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Pilot Automated Home Monitoring System for Asthma Patients, National Healthcare Group, Singapore

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Chronic asthma patients regularly visit hospitals for follow ups at about 3 monthly intervals and are required to recall their frequency of asthma symptoms during these visits. The frequency of symptoms aids the doctor on his management plan for the patients, but is unfortunately often tainted by recall bias.
Home monitoring devices available in the market however are expensive to most local Singapore patients, easily costing hundreds of dollars just to purchase the device. With Singapore having one of the highest mobile phone subscription rates and accessibility to internet, a pilot was initiated to provide accurate monitoring service using mobile phones and internet.

Objective:

To provide an affordable and user-friendly system in optimizing control of asthma through gathering accurate information on patient's condition.

Methods:

The needs of asthma patients and clinicians were identified prior to creating the IT programme (named as eCare) to support the service. With extensive inputs from clinicians, the programme was custom made around the workflow of a typical clinic to minimize operational impacts on the ground. Algorithm based on Global Initiatives for Asthma (GINA) guidelines was incorporated into the programme as a decision support feature in aiding nurses to identify and focus on patients with deterioration of conditions. Through capturing the replies from patients, the programme automatically calculates the GINA severity scores of each patient and informs the nurses on any patients who had a change in GINA score. Nurses will then call up patients to ascertain their conditions and provide advice including early appointments. To enhance user friendliness, 3 channels of responses (Short Message Service, Integrated Voice Respond and Internet) are made available to patients and are linked to the eCare system.

Results:

A typical patient recruited into the pilot will receive two SMS questions daily (once in morning and once in evening), seeking their input on asthma symptoms of the previous night and that same day, thus reducing recall bias, as compared to recalling frequency of symptoms for the past 3 months in the usual clinic visits. The frequency and numbers of questions can be adjusted depending on stability of the patient's condition.
There is no additional setup cost to patients as most of them already have access to mobile phones, fixed line phones and or Internet. An SMS reply costs the patient S$0.05, thus translating to about S$3.00 per month for a typical twice-daily monitoring. Furthermore, most patients' mobile phone line subscriptions already entail them to free 100 to 500 SMS per month. Thus the operating cost to patients using SMS, IVR through telephones or Internet is low or negligible.

Conclusions:

The NHG eCare system has successfully provide an affordable home monitoring service to patients and also captures accurate information to facilitate optimizing control of asthma. It also provides safe home monitoring by using evidence based guidelines such as the GINA severity scoring system. Further studies are needed to evaluate the effect of possible reduction of workload by nurses and clinicians. Future potential applications and benefits include allowing stable home monitored patients to have longer physical reviews intervals and extension of service to other disease groups like heart failure patients.

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