

Screening in General Practice

*JH Levenstein

Summary

Screening is the identification in an asymptomatic population of precursors of a disease or manifest disease. To be scientifically justified, it must fulfill several criteria. A review of the literature appears to indicate that both multiphasic screening and indiscriminate monophasic screening do not improve health care. Other than a few well-proven interventions, developmental screening and an awareness of patients at risk from dislocating life events, there appears to be little benefit in applying ritualistic, costly and sometimes even harmful examinations and investigations at regular intervals on asymptomatic patients.

KEYWORDS: Mass Screening; Physical Examination; Physicians, Family; Sick Role; Health Promotion; Self Care; Attitude to Health; Vaginal Smears; Absenteeism.

SA Academy of Family Practice/Primary Care
Medical House
Central Square
PINELANDS 7405

**Dr J Levenstein MB ChB (UCT)
MFGP(SA) ECFMG**

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Curriculum Vitae

Dr Joseph Henry Levenstein graduated at UCT in 1965 with MB-ChB and in 1972 he obtained the MFGP(SA). He is currently Head, Unit of General Practice, Dept of Community Health at UCT and is examiner for the Faculty of General Practice Examination. He has received numerous awards and honours amongst which are the Louis Leipoldt Medal for the most outstanding article in the *SAfr Med J* (1971) and the Noristan Gold Medal for contributions to medical science (1976). He has served on various academic and medical committees and was Vice-President of WONCA (1978-'80). He is serving on the committee of the SA Academy of Family Practice/Primary Care as well as on the Faculty of General Practitioners of the College of Medicine of South Africa. He has 34 publications to his credit.

INTRODUCTION

Screening is the identification of precursors of a disease or manifest disease in a population. Implicit in the process is the existence of a defined population at risk and an assumption that these are asymptomatic. Therefore, screening is usually accepted as a doctor-initiated activity even though it might be an explicit or implicit expectation of the patient.

Screening, per se, is not usually undertaken by the general practitioner as he does not usually go into a community and screen the population. Rather he examines those who consult him. This process is called 'case finding'. Having made that point I will continue to

use the word 'screen' since this is the one in common usage.

Screening must not be confused with the other preventive functions of the doctor. These include immunisation, health education and developmental assessment¹. Furthermore, other activities of the general practitioner such as aborting or limiting manifest disease (secondary prevention) or preventing the complications of established disease, (tertiary prevention), likewise do not fall under the ambit of screening. Finally, any management that follows upon the information offered by the patient, cannot, by definition, be regarded as screening.

There are four sources which can initiate screening:

1. Patient initiated screening

Where this occurs it must be remembered that almost by definition we may not be dealing with screening alone. There are almost always other feelings and fears associated with these interactions when the question as to why the patient came now is addressed². Every

Universal indiscriminate examinations and investigations do not improve health care.

family physician knows that when a patient asks for a check-up there are many other factors involved in this interaction². In certain instances, however, behavioural patterns may be ingrained enough for patients to motivate their own screening. Patient initiated screening, in the form of the periodic health examination, represents the single most common reason, (between 10-20%) in North America, for patients presenting to their doctor³.

2. 'Other agency' screening

This is usually initiated by insurance agencies and employers, for example, to protect themselves rather than for the patient's good.

3. Doctor-initiated screening

Here the doctor in the course of his day to day interactions, as part of his management, includes a screening procedure at appropriate intervals.

This in fact is **case finding**. There is strong argument for this approach for appropriate conditions since it is said that in any one year 70% of a practice population is seen and in 5 years 80% have attended at least once⁴. Furthermore, in all probability the doctor is seeing at least one member of a family per year and is therefore in indirect contact with the rest of the family.

The objectives of this screening must be directed towards the patient's good with the doctor preventing

and curing disease, being able to institute care and to provide baseline data. (The latter concept has been vigorously challenged by Frame as to its real benefit⁴.)

4. Epidemiological screening

The essential purpose of this study of screening is to provide information about the health status of the population in order to be able to evaluate the health care needs of a community⁵.

TYPES OF SCREENING

There are several types or approaches to screening. Traditionally it is looked at as either being multiphasic or monophasic. However, it can be performed in high-risk patients for certain diseases, at certain ages (developmental) or in certain stressful situations. Some workers review it in terms of diseases such as cancers⁶ or coronary artery heart disease⁷ while others review it organ by organ.

GENERAL HEALTH OR MULTIPHASIC SCREENING

This is achieved by routine examination and/or investigations of a group of people. This type of screening is undertaken predominantly in the middle-aged patient and has been subject to the most vigorous debate⁸. Three controlled studies are available on this type of screening:

(a) **Kaiser Permanente Study, USA⁹**: This was initiated in 1941 and reported on in 1978. There was no change in the mortality between those screened and controls and uncertain results for morbidity and cost-effectiveness.

(b) **Salt Lake City, USA (1976)¹⁰**: Here families from varying socio-economic groups with differing health care systems were studied. All patients were examined for baseline data and then randomly divided into experimental and control groups. The experimental group was offered free multiphasic screening thereafter. In subsequent evaluation which included a questionnaire, health status index, number of disability days

At least 30% of patients reject the offer of being screened.

caused by illness, patterns of health care utilisation, health knowledge and a scale of hypochondriasis, no differences were evident between the two groups. The only difference was that the experimental group spent significantly more days in hospital.

(c) **SE London Screening Study¹¹**: Here 3 297 individuals were invited to be screened, of which 2 420 (73/4%) accepted. This latter group were divided into experimental and control groups. The results of the

comprehensive screening (Table 1) were made available to the GPs of the experimental group who decided on further investigations, diagnoses and treatments.

TABLE 1: TESTS USED IN MULTIPHASIC SCREENING¹¹

- (a) Self-administered symptoms questionnaire.
- (b) Interviewer administered questions on occupational data
- (c) Anthropometry — height, weight, skinfold thickness
- (d) Visual testing near distance visual fields
- (e) Audiometry
- (f) Chest X-Ray
- (g) Lung function tests
- (h) Electro-cardiogram
- (i) Blood pressure
- (j) Blood tests : HB, Packed Cell Volume, Blood urea, Blood creatinine, Random Blood Sugar, Protein Bound iodine, serum cholesterol, serum uric acid
- (k) Stool for occult blood
- (l) Basic physical examination

In broad terms, there were no statistical differences in the measurement indexes of both groups after various intervals.

The indexes included: general practice consultation rates, hospital admission rates, sickness absence rates and mortality rates.

Schor revealed the inadequacy of detecting even serious diseases by periodic health examination¹². Within one year after examination only 58% of those who had died of ischaemic heart disease had been so diagnosed at screening while of those who succumbed from a neoplasm only 43% had had this diagnosis elicited at their periodic health examination¹³.

As D'Sousa, in his devastating review of multiphasic screening concludes — no properly controlled study has shown any benefit from multiphasic screening¹⁴.

There have been a number of enthusiastic reports by GPs in their own practices who claim to have shown some benefit^{15,16}. However, no real follow-up or proper evaluation has been done, so judgement must be reserved till an appropriately controlled study has been done.

Finally, if all patients in a practice of 2 000 patients had a twenty minute annual health examination it would occupy 22 weeks of the GP's working time¹.

MONOPHASIC OR SIMPLE SCREENING

It stands to reason, however, that certain conditions might justify screening procedures. Several sets of criteria have been laid down for such screening^{1, 19-21}. Broadly speaking they accentuate the following:

- (a) The disease in question should be a serious health problem
- (b) There should be a pre-symptomatic or latent phase

of a disease whose natural history is known, in which treatment can change the course of the disease more successfully than in the symptomatic phase

(c) The screening procedure and the ensuing treatment should be acceptable to both the public and doctor

(d) The screening procedure should have acceptable sensitivity and specificity (ie, not produce too many false positives or negatives)

(e) The screening procedure and ensuing treatment should be cost-effective

(f) Adequate facilities for diagnosis and treatment should be available

By these criteria only a few interventions can be seen to have qualified.

Hypertension

The subject of hypertension screening and treatment is possibly one of the greatest dilemmas facing medicine today⁶. While it is argued by some that there is an imperative need for treating all established hypertensives, others feel that the case is less certain in mild to moderate hypertension⁶. Fry, for example, points to groups of patients over the age of sixty who have survived mild to moderate hypertension for decades⁶. There appears little doubt, however, that young hypertensives and severe hypertensives benefit from treatment particularly in the reduction of cerebrovascular accidents²². The concept of screening patients has been shown to be feasible in general practice²³. The incidence of hypertension is said to be 20%.

Carcinoma of the Cervix

This disease is said to have an incidence of 1.3% in the lower socio-economic groups^{6, 25}. The natural history of the various pre-clinical phases is uncertain but nevertheless the Papinocoleau smear has become routine. Recent recommendations have been made to decrease the frequency of the procedure^{21,24,25}. It is suggested that smears be done after the commencement of sexual activity and be repeated one year later. If both smears are negative then the procedure be repeated every 2-5 years. With repeated negative smears no further screening is suggested after the age of 50 years.

Carcinoma of the Colon and Rectum

Carcinoma of the large bowel is said to be the second most common malignancy of both males and females^{25,26,27}. The incidence in the population is said to be 3-4% while haemoccult screening will yield a 1% positive result for malignant and pre-malignant conditions²⁷. It is argued that due to the intermittent bleeding of the lesions, several tests should be performed at one screening and that it should be repeated annually.

Carcinoma of the Breast

This is the most common carcinoma in woman (1 in 15)¹. Annual breast palpation has been shown to decrease the mortality in woman over 50 years of age. Furthermore the smaller the tumour on treatment the better the prognosis⁸. Routine mammography has largely fallen out of favour due to its risks and its high

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false positive rates^{16,7}. Self-examination by women is recommended.

Smoking and Drinking Habits

Eliciting of this data from patients need hardly be stressed in view of the increased morbidity and mortality that follow and the reduction of these following cessation.

Psychiatric Illness

Screening for psychiatric illness is one of the few strategies which have been shown in a carefully controlled study to have some benefit in general practice²⁸.

Hypertensive patients who were told of their diagnoses, had a higher incidence of absenteeism from work than those who were not told.

In a general practice 1 093 patients were screened by means of a questionnaire. Of these 32% were found to have a conspicuous psychiatric disorder and 11% were found to have a 'hidden' psychiatric disorder. The 11%, all of whom who presented with physical complaints, were divided into a control and a treatment group. Both the treated groups (conspicuous psychiatric group and the treatment group of hidden psychiatric disorders) fared better than the control hidden group. While those treated had far more emotional illness consultations than the untreated group, the number of consultations for all groups were similar. Treatment consisted of open-ended short interviews and/or drugs²⁸.

For purposes of this review, accepted screening tests that are performed only at certain developmental stages, are not being elaborated on. These include phenylketonuria, congenital dislocation of the hip, auscultation (in the neonate), height, weight, circumference of the head, vision, hearing and orthopaedic defects (in the young child), rubella screening (adolescent), rhesus factors and VDRL in pregnant women and the high incidence of defects in screening of the elderly.

INDISCRIMINATE MONOPHASIC SCREENING

There has been an irresistible impulse to use every diagnostic instrument available for monophasic screenings with very little yield. The ECG has tremendous drawbacks in the screening of coronary artery heart disease due to normal variations as well as false negative results²⁹.

There is no strong ethical imperative to weigh up carefully one's screening procedures.

Perhaps the most telling review was provided by Hsieh when re-viewing all the screening tests in the Baltimore Hospital³⁰. He calculated false positivity ratings by comparing ultimate diagnoses as compared to those made by screening tests (Table II).

**TABLE II
FALSE POSITIVE RESULTS ON SCREENING:
BALTIMORE HOSPITAL**

Tonometry	100%
Vision testing	31,8%
Spirometry	29%
Audiometry	23,1%
Urinalysis	43,6%
Blood Pressure	6,2%
X-Ray	10,3%
ECG	0,1%
Visual Fields	39,1%
Pap Smear	42%
VDRL	60%

Very little work has been done on false negative tests obtained from monophasic tests but it is implicit in the false negative results of multiphasic screening, (eg ECGs.)

PROBLEMS RELATED TO SCREENING

There are several problems related to screening whether they fulfill the scientific criteria for acceptance or not. There is always a large group of patients who fail to avail themselves of the opportunity to be screened. Most studies show at least 30% of patients rejecting the offer to be screened⁴. The inherent danger of this situation is illustrated in a survey of 115 women in Aberdeen who died of carcinoma of the cervix between 1973 and 1978, none of whom had had a previous cervical smear³¹. Doctors often fail to carry out the agreed upon tests³¹ and even if they do, fail to follow them up¹⁵. This adds to the problem of patient compliance in detected abnormalities.

The harmful results of testing, besides such risks of radiation, anxiety induction and unnecessary investigations with false positives, include the labelling of a patient as being ill with implications both for work and insurance. It has also been shown for example, that the mere labelling can have adverse effects³². Hypertensives who were told of their diagnosis as opposed to those who were not, had a far higher incidence of absenteeism from work³².

Thus, there is a strong ethical imperative to weigh up carefully screening procedures which one performs. The argument that 'it can do no harm' is not valid on many scores, and outcomes of our screening procedures in terms of health must be demonstrable and not presumed.

This analysis must be construed to be nihilistic towards special investigations. These tests still have a place in the context of a specific patient's illness. The readings can sometimes be useful in providing a data base for individuals but not as a measure of health or disease. The more one analyses patient care however, the more one realises the short-comings of a doctor-centred approach as

compared to a patient-centred one². Most of our diagnostic tools are confirmatory instruments, or at best add additional detail in an already known hypothesis.

DEVELOPMENTAL SCREENING

There is very little argument about screening patients who are at special risk for undetected disease at certain growth stages of their life. These situations include:

Pregnancy/Parenthood
Examination of the newborn
Awareness of milestones of children's development
Adolescence
Middle Age
Aged

LIFE EVENTS 'SCREENING'

Major developments, changes, stresses, all have been shown to effect morbidity and mortality. Examples include:

Bereavement
Geographic dislocation
Divorce
Natural disasters
Job changes
Additions to the family
Financial stresses
Retirement

Every family physician will be aware of the importance of paying particular attention to those patients who have undergone these dislocating traumas. The increased mortality from bereaved patients is a striking example.

PATIENTS AT RISK

Certain patients with certain disease or characteristics are at risk for seemingly unrelated conditions.

Examples of these include endometrial cancer where obese women have three times the risk of the latter³¹. Likewise women who are on oestrogen replacement

therapy, are post-menopausal or are pre-menopausal, have a history of anovulatory cycles or have hepatic cirrhosis are at increased risk³².

Similarly, the unwanted baby who has an unmarried, emotionally deprived mother is at risk for battering.

In conclusion, other than for a few well proven examples, universal indiscriminate examinations and investigations have not been shown to improve health care. The latter cannot compensate for careful attention to an individual patient's needs.

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