**CHAPTER 2: REVIEW OF RELATED LITERATURE**

The review of the literature for this study would cover the usage of an automated patient record system, appointment system, and automated billing system for dental clinics or other types of clinics, its capabilities and how advantageous the outcome of the automated systems will be. The chapter would start out on defining what these systems do and it’s understanding regarding automated systems for clinics, and what these kinds of automated systems will be throughout the years to come.

**An appointment system is much recommended nowadays where an article according to** Diana P. Friedman (2013) says that **Internet age has dramatically altered communication patterns. Face-to-face interchanges continue to give way to digital message exchanges. Channels for these digital communications have rapidly morphed and expanded over the past years toward a faster, more interactive means of exchange. This is the reality that faces dental practices: Interaction with current and prospective patients will predominately take place online.** A national research study by Sesame Communications documented that 97 percent of dental patients would rather click than call their dental practice. The same study found that 79.5 percent of dental patients prefer SMS text and email reminders over phone calls from the practice. And so this is where an appointment system would go along the ways, since the Internet age has drastically rise and technology nowadays has almost at its maximum peak for this generation.

Another article which are published by Jun Yan, Ping Yu and HongXiang Hu (2010). Appointment system has brought in the benefits of eliminating service provider's waiting lists, improving patients' timely access to services and reducing no-show rate. However, to implement this model, practices need to collect relevant information, develop contingency plans and set up practice strategies to balance the provision of care and patient's demand. These tasks are not always easy to achieve. Understanding the requirements and constraints for effective management of patient booking is essential for developing an automatic appointment system that effectively supports this model in practice. Another article in regards to reducing appointment lead –time according to Ronald E. Giachetti (2008) is the lengthy waiting time for patients to receive an appointment. A long appointment delay cause patient dissatisfaction with the health care clinic and also has clinical ramifications. Long appointment delays are also found to increase patient no-shows, which further wastes medical resources and leads to a decrease in clinical care. Thus making a policy of eliminating multiple appointment types can be effective in reducing appointment delay and as consequent no-shows. This policy is equally effective as general overbooking without penalizing the entire patient population. So a need of an appointment system could really help improve and allow patients a more conventional way to communicate via online.

In the article, Automated Pharmacy System Cuts Waiting Time at Themba Lethu Clinic, the title already gives us the idea that automation of something may lead to cutting of waiting time. And so with the dental clinic, waiting time also needs to be cut-off, and so with the implementation of the patient profile and records automation, the waiting time of each patient should be lessen for the clinic staff would only search his/her name if he/she has already filled-up his/her information in the system.

After making-up with the automation of the patient, thinking of possible way for the information to be more safe and secure, we come to think of something that would make it better-off in the security field. In the article, IiWAS '09 Proceedings of the 11th International Conference on Information Integration and Web-based Applications & Services, they made an application, which is a patient electronic medical records, to be a web-based application using the tools needed. The idea of a web-based application are applied in our system, as this secures the data more than storing it locally.

In the article, Dental Information System, they have supplied idea that is similar to a tracker which would keep track of the information stored in the system. An example of this is that if you have a bunch of patient information stored in your system, you still can filter out information according to your needs, like filter it out by date, name, etc. In our system, the idea is applied in the patient record which would keep track of the treatment done to the patient, the date, and also the payment of that transaction.

In the patient information part of the system, automation would be a complete solution for the problems such as long waiting time, the possibility of the loss of patient record, retrieving of manual records, redundancy of patient information, and the information about the payments (incurred fees, paid, balances).

According to a previous study made by Kevin A. Jones (2012) which aimed to analyze one such application that codes endoscopy procedures based on the documentation to compare the automated coding method with manual physician billing to determine the efficacy of charge by documentation. He concluded in the study that charge by documentation is effective and should be considered where it is economically feasible. Implementing a system to tie clinical documentation with billing data was said to have a positive revenue and significant compliance impact. Our study is similar because we aim to develop a billing system which will be documented by saving it to an automated patient record.

An automated Billing system has been proven to be effectively reduce the labor required for manual input based on an article by Mesel E, Wirtschafter DD, and Ramsey-Klee DM (1976) wherein an on-line Medicaid billing system for physicians' services was implemented and tested during a two and one-half year period in 100 offices throughout the State of +0.50,Alabama. It was concluded that the input time for the average claim billing for two separate services was less than one and one-half minutes and resulted in a reduction of clerical labor required for manual input by at least 50%. Another study made by June Gibbs Brown (2000) has concluded that the same tools used to ensure accurate billing can also be misused to maximize reimbursement and to submit false claims. Even though the system will decrease human effort, it’s still prone to human mistakes therefore the users would need to exercise caution at all times.

A thesis made by Fadzhila Binti Sabri (2011) which was a Decision Support System for Dental Clinic. Some features of the system are the same with ours. The only feature which differs our system from his system is the appointment notification through SMS messaging. Therefore it’s very feasible to achieve our proposed system based on Sabri’s thesis.

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