



Introduce new paper-based outpatient morbidity recording system to outpatient departments of public hospitals in Sri Lanka: feasibility study

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Background: Effective evaluation of public health status is reinforced by description of the current health status of the community, ability to detect changes in this status and prediction of trends. Morbidity and mortality are often recorded in patients presenting to hospitals. There are more than 1,100 government owned hospitals in Sri Lanka and these institutions have been providing services to average 50 million outpatients per annum. Morbidity data of patients attending Out Patient Department (OPD) of these health facilities are not routinely recorded. We developed a new paper based OPD morbidity recording system adapted with International Classification of Primary Care (ICPC-2) coding and tested its feasibility in various hospitals.

Methods: We used an intervention study design composed of three phases. Pre-intervention was to develop the new paper based OPD morbidity recording system. During the second phase, new recording system was tested in 3 hospitals, which were selected randomly from each hospital level: a primary care hospital, a divisional hospital and a base hospital located in Colombo district. New recording system implemented for a month period in selected three hospitals. We measured the feasibility over the process and acceptability of participants for the new recording system in various aspects during the post-intervention phase.

Results: New paper based OPD morbidity recording system consisted with an OPD form, an OPD return and a Tally sheet and data flow was outlined in the pre-intervention. Feasibility assessment showed high perceived satisfaction to layout (97%), timeliness (97.5%), technical competency (75%) and training & orientation provided (98%). All hospitals showed more than 90% of overall completeness for the new OPD at registration table. Although overall completeness of entries made at consultation table had shown more than 68% completeness, it is declining when hospital becomes larger. High accuracy (99%) is shown in direct entering ICPC-2 codes and 98% in overall satisfaction of MO/OPD implied that new OPD recording system is acceptable. The preparation of new OPD return and tally sheet was also well accepted by medical record officers (MRO).

Conclusions: New paper based OPD morbidity recording system was accepted as user-friendly and feasible to be implemented in OPD settings and medical record offices in tested hospitals. The readiness of central medical statistic unit for large OPD data flow should be assessed and possibility of incorporating IT solutions in future is recommended.

Keywords: International Classification of Primary Care (ICPC-2); morbidity data; morbidity recording system; outpatient; Out Patient Department (OPD); Health Management Information System (HMIS)

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Introduction

Health status is often measured using a range of indicators of mortality and morbidity. Morbidity refers to diseases, illness, injuries and disabilities in a population. Furthermore it provides vital feedback in setting priorities of health system reforms (1). Morbidity data derived from Health Management Information Systems (HMIS) describe the real burden of disease in a community. A continuous morbidity registry provides data for longitudinal clinical research in general practice. Accuracy and consistency of the health records are crucial to ensure in sound management of health system resources (2).

Health care services in Sri Lanka are provided through both public and private sector. Although, the bulk of the in-ward patient service (90%) is provided from the government hospitals, the outpatient services are almost equally shared (50%) among two sectors (3). By the end of 2015, there were 1,104 curative care hospitals governed by Ministry of Health Sri Lanka. These government hospitals have been providing services to average 50 million out-patients per annum (4). These facilities include range of primary, secondary and tertiary care provided with Out Patient Department (OPD) services with or without in-patient facilities.

Morbidity data of patients attending the OPD are not routinely recorded and collected in public sector hospitals in Sri Lanka (5). Morbidity data is recorded only for patients seeking treatment as inward-patients of government hospitals. Hospital in-patient and out-patient records in local settings are not comprehensive enough to assess the prevalence of most of the common diseases (6). National morbidity statistics in HMIS are vital for planning, monitoring and evaluation of health care delivery. The absence of formal OPD morbidity data flow further diminishes the key factor to estimate cost of OPD services in Sri Lanka (7). Need of a routine OPD morbidity data was repeatedly emphasized by researchers (8) and international organizations (9). Health system researchers investigate how health care is financed, organized, delivered and used in the process of achieving wider health and social goals. In this arena of research, this study explores the perception and feasibility of new out patients morbidity recording system introduced to OPD of public hospitals Sri Lanka as a systematic intervention.

Methodologies used for data generation depend on the organization's needs. Morbidity data is often

recorded as standard codes. Classification of diseases is a standard diagnostic tool, used to monitor the incidence and prevalence of diseases and other health problems or populations. ICPC (International Classification of Primary Care), which is an adaptation of International Classification of Diseases (ICD) (2) has achieved recognition as suitable for a General Practice (GP) (10). ICPC-2 is the most commonly used system in GP software (11) and useful in monitoring OPD functions (12). ICPC is recommended as a new analysis tool and is validated as a useful tool in a number of research projects (13). ICPC had been incorporated for morbidity surveys in many countries and had shown very effective (14-16). All studies given above were operated in electronic version of ICPC-2 software systems, but OPD in Sri Lankan hospitals depends mainly on paper-based manual systems. Since manual records carry many inherent limitations, developing a user friendly manual OPD morbidity recording system was a challenge.

Methods

We formulated an intervention study with three stages incorporated with mix method research design.

- (I) Pre-intervention: development of new paper based OPD morbidity recording system;
- (II) Intervention: implementation of new paper based OPD morbidity recording system in sample of hospitals;
- (III) Post-intervention: feasibility assessment of the new paper based OPD morbidity recording system.

Pre-intervention

Development and designing of the new manual OPD morbidity recording system was done in this phase. A convenient sample representing all relevant stakeholders from policy level administrators, middle managers to operational level were included. OPD medical officers (MO/OPD), medical record officers (MRO), officers in registration table, officers in Medical Statistics Unit (MSU) were invited for discussions. Series of iterative open Delphi interviews, in-depth-interviews and focus group discussions were conducted as consultative discussions. A new 'OPD form', 'OPD return' and 'Tally sheet' with a documented training plan for orientation were formulated as part of a new morbidity recording system. The new recording system with its format designs were finalized with everybody's

consensus at the final workshop. New system was pretested in a peripheral hospital and altered for improvements.

Intervention

Three hospitals were selected randomly from all hospitals under the preview of Regional Director of Health Services Colombo representing each level; Primary Health Care Unit (PMCU), Divisional Hospitals (DH) and Base Hospitals (BH). All permanent staff working in OPD of selected hospitals were recruited for the study. Orientation to new process was done to all staff with a classroom training followed with one-week on-the-job training. Identification data and demographic information of the OPD form was filled by nurses and health assistants in registration table. Morbidity related information; patient's history & examination and provisional/definitive diagnosis with ICPC-2 coding and treatments were recorded by MO/OPD in the same OPD form at consultation tables. All OPD forms were daily collected from the pharmacy counter and sent to medical record office in hospital as a monthly bundle. Hands-on-training for transferring data from OPD forms to tally sheets and completing the monthly OPD return was practiced for MRO. After adequate familiarization, the new OPD morbidity recording system was implemented for one-month duration in all 3 hospital OPD.

Post-intervention

Feasibility assessment was conducted at this phase and following quantitative and qualitative evaluations were carried out.

- ❖ Statistical analysis of the satisfaction of MO/OPD towards new OPD form using self-administered questionnaire;
- ❖ Quantitative analysis of accuracy & completeness of the entered OPD forms using observation check list;
- ❖ Average time taken to fill the new OPD form by time measuring check list;
- ❖ Qualitative assessment of new OPD morbidity recording system with staff involved to the process by focus group discussions.

Results

Qualitative discussions conducted at pre-intervention stage

concluded with formulating a standard paper based OPD morbidity recording system. It consisted with 'OPD form' (*Figure 1*) which is to be completed at the registration table and consultation table. An 'OPD return' (*Figure S1*), a consolidated data entry form which is to be completed by MRO using the 'Tally sheet' (*Figure S2*) at record room. Induction training was designed to introduce the new recording system to all OPD and medical record office staff.

After the novel OPD morbidity recording system was allowed to execute for one-month period, perception of MO/OPDs was assessed using a self-administered questionnaire. Basic demographic and work-related characteristics of the sample MO/OPDs working in hospitals were given *Table 1*. Eighty percent of MO/OPDs had 10 years or more experience as an MO. User satisfaction towards new OPD form was measured in five dimensions; user-friendly layout, perceived time to complete the form, technical competency to fill the form, adequacy of induction training and overall Satisfaction (*Table 2*). Overall satisfaction was very high (98%) and users were satisfied more than 95% with all the dimensions except for 'Technical Competency' (75%) (*Table 2*). Measurement of "Technical Competency" who are satisfied and not satisfied was statistically tested against work experience in *Table 3* to figure out any association. There was no significant difference in satisfaction pertaining to "Technical Competency" of MO/OPD over work experience.

Entries made in all filled OPD forms were statistically analyzed for completeness. All hospitals showed more than 90% of overall completeness at registration table (*Table 4*). The overall completeness of the entries made in OPD form at the consultation table showed in PMCU: 95.1%, DH: 86.2% and BH: 68.3% for each hospital and overall completeness is declining when hospital becomes larger with the number of OPD patients (*Table 5*). Accuracy of entered ICPC-2 codes by MO/OPDs along with the patient disease presentation showed correct in almost all the cases (*Table 6*). Average time taken to fill the OPD form was less than 7 minutes (*Table 7*).

Qualitative assessment revealed fact that new morbidity recording system is user friendly and MO/OPD could easily adapt with ICPC-2 coding for diagnosis. MRO informed that absence of converting diagnoses to codes during preparation of OPD return is well acceptable and convenient comparing to the problems experienced in Indoor Morbidity & Mortality Return (IMMR) recording. Apart from that, new OPD morbidity recording system has

Figure 1 OPD form. Produced to make entries at the registration table and consultation table. Entry labels are provided in Sinhala, Tamil and English languages for ease in understanding. Modified provisional Diagnosis coding adapted with ICPC-2 is given as a table to record the diagnosis as a code with a tick. OPD, Out Patient Department; ICPC, International Classification of Primary Care.

Table 1 Socio-demographic and work-related characteristics of MO/OPD in recruited sample for the intervention of new OPD morbidity recording system

Character	Number (n=40)	Percentage
Age		
30 to <40 years	11	27.5
40 to <50 years	13	32.5
50 years or more	16	40.0
Sex		
Male	18	45.0
Female	22	55.0
Work experience in public service		
Up to 10 years	08	20.0
More than 10 years	32	80.0

MO, medical officers; OPD, Out Patient Department.

Table 2 Perceived satisfaction of MO/OPD towards the use of new OPD form

Dimensions of satisfaction measured towards the use of OPD form	Number satisfied (n=40)	Percentage
User-friendly layout	40	97.0
Perceived time to complete	39	97.5
Technical competency to fill the form	30	75.0
Adequacy of induction training	40	98.0
Overall satisfaction	40	98.0

MO, medical officers; OPD, Out Patient Department.

made MO/OPDs more conscious and accountable during consultation leading to rational prescribing.

Discussion

OPD is a vibrant place in a hospital. This project involved various stakeholders from all levels during the pre-intervention. Qualitative research methods allowed building consensus through communicating, sharing and problem-solving dialogues during the design stage of the project. Facilitating stakeholders to contribute during implementing

novel systems minimize the resistance or unpredictable failure in future (17). Personnel Health Number (PHN) which is to be introduced to the hospital system in near future was also incorporated to OPD form in order to ease the data tracking (18).

Feasibility assessment which was carried out in the post-intervention, consisted with quantitative analysis and qualitative discussions to made rigor for evidence (19). Assessment of Perception of MO/OPD towards new OPD morbidity recoding system showed high overall satisfaction (98%). “Technical competency” which showed lower satisfaction can be attributed to MO/OPD unfamiliarity to a new coding system. This has been identified as an expected behavior in innovative approaches of work settings which needs to be managed carefully (20,21).

Completeness of filled new OPD form entries made at the registration table was high (>90%) in all three types of hospitals. ‘History & Examination’, ‘Treatment’ and ‘Diagnosis’ related entries were well recorded at the consultation table, but high variability (71–95%) in completeness of “diagnosis” was shown in the entries made at consultation table. A systematic review also has reported 67–99% variation in morbidity recording while carrying high overall completeness (22). Complement with above result, two Sri Lankan studies also have demonstrated 88.3% OPD morbidity records in hospitals at Polonnaruwa region and 50–70% in OPD of General Hospital Trincomalee (23) which were investigated in computerized OPDs. MO/OPD showed very high accuracy (99%) in direct manual entering of ICPC-2 codes (Table 6). ICPC-2 had been tested and found to be practical and reliable in general practice with less than 3% recoding errors (24). Some authors argue that accuracy may depend on the level of coding, whereas chapter heading for ICPC diagnoses carries high accuracy (22,25). This intervention had only been used to record chapter headings due to the limitation of paper based entering forms.

‘Physician time’ had been considered as a demanding resource which can make major bad effects on the patient-doctor relationship (26). Timeliness for completion of OPD form was a major concern in this study due to the high work load and long queues in OPDs. Time spent at registration table with new recording system was not different from previous practice time. There was no perceived difference for average time spent at consultation table within two systems (Table 2). Adequate training is recommended before practice for successful results (27) before introducing novel systems. MROs were positive towards the new OPD

Table 3 Satisfaction of OPD medical officers perceived technical competency by their working experience

Level of satisfaction	Working experience		Significance
	≤10 years	>10 years	
Satisfied pertaining to technical competency	5 (62.5%)	25 (78.1%)	0.387*
Not satisfied pertaining to technical competency	3 (37.5%)	7 (21.9%)	
Total	8 (100%)	32 (100%)	Not significant

*, Fisher's exact. OPD, Out Patient Department.

Table 4 Overall completeness of entries in OPD form made at registration table by type of hospital

Type of hospital	Overall completeness* (%)	95% confidence interval (CI)
PMCU (n=806)	98.8	98.05–99.55
DH (n=6,512)	96.2	95.74–96.66
BH (n=33,982)	91.2	90.90–91.50

*, entries: date, OPD number, name, sex and address of OPD patients. OPD, Out Patient Department; PMCU, Primary Health Care Unit; DH, Divisional Hospitals; BH, Base Hospitals.

Table 5 Overall completeness of entries in OPD form made at consultation table by each type of hospital

Type of hospital	Percentage completeness* (%)	95% CI
PMCU (n=806)	95.1	93.61–96.59
DH (n=6512)	86.2	85.36–87.04
BH (n=33,982)	68.3	67.80–68.80

*, history & examination, diagnosis code (ICPC-2) and treatment. OPD, Out Patient Department; PMCU, Primary Health Care Unit; DH, Divisional Hospitals; BH, Base Hospitals.

Table 6 Number of accurate diagnosis codes of ICPC-2 entered in OPD forms by OPD/MO

Aspect of accuracy	Number of patients (n=80)
Accurately entered	79 (98.8%)
Not accurate	1 (1.3%)
Total	80 (100%)

MO, medical officers; OPD, Out Patient Department.

return and tally sheet due to absence of code conversion, because the reliability of the data extraction for coding from medical records has reported as questionable (28). Tally sheet had made them easy to consolidate data, where there are no computer facilities. The goal of recording and adapting OPD morbidity data to the HMIS is to use them

for decision making (29). Framework for conceptualizing and measuring implementation outcomes based on variables such as 'acceptability', 'appropriateness' and 'feasibility' (30), which were achieved in this study are the recommendations by WHO as the base for a successful implementation.

Conclusions

Results of the qualitative and quantitative assessments demonstrated that new paper based OPD morbidity recording system was well acceptable and feasible to implement in OPD settings and able to adapt with the HMIS. All staff working in OPD and record rooms were satisfied with the orientation training provided in introducing new recording system.

Recommendations

This research covered three levels of hospitals: PMCU, DH, BH with successful results, it is recommended to implement the new paper based OPD morbidity recording system to all hospital network step-wise along with orientation training. The readiness of the HMIS in MSU to respond to a large volume of data load from OPDs should be improved before implementation of the novel system. Include ICPC classifications for undergraduate curriculum is recommended to assure the technical quality in morbidity coding in future and it enables gradual omission of

Table 7 Average time taken to complete the entries of OPD form at OPD

Activity	Average time in minutes (n=80) (95% CI)
At the registration table	2.2 (1.9–2.5)
At the consultation table	4.0 (3.6–4.3)

OPD, Out Patient Department.

the orientation training for Medical Officers in future. Possibility of incorporating IT solutions with electronic version of ICPC to OPD units should be explored and researched in future.

Post-project sustainability measurements

Details of new paper based OPD morbidity recording system was forwarded to the National Drugs & Therapeutic Committee (NDTC) and recommended up in the Technical Advisory Committee (TAC) through Director Health Information with the concurrence of the Director General of Health Services in Ministry of Health Sri Lanka. Principal investigator presented the results to the executive committee and obtained approval for new recording system to be implemented in all hospitals in Sri Lanka. The responsibility of launching the new system was delegated to Health Information Unit at Ministry of Health. The up lifting the capacity of the MSU is being discussed and the procurements are to be commenced with the Second Health Sector Development Project (SHSDP) project allocations.

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Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/jhmhp.2019.09.02>). The authors have no

conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Ethical clearance was obtained from Ethical Research Committee, Medical Research Institute, Sri Lanka (No. 09/2015). The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). Formal approval was granted by Director General Health Services in Ministry of Health followed with relevant institutional heads for the pilot study. Since intervention was only a process improvement tool, there was no anticipated risk to patients. Participants were well informed, trained and written consent was obtained for participation & publication. The permission for copy righting of ICPC was freely granted for research use by World Organization of Family Doctors (WONCA) Classification Committee.

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Figure S1 OPD return. The manual return is to enter consolidated morbidity data using Tally sheet for a month period. Diagnosis codes entered in OPD forms at OPD are entered to this by MRO. Morbidity is recorded as totals accordingly to adapted ICPC-2 chapters along with selected age groups of ≤ 12 , 13–35, ≥ 36 years and N/A for not entered. Completed returns with the approval of hospital head are forwarded to decentralized units affiliated to respective hospital with a copy to MSU. OPD, Out Patient Department; MRO, medical record officers; MSU, Medical Statistics Unit.

Figure S2 Tally sheet. Manual format to be used for consolidate totals for each ICPC-2 code of diagnosis. A Tally sheet is to be maintained for each diagnosis code while tallies to be marked for each diagnosis code made in OPD form along with respective age group. Cumulative totals will be entered at the end row for each month by MRO. Total number is to be transferred to OPD return. OPD, Out Patient Department; MRO, medical record officers.