for patient records, the Australian respondents (81%) being more guilty of this than the Swedish respondents (19%). This is attributable to the fact that Australian GPs are predominantly non CMR users and do not keep paper based backup records. Both samples overwhelmingly consider themselves as responsible for the accuracy of patient information contained in patient records. Again, ideological differences become apparent in that of the Australian sample, 95% believe that it is the GP who owns the patient record while 42% of the Swedish respondents believe that the Government owns the patient record. But clearly, GPs feel that they are responsible in some way for the patient information but interestingly the Australian GPs more so, do not seem responsible enough in protecting this valuable resource. A legal precedent may await this dormant sleeper as does testing the validity of CMRs in the courts. This also begs the question: what about the patient ? Only 3% of the Australian respondents indicated that they thought the patient owned the information and no respondents thought that the government owned the information. The Swedish respondents reflect a more joint oriented model of patient information ownership between Government, GPs and patients than did the Australian sample. This may be linked to the funding mechanisms for CMRs, 88% of the Australian respondents indicated receiving no government help with computerisation as opposed to 76% of Swedish respondents who did receive financial help from the Government or County Council to computerise.

Within both samples, very few undertook computer related subjects as part of their medical education. This may well be attributable to the fact that desk top computers were not around or as accessible when the majority of respondents were undergoing their medical education. The most common source of information about keeping up to date about computers was via colleagues followed by journals and conferences. This confers that word of mouth can be seen as an important form of communication among GPs. This could be attributable to personalising what one GP may have read in a journal and then verifying that information with colleagues to either accept or reject information and ideas. Thus, face to face communication, conferences and workshops are an important part of communicating information to others in a more personalised way. Respondents indicated having a wide range of computer experience. The general software/hardware trend is towards PC Windows based platforms with software that integrates CMRs with other functions e.g. accounts/billing, appointments scheduling, word processing, electronic mail etc. The potential for a "GP Office" like software is obvious. The mix was even for computers being used solely as standalone workstations or in a multi user network configuration. The password remains the most common form of security protection. Results would suggest that financial investment or reimbursement for the purchase of computer equipment would benefit some GPs but there would still be some who would not know what to do with the technology even if they had a computer on their desk. This can be attributable to their lack of computer literacy and general knowledge about computers (the number 2 barrier as indicated in both surveys). GP respondents in Sweden were more concerned about a lack of a CMR software standard among GPs as being their main barrier to adoption. Australian GP respondents indicated that cost was the major inhibiting factor. The results support the findings of Bolton and Gay (1995) who concluded that "non computer users do not know enough about the benefits of computerisation to make an informed decision about computerising" and that cost was a "high priority" [9].

Conclusions: Policy, Strategy and Future Trends

Both systems are under pressure due to rising costs and diminishing government tax base revenues to fund health services. Thus, more economic rationalist, cost cutting, principles are being applied to managing health care. Governments of today are more interested in outcomes and cost reduction. Systems that allow for greater accountability and evaluation represent a means for governments to exercise more control over health care services. Thus, implementation of computers, CMRs,

financial and information management systems can be seen as a prominent part of gaining greater control and accountability of how public money is spent in the health care sector. Thus, at a political level, it can well be argued that CMRs represent a means of obtaining greater control of information by governments in the health care sector. Hence, GPs in Australia may see this as a loss of control at two levels over: (1) revenue and (2) their operational information at the practice level and thus be loath to adopt any technology which rearranges the balance of power in favour of the government.

Both systems are having to place more emphasis on cost reduction (GPs, hospital services, pharmaceuticals etc) as evidenced through the use of such terms as performance, competition and quality. This is the rhetoric that is being used to try and institute change. Sweden faces the pressure to move to a more market orientated health system instead of reliance on fixed annual allocations to GPs and hospitals. Payment would be made according to outcomes or performance. The small but growing number of private GPs in Sweden is itself a reflection upon changing economic conditions in Sweden with the hope of creating more competition between GPs with the aim of reducing costs for services rendered while trying to maintain or improve quality. Direct evidence of this has been in the shift towards patients being able to choose a GP, previously they were allocated a GP but this move itself is still in a state of flux. This change could marginalise and effectively squeeze unpopular or inefficient GPs out of a job, possibly those not using computers or CMRs. Greater competition between the public and private sectors is being encouraged both in Australia and Sweden. Globally, there has been a greater move towards competition, privatisation and reregulation of markets, health being one such market sector experiencing pressure to change.

In terms of policy and program recommendations for encouraging CMR adoption, based on the survey results it becomes obvious that there is no one simple solution to increase the rate of CMR adoption among GPs without carefully examining the environment they are to be diffused within. The following are some options and initiatives that could be helpful to policy planners, coordinators and strategists. Greater focus needs to be placed upon research, design, marketing, implementation, training and policy. Co-ordination among government and the various professional medical bodies is essential. Education, information, training and support initiatives are vital for the proliferation of CMRs among GPs. In a market economy, the reality is that there has to be some form of financial incentive for GPs to computerise.

For CMRs to be marketed successfully to GPs they further need to be seen as more than just an automated version of the existing manual paper records process. An integrated software system approach needs to be advocated i.e CMRs need to be seen as part of an integrated system ("GP Office" software approach) which links together other functions such as accounts/billing, appointments scheduling, prescription, drug interaction database, email, Internet access etc. But the future lies in promoting the idea of GPs being able to generate practice statistics both in aiding them in spotting disease trends and for opportunistic revenue generation through patient reminders and recalls. GPs would have the ability to effectively "mine" their practice population database for information that was previously difficult to access due to the physical nature of patient records being held in paper form. With the computerisation of patient records GPs can then utilise software capabilities to produce practice statistics and/or queries about their practice population. It is the view of this author that this database query feature is undersold at present. If GPs can be made to see that they can generate opportunistic revenue through patient reminders and patient recalls then they may be more willing to invest in the purchase of computer equipment and computer medical records software.

To achieve a higher rate of CMR diffusion among GPs ultimately the GPs themselves have to take a pro active role among members of their own medical community. GPs themselves need to become their own self diffusers of the technology to other GPs within their social networks if a higher rate of adoption is to be achieved. The early adopters need to act as facilitators for other GPs. Computer training workshops can act as a starting point for information exchange and networking. It also provides a forum for GPs to be directly exposed to the technology in a non threatening environment among their peers. Such simple exposure to CMRs can lessen the distance and fear GPs may have about CMRs. Training and support needs to be seen as on going and hence, having GPs or technical staff/consultants to offer advice and assistance is critical for the whole process to work. Ideally, at the local network or divisional level staff who have an understanding for both computing and medicine would be invaluable in such roles. This also highlights the importance of developing educational programs at tertiary level to include both computing in medical degrees and to establish medical/health informatics as a discipline in its own right for various allied health professionals.

In terms of long term direction and health policy formulation, caution needs to be taken in both the undertaking and interpretation of research results since results may not be generalisable beyond the sample or environment that they were obtained in. Hence, adopting a high diffusion strategy of another country may not necessarily translate into direct success in one's own country. Such adoption strategies may need to be modified to suit local settings, hence, both the utility and drawback of adopting strategies from other countries. Careful consideration needs to be given to the regulatory environment that health operates within and the people involved. Therefore, devising policy and strategic information technology plans need careful consideration of the options and alternatives available before expenditure of significant sums of money and effort are made in order to obtain what can sometimes appear to be elusive but desired outcomes. As such, for long term national health gains to be made, desired health outcomes need to be clearly predefined in order to avoid continually shifting goal posts in an environment of rapid change, hence the importance of standards [17, 18, 19]. Otherwise, a completely different technology and health strategy for operation in a short term dynamic market environment needs to be adopted which may maximise the economic return for some actors and eliminate others due to the adoption or non adoption of competitive practices.

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