WEEKLY EPIDEMIOLOGICAL REPORT

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Population screening for chronic kidney disease - is it a feasible option ?

According to the United States commission on chronic illness, screening has been defined as presumptive identification of unrecognized diseases by application of rapidly applicable tests, examinations or other procedures. Screening is a word that has been used loosely and erroneously over a long period of time interchangeably with the case detection. Screening is done on apparently healthy (asymptomatic) populations with a view to categorizing the former into those who are likely to have the disease and have not. Those who are likely to have the disease will be subject to further testing for confirmation of the disease and interventions including treatments will be introduced for those who are tested positive in the confirmation. In contrast to screening, case detection is performed when the person initiates consultation with the physician as symptoms manifest. Opportunistic screening is feasible in this situation as application of tests are possible when patient seeks an appointment with his clinician for another reason.

Along this line, it has been argued if screening for chronic kidney disease(CKD) is an erroneously used terminology for case detection. This situation has risen as CKD is an outcome of another disease entities such as diabetes, hypertension , urological diseases and glomerulonephritis in majority of cases. However, it is necessary to bear in mind that the CKD manifests without an apparent reason and is known as CKD of unknown aetiology (CKDU). According to the definition of the US national kidney foundation's kidney diseases outcome quality initiative , CKD is defined as kidney damage for three months based on findings of abnormal structures (imaging studies) or abnormal function (blood tests and urinalysis) or Glomerular Filtration Rate (GFR) below 60 ml per minute for 1.73m^2 for three or more months with or without evidence of kidney damage . End Stage Renal Disease (kidney failure) which is an outcome of the CKD is defined as GFR below 15 ml per minute for 1.73m^2 or need for kidney replacement therapy (dialysis or transplantation). Though in most of the cases CKD appears as a result of other disease entities, detection of CKD at early stages enables reversing or if it is not possible at all, delaying the progression of CKD into End Stage Renal Disease(ESRD). The period from the onset of the CKD to the manifestation of ESRD can be considered as the Total Pre Clinical Phase (TPCP) of the ESRD.

Burden of a disease, having serious consequences or being recognized as a public health problem make a disease suitable for screening. It has been reported that there is a high prevalence of CKD including that of unidentified etiology confined to some geographical areas in Sri Lanka. Ailing from CKD deteriorates the quality of life of the concerned patient and may lead to decreased life expectancy. The economic impact that will be upon the individual, family, community and the country as a result of the CKD is colossal. These factors warrant introduction of a screening program with a view to detecting those who are likely to be CKD patents and intervening to delay or prevent the progression into ESRD. Another factor that favours such a programme is the prevalence of undetected, untreated and uncontrolled CKD.

As stated earlier, CKD has a variable latent period. During this period, CKD is asymptomatic and there is a substantial loss of renal function before clinical events associated with CKD are apparent. Being an important public health problem and the presence of a detectable preclinical phase (DPCP) alone are insufficient for the CKD to be a suitable disease for screening. Early detection of CKD leading to appropriate treatment is yet another favourable criteria for screening. There are ample evidences that

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control of diabetes, hypertension, use of Angio tensin converting enzymes inhibitors will delay, if not prevent subsequent progression of CKD to ESRD.However much a disease is suitable for screening, the tests that are intended to be used in screening should comply with certain criteria. The validity of the test should be of a high value. Basically, this refers to the sensitivity and specificity of the test. These tests should be of low cost, easy to administer and should not cause either discomfort or morbidity in the recipient. The latter is pivotal in ensuring a high acceptability of the programme by the target population. There is a wide range of suitable tests which could be used in CKD screening.

Measurement of proteinuria/albuminuria is used for the detection of patients with or at risk of developing CKD. Both proteinuria and albuminuria are associated with an increased risk of progressive kidney disease and ESRD.A highlighted limitation of the method is the too low yield of treatable disease. Dipstick urinanalysis has imperfect accuracy in diagnosis of persistent proteinuria. Another issue is that the use of this method for prevalence studies has led to over estimation of prevalence figures simply because there possibly could be a large number of false positives. Dipstick tests for proteinuria are insensitive to detect albumin concentrations lower than 300 mg/day. The only advantage is that it is a simple, cheap test that can be performed in low resource settings. Various antibody-based methods are used to measure these lower levels of urinary albumin, including RIA, nephelometry, immunoturbidimetry and ELISA, but all require costly laboratory facilities not easily affordable in poor countries. There are also antibody-based dipstick tests for microalbuminuria which have the advantage that they can be used easily by the general practitioners and health workers in large screening programmes. However, the cost of the tests is still too high for low-resource settings to use them for community screening. It's been reported in the literature that single spot urine tests have been designed to quantify microalbuminuria by spotting microlitres of urine on cellulose acetate strips and staining them with a protein binding dye. The proposed new tests are simple, cheap and reported to be ideal for mass screening of CKD patients in low resource settings. The glomerular filtration rate, calculated by using a prediction equation, detects chronic kidney disease more accurately than does the serum creatinine levels alone. However, a limitation of the GFR is that the GFR may vary for patients with the same serum creatinine levels. Clinically useful GFR estimates are calculated from the measured serum creatinine levels after adjustments for age, sex, and race. Single Albumin Creatinine Ratio (ACR) is yet another test that has been validated in overseas settings for screening CKD. As pointed out by Mattix and colleagues, when gender specific cut offs were used, ACR has provided high sensitivities and excellent ROC curves.

Another dilemma for policy makers is the screening approach that is necessary to be instigated. Evidence are required through randomized controlled trials and cost benefit studies to select the most appropriate strategy. A systematic review done in UK pointed out that there was no adequate evidence to support population based screening strategy. The formal policy of the UK national steering committee is that targeted screening at 'high risk' groups using test for both eGFR and proteinuria may be of benefit.UK position has practically been adopted in many a state. Despite this position, studies have demonstrated that the high risk strategy targeting diabetes and hypertension is capable of detecting less than 50% of CKD. This has a significant implication in particular in the Sri Lankan setting where implementation of the high risk strategy in a future screening programme will lead to non detection of CKD of unknown aetiology. On the other hand, if the high risk strategy is able to detect less than 50% of CKD, it will have far reaching consequences on undetected diabetes and hypertension in the community.

Once the brainchild of screening is operationalised, programme managers need contemplation on measures related to performance of the programme. Acceptability, cost, cost effectiveness and yield are some noteworthy areas for consideration. There is a wealth of information regarding the tertiary prevention of CKD by treatment of hypertension, albuminuria and use of ACE inhibitors in developed countries. These studies are simulated models and there is a dearth of definitive studies even in these settings. In resource poor countries, uncertainties related to the effectiveness are eminent and naturally it becomes a priority area for research. Ultimately, the biggest issue that lies ahead of us is to determine if the screening programme has been able to reduce morbidity and mortality due to CKD.

Although there are many perspectives of screening for CKD, there are loads of unresolved issues. Most of the global recommendations are consensual rather than hard evidence based. Different screening strategies are not compared for their ability and efficiency in terms of screening CKD. Another mind boggling question for policy makers is to decide if the high risk or population strategy is the best preventive strategy for modifying risk factors in the particular setting. Selecting appropriate screening tests also has a big value as the yield depends on the selected test.

In conclusion , it must be stated that there is a myriad of issues that need contemplation in the Sri Lankan setting. Epidemiology and demographic transition in the country speaks volumes about the need for focus on CKD. However, available epidemiological studies are hardly adequate to warrant an introduction of a large scale community based screening programme. Such a program requires a well thought out intervention programme too. The program should be responsive to the country needs and adjusted to existing public health infrastructure. It should be capable of detecting under diagnosed CKD and CKDs of unidentified aetiologies with a view to either preventing or delaying progression of CKD into ESRD. A successful implementation of such a programme will enable a great majority of CKD patients to over come the cost and complexities with regard to renal replacement therapy which is beyond the reach of many ordinary citizens of Sri Lanka.

This article is based on the presentation made by Dr. Ranjan Wijesinghe, consultant Epidemiologist in the Nephrology Symposium at the 122nd sessions of the Sri Lanka Medical Association.

(This article compiled by Dr.Ranjan wijesinghe, Consultant Epidemiologist)

Table 1: Vaccine-preventable Diseases & AFP

21st February 27th February 2009 (09th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2009	Number of cases during same week in 2008	Total number of cases to date in 2009	Total number of cases to date in 2008	Difference between the number of cases to date in 2009 & 2008
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	0	00	00	00	01 KM=1	00	00	00	00	01	02	11	12	-08.3%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	-
Measles	00	02 KD=1 ML=1	00	03 VA=3	00	00	02 AP=2	00	00	07	03	27	27	00.0%
Tetanus	00	00	00	00	00	00	00	00	00	00	02	06	08	-25.0%
Whooping Cough	02 CB=1 GM=1	00	00	00	00	00	00	00	00	02	0	16	07	+128.5%
Tuberculosis	81	46	10	01	20	00	00	00	51	209	150	1436	1722	-19.5%

Table 2: Newly Introduced Notifiable Disease

21st February 27th February 2009 (09th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2009	Number of cases during same week in 2008	Total number of cases to date in 2009	Total number of cases to date in 2008	Difference between the number of cases to date in 2009 & 2008
	W	C	S	N	E	NW	NC	U	Sab					
Chickenpox	33	23	27	213	04	18	04	07	15	344	137	1685	973	+73.2%
Meningitis	01	01	02 GL=2	00	03 BT=3	00	01 AP=1	02 BD=2	02 RP=2	11	20	169	333	-49.2%
Mumps	05	04	01	02	01	00	01	01	02	17	32	317	396	-19.9%
Leishmaniasis	00	00	01 MT=1	00	00	00	00	00	00	1	Not available*	60	Not available*	-

Key to Table 1 & 2

Provinces: W: Western, C: Central, S: Southern, N: North, E: East, NC: North Central, NW: North Western, U: Uva, Sab: Sabaragamuwa.

DPDHS Divisions: CB: Colombo, GM: Gampaha, KL: Kalutara, KD: Kandy, ML: Matale, NE: Nuwara Eliya, GL: Galle, HB: Hambantota, MT: Matara, JF: Jaffna, KN: Killinochchi, MN: Mannar, VA: Vavuniya, MU: Mullaitivu, BT: Batticaloa, AM: Ampara, TR: Trincomalee, KM: Kalmunai, KR: Kurunegala, PU: Puttalam, AP: Anuradhapura, PO: Polonnaruwa, BD: Badulla, MO: Moneragala, RP: Ratnapura, KG: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps.

Special Surveillance: Acute Flaccid Paralysis.

Leishmaniasis is notifiable only after the General Circular No: 02/102/2008 issued on 23 September 2008.

Table 3: Laboratory Surveillance of Dengue Fever

21st February 27th February 2009 (09th Week)

Samples	Number tested	Number positive	Serotypes *				
			D1	D2	D3	D4	Negative
Number for current week	00	00	00	00	00	00	00
Total number to date in 2009	12	02	00	00	02	00	00

Sources: Genetic Laboratory, Asiri Surgical Hospital

* Not all positives are subjected to serotyping.

NA= Not Available.

Table 4: Selected notifiable diseases reported by Medical Officers of Health

21th February 27th February 2009 (09th Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns Received Timely**
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	28	419	5	37	0	3	3	56	0	7	8	55	0	2	1	15	0	1	**100**
Gampaha	15	226	0	26	0	5	3	12	1	9	6	43	0	3	2	22	0	0	**86**
Kalutara	9	113	4	69	0	2	1	17	1	5	4	31	0	0	0	3	0	0	**100**
Kandy	24	398	0	66	1	1	4	7	46	46	5	50	2	25	1	11	0	0	**84**
Matale	9	116	0	21	0	0	4	12	0	5	11	107	0	2	0	2	0	1	**100**
Nuwara Eliya	1	17	7	55	0	0	3	46	0	20	0	14	2	11	0	7	0	0	**100**
Galle	0	22	5	39	0	3	0	0	0	2	2	38	0	1	2	6	0	0	**89**
Hambantota	1	36	4	25	0	5	0	1	0	4	1	11	3	20	0	4	0	0	**100**
Matara	10	145	7	65	0	2	0	4	0	3	5	39	3	42	1	1	0	0	**94**
Jaffna	0	6	0	23	0	3	2	48	0	19	0	0	3	60	0	3	0	1	**25**
Kilinochchi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Mannar	1	3	1	9	0	0	0	51	0	0	0	0	0	0	3	8	0	0	**50**
Vavuniya	0	4	16	22	0	0	0	2	0	1	0	2	0	0	0	0	0	0	**75**
Mullaitivu	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**0**
Batticaloa	5	61	1	32	0	6	1	5	0	5	0	2	0	0	0	1	0	0	**82**
Ampara	0	13	1	6	0	0	0	5	0	0	0	5	0	0	0	3	0	0	**71**
Trincomalee	3	40	1	20	0	1	0	0	0	0	0	1	1	3	0	3	0	0	**90**
Kurunegala	10	162	0	34	0	3	1	11	0	1	0	26	0	39	0	10	0	3	**74**
Puttalam	2	25	2	30	0	5	0	26	0	0	5	14	1	15	0	2	0	1	**89**
Anuradhapura	5	18	1	19	0	1	0	1	0	2	1	50	1	13	0	3	0	0	**63**
Polonnaruwa	0	15	0	10	0	1	0	6	0	2	0	27	0	0	0	1	0	0	**57**
Badulla	1	17	2	59	0	2	0	11	0	13	1	25	0	17	2	55	0	0	**73**
Monaragala	1	8	0	11	0	0	1	7	0	2	0	5	1	22	2	11	0	0	**91**
Ratnapura	1	48	13	113	1	6	2	20	0	1	2	16	0	9	0	4	0	1	**67**
Kegalle	22	191	0	22	0	1	2	10	0	1	1	21	0	7	6	35	0	1	**100**
Kalmunai	3	57	2	37	0	1	0	5	0	0	0	2	0	1	1	3	0	0	**69**
SRI LANKA	**151**	**2160**	**72**	**852**	**2**	**2**	**27**	**364**	**48**	**148**	**52**	**584**	**17**	**292**	**21**	**213**	**0**	**9**	**80**

Source: Weekly Returns of Communicable Diseases (WRCD). 0

*Dengue Fever / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.

**Timely refers to returns received on or before 28 February, 2009 Total number of reporting units =311. Number of reporting units data provided for the current week: 254

A = Cases reported during the current week. B = Cumulative cases for the year.

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ON STATE SERVICE

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