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MASS SCREENING FOR PROSTATE DISEASES

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EXECUTIVE SUMMARY

1. INTRODUCTION

Prostate Cancer is the sixth most frequent cancer and accounts for 5.7 per cent of cancer cases in males in Malaysia. Screening is based on digital rectal examination (DRE) and Prostate-specific Antigen (PSA) assessment. Many men die of prostate cancer because they do not know how to detect the symptoms of the cancer in the early stage when treatment would be effective which is made worse by the prevailing 'culture of embarrassment'.

2. TECHNICAL FEATURES

PSA is a glycoprotein chain and an organ-confined tumour marker for Prostate Cancer. Population-based studies on PSA screening and its effectiveness have been widely done world-wide. Refinements in PSA testing should increase specificity and limited unnecessary prostate biopsies.

3. CONCLUSION

The PSA is found to be an efficient screening tool to detect Prostate Cancer and Benign Prostate Hypertrophy. However, issue of false-positive screening result need to be addressed thoroughly as to prevent those at risk default subsequent screening or confirmatory diagnostic procedure. On the other hand, World Health Organization and many studies advocate strongly health promotions. Evidence on increasing survival from the cancer must be documented before a mass screening could be advocated as well. In short, there is insufficient evidence to support the effectiveness or cost-effectiveness of such campaign for mass prostate screening using PSA.

4. RECOMMENDATION

Based on the above review, Prostate Cancer mass screening is not recommended. However, health promotion on awareness of the cancer is advocated.

1. INTRODUCTION

Clinical Prostate Cancer is most common among men aged 65 and older with about 80% of all diagnosed cases found in this age group.[1] Prostate Cancer is the second leading cause of cancer deaths among men. Screening is based on Digital Rectal Examination (DRE) and Prostate-Specific Antigen (PSA) assessment. Diagnosis in earlier stages (T1 and T2) commonly leads to cure with current treatment modalities. Metatstatic Prostate Cancer is incurable and treatment is based on hormonal therapy. Quality of life issues play an important role in selecting treatment, especially in the elderly due to the possibility of co-morbidities.

The incidence of Prostate Cancer rose worldwide in the late 1980s and early 1990s.[1] This is due to increased life expectancy, earlier and more accurate diagnosis and increased public awareness of the disease. However, it accounts for 10% male cancer-related deaths in USA and 9% of such group in European Union. Prostate Cancer is the 5th most common male cancer in Singapore with incidence increasing at 5.6% annually.[2] In Malaysia it is the sixth most frequent cancer and it accounts for 5.7 per cent of cancer cases in males.[3]

It is said that too many men die of Prostate Cancer because they do not know how to detect the symptoms of these cancers in the early stages when treatment would be more effective. This ignorance is made worse by the prevailing 'culture of embarrassment' that discourages men from discussing and resolving problems related to intimate parts of their body.[4]

In relation to cancer prevention and control, the Fifty-eighth World Health Assembly urges Member States to develop and reinforce comprehensive cancer control programmes aimed at reducing cancer incidence and mortality as well as improving the quality of life of cancer patients and their families.[5] This should be implemented via evidence-based strategies which include health promotion for prevention, early detection, diagnosis,

treatment, rehabilitation and palliative care. The impact of implementing such programmes must be evaluated as well.

This technology review was requested by Director of Medical Development, Ministry of Health.

2. OBJECTIVE

To assess effectiveness and cost-effectiveness of mass prostate screening using PSA in the community.

3. TECHNICAL FEATURES

There is no specific technical feature related to the issue of prostate awareness campaign discussed in this review. Thus, discussion will be focused on the screening activities especially PSA, the main screening tool apart from DRE and to a lesser extent urodynamic measures in any such campaign programme.

Criteria for effective screening tests include accurate test as well as efficacy and acceptability of treatment, cost-effectiveness and resource availability.[6] Emerging evidence supports the efficacy of curative therapeutic options e.g. surgery or radiation therapy for Prostate Cancer. In fact, many more men will die with Prostate Cancer than from it. Most clinically apparent cases are seen in men in their 60s and 70s. More aggressive cancers are associated with higher PSA levels, Gleason grade and clinical stage. Prostate Cancer follows an age-related pattern of mortality.[7] The challenge for prostate screening programs is therefore to detect clinically significant cancers at an age and stage when intervention will be successful and to avoid over-diagnosis of occult low-grade cancers, particularly in elderly people who will likely die of something else or old age long before the tumour progresses.[6] Early screening for all men is central to the success of curative treatment.[7] In addition to the PSA, the DRE is considered equally important as a screening test.

The PSA is a glycoprotein chain of 237 amino acids that can be found in periurethral and perianal glands, and also in normal breast tissue and certain breast tumours.[7] The antigen is found in the blood both as free PSA and as PSA complexes.[8] Apart from Prostate Cancer, PSA levels can be raised by benign prostatic hyperplasia, biopsy of the prostate, transurethral prostatectomy, acute urinary retention, acute prostatitis, and ejaculation. To further muddy the waters, there are several PSA testing kits available, and results can vary from kit to kit, although there is movement toward standardizing the commercially available tests. Traditionally, a PSA level of 4.0 ng/mL has been used as the upper limit of normal although many issues related to this is being addressed. Because 75% of men with PSA levels between 4 ng/mL and 10 ng/mL have negative results of biopsy, there is interest in improving the specificity of the test.

There is little doubt that PSA can detect Prostate Cancer.[6, 7] Mortality from Prostate Cancer has been falling for about ten years and it began before widespread PSA testing. There is no evidence yet indicating that its screening lowers the mortality. For diagnosis within five years, PSA testing has a sensitivity of approximately 65% and specificity of 90%, but its positive predictive value is only about 25% to 35%.[6] Use of age-adjusted rates is important[6, 8], because benign prostatic hypertrophy (BPH), which is increasingly common as men age, also causes PSA levels to rise: 2.5 ng/mL is abnormally high for a 49-year-old; 6 ng/mL is normal for an 80-year-old.[6] For some unknown reason, patients with cancer of the prostate have lower levels of free PSA than patients with benign prostatic hypertrophy do and the free PSA ratio, a refinement of the PSA test, can help distinguish benign from malignant sources of PSA.[6, 8] Because PSA binds more avidly to α1-antichymotrypsin when it is from a malignant source, a low PSA ratio suggests malignancy.[6] This is most useful when PSA falls into the “gray” zone, 4 to 10 ng/mL.

The European Association of Urology guidelines recommend that both PSA and DRE testing be offered annually, beginning at age 50, to men who have at least a 10-year life expectancy.[1] Those at higher risk, e.g. African Americans and those having a first-degree relative with such cancer, should begin testing at age 45 years.[1, 7] Black men have the highest incidence rates of Prostate Cancer in the world and are twice as likely to develop

the disease.[7] Refinements in PSA testing (age-specific reference ranges, free PSA, PSA density and velocity) increased specificity (avoid false-positive results) and limited unnecessary prostate biopsies.[1, 8] Age-specific reference ranges have the potential to make serum PSA a more discriminating marker. There are numerous options available for treatment of Prostate Cancer at different stages of disease.

Important to note is that medical practitioners' judgment on prostate disorders may be prejudiced by common aging misconceptions i.e. symptoms and complaints are attributed to the 'aging process'.[7] Putting this issue aside, there is no clear consensus on PSA screening. Some groups, such as the American Urological Association, are in favour; most others, such as the Canadian Cancer Society, are not.[6] There is general consensus, including from International Conference on Prostate Cancer Screening and Diagnosis in June 1999 in Paris, that men should be made aware of PSA as a screening test and should make an informed decision about whether to have it.[6, 7, 8] The controversy over PSA is due, in part, to the lack of evidence showing that early detection of Prostate Cancer and aggressive treatment of early cancers reduce mortality. In fact, studies show that many more men are diagnosed with cancer of the prostate than die of it.[8] To complicate things further, negative test results do not guarantee freedom from disease, nor do positive test results necessarily indicate true cancer.

The U.S. Preventive Services Task Force (USPSTF) concludes that the evidence is insufficient to recommend for or against routine screening for Prostate Cancer using PSA testing or DRE.[9] Screening is associated with important harms including frequent-false positive results and unnecessary anxiety, biopsies and potential complications of treatment.[7, 8, 9] Thus, clinicians should not order the PSA test without first discussing with the patient the potential but uncertain benefits and the possible harms of Prostate Cancer screening.[7, 9] Apart from African-American men, benefits may be smaller in Asian-American, Hispanic and other ethnic groups that have a lower risk for the cancer.[9] The report also mentioned that none of the most major U.S. medical organizations endorses universal or mass screening for any group of men.

Whatever the controversy among medical professionals, patients want PSA screening.[6] Widespread enthusiasm for PSA screening has been replaced with a more cautious, individualized approach. If a man wants to minimize risk of Prostate Cancer and maximize his chance of living as long as possible, PSA screening might be appropriate. Patients should be informed that PSA testing can lead to earlier diagnosis and that it has both benefits and drawbacks. The natural course of Prostate Cancer is long, so patients should be screened only if they have a 10-year life expectancy and are at appreciable risk of cancer. Most authorities that recommend screening include only men between 50 and 70 years. Optimum screening intervals could depend on PSA velocity and absolute level. With BPH, a rise in PSA usually is slow and stabilizes whereas PSA rise resulting from Prostate Cancer usually continues to climb.[7] Suggested intervals are at age 40 and then 45 to establish a baseline, and then not again until 50.[6] After that, men should be tested every 2 years unless there has been a substantial change in results or levels are raised. It was also suggested that monitoring the rate of change in PSA level, to exclude Prostate Cancer, requires annual testing for at least 3 years.[8]

4. METHODOLOGY

4.1 Search Methods

Literatures were searched through electronic databases specifically PubMed, Ovid and ProQuest, and general databases e.g. Yahoo and Google. The search strategy used the terms, which are either used singly or in various combinations: “prostate awareness programme”. Even without using the word “effectiveness” and no limitation applied in the search, a limited number of literatures were obtained. A second search using new combination of terms ("prostate* cancer" OR "prostate* carcinoma" OR "prostate tumour" OR "prostate neoplasm") AND "screening" revealed more literatures. Limitations applied were Humans, Male, Clinical Trial, Meta-Analysis, Randomized Controlled Trial, Review, English, Adult: 19-44 years, Middle Aged: 45-64 years, Middle Aged + Aged: 45+ years, Aged: 65+ years, 80 and over: 80+ years. It yielded many related articles pertaining to prostate screening programme. The third search combined terms of "prostate screening" AND "uroflow" revealed one related article in abstract. The last search used combination words of “Prostate-specific antigen”, “Prostatic

Neoplasms", "Prostatic Hyperplasia" and "Mass Screening". Limitations applied were published in the last 5 years, Humans, Male, English, Adult: 19-44 years, Middle Aged: 45-64 years, Middle Aged + Aged: 45+ years, Aged: 65+ years, 80 and over: 80+ years

4.2 Selection of studies

All primary papers pertaining to prostate awareness programme were included in this technology review. A critical appraisal of all relevant literature was performed and the evidence level graded according to the modified Catalonian Agency of Health Technology Assessment (CAHTA) scale.

5. RESULTS AND DISCUSSION

5.1 Effectiveness of PSA

There were not many primary papers on "prostate awareness campaign" per say. As a matter of fact, none on "effectiveness" of such campaign was found on the online database. However, there were many studies conducted on "prostate screening programme".

Prostate health has emerged as a key health issue for men now. Despite its widespread prevalence, evidences suggest that men lack knowledge about Prostate Cancer and other conditions and are more likely to ignore signs and delay in seeking help. Health promotion is therefore increasingly being advocated as an important way of providing men with health information about it and encouraging them to see a health professional where appropriate. This is to avoid unnecessary suffering as well as delayed diagnosis and treatment which can be life threatening in the cancerous condition. Since its development in 1980s, PSA has become the most commonly used tumour marker for Prostate Cancer Thus, many studies had included PSA screening as the main study instrument with some others incorporated DRE as well.

In a USA study, Kishor Mistry and Greg Cable did a meta-Analysis on PSA and DRE as screening tests for Prostate Cancer. A total of 13 articles were selected whereby most of them studied asymptomatic men older than 50 years from various countries.[10 Level 1] Based

on positive biopsy, the overall detection rate for the Prostate Cancer was 1.8%. Pooled sensitivity, specificity and positive predictive value for PSA were 72.1%, 93.2% and 25.1% respectively; and for DRE were 53.2%, 83.6% and 17.8% respectively. Thus, the overall sensitivity, specificity and positive predictive values for PSA were higher than those for DRE when it was used as a screening tool to detect Prostate Cancer. In fact, the study also showed the potential for detecting early-stage Prostate Cancer with the screening tests because 83.4% of the detected cancers were localized. It was suggested that improve sensitivity and specificity of screening methods could be done by using e.g. age-specific cutoff values, determining free and bound forms of PSA, correcting PSA for BPH and standardizing DRE.

In a simpler and smaller meta-analysis on diagnostic properties of serum PSA in screening Prostate Cancer among the Thais by Wiwanitkit V, 4 local literatures were reviewed.[11 Level 1] The overall prevalence of Prostate Cancer was 10.8% i.e. much higher than the above meta-analysis. The diagnostic activity with regard to sensitivity, specificity, false positive and false negative rates values were 95.8 %, 66.2 %, 33.8 % and 4.2 % respectively. Again, these values differed from the earlier mentioned meta-analysis but this could not be commented much as this meta-analysis did not have a good report on its methodology. However, the report concluded that PSA screening had sufficiently good diagnostic properties for screening. As false positive rate was high, with BPH being the main contributory disease, serum PSA could not be used for a definitive diagnosis and a histopathological confirmation was necessary for that purpose.

Eight literatures on effectiveness of PSA screening programmes on Prostate Cancer had been retrieved. Three were conducted in the Scandinavia and each one in Switzerland, USA, Iran and China. All except one of the European studies were Randomized Control Trial (RCT) in design, part of a bigger study i.e. European Randomized Study of Screening for Prostate Cancer / ERSPC), involved thousands of study subjects, had at least 8 years follow-up and published between 2004 and 2007. Whereas, the USA study was a nested case-control, and the Asian studies were cross-sectional in design. However, except for the USA study, all studies used different cut-off point (three or four) and unit

(ng or mg) to determine pathological values or further investigations. Performing studies aimed at showing mortality reduction after the introduction of a screening programme requires extremely large resources. Unfortunately, these studies must be conducted for a long period of time since Prostate Cancer progresses slowly or has long natural history.[12] Level 2 This implies that a screening-related decrease in mortality should not become evident until many years after initiation of the screening. Thus, a life expectancy of more than 10 years is usually needed to document a survival benefit from early detection and consecutive curative treatment of organ confined disease. This point has been stressed by the European studies whereby they did not recommend mass PSA screening before the mortality results from Prostate Cancer were known especially after consideration of lead-time effects. In fact, further improvement in specificity could, however, improve acceptability of screening and decrease screening costs and if such screening is to be adopted as public health policy.

In a 2004 Swedish study by Hugosson J et al, having high participation rate, early and marked shift toward more favourable disease stage and graded for malignancies detected were found on repeat screening.[13] Level 2 This was based on the fact that cases of locally advanced or metastatic disease virtually disappeared in later screening rounds which were mirrored by changes in PSA level at diagnosis. At eight years, cumulative disease incidence rate in the screening group was 7.3% as compared to 2.4% in control arm (without screening).

Another study in Sweden (not mentioned as part of the ERSPC) tested the feasibility of a population-based Prostate Cancer screening programmes in general practice and explore the outcome after a 15-year follow-up period.[14] Level 2 This pilot study was conducted to show how a screening procedure could be designed and in which PSA >4 mg/l was considered as pathological. Although PSA had not been introduced in the clinical practice at the start of the study, evidences showed that it was possible to perform a long-term population-based randomised controlled study with standardised management. In fact, the screening programme was organized in such a way that made it possible to be integrated into routine clinical work. Detection rates for Prostate Cancer were 5.7% in the

intervention group and 3.8% in the control group. This study also showed no significant difference in total or Prostate Cancer-specific survival between the two studied groups but at the same time supported that screening in general practice was an efficient way of detecting Prostate Cancer whilst it is localised. Validated cancer register was found to be a fundamental prerequisite when assessing the screening programme. The third and latest (2007) Swedish study (based on abstract) showed that biennial PSA screening had reduced risk of being diagnosed with metastatic Prostate Cancer by 48.9%.[15] This putative benefit was balanced by a 1.8-fold increased risk for diagnosis of Prostate Cancer.

L Ma¨a¨tta¨nen et al studied the specificity of serum PSA determination in the Finnish population.[16 Level 2] The specificity was calculated after assuming that the proportion of false negatives (cancers among screen negative men surfacing during the screening interval) was negligible and could be ignored. The detection rate for Prostate Cancer was 2.4%. Specificity was estimated at 0.933 (95% CI 0.929, 0.936) in the first round of screening but dropped slightly to 0.912, (95% CI 0.908, 0.916) in the second round. The specificity values decreased with age and all the results were considered acceptable. As specificity was inversely correlated with age, it was likely that use of age-specific cut-off values would have resulted in lower specificity. On the other hand, DRE as ancillary examination had similar or higher specificity than free / total PSA. In a study conducted in Switzerland, the overall Prostate Cancer detection rate was similar with other European studies i.e. at 2.5%.[17 Level 2] The author stated that for daily practice a 'PSA grey zone' of 4–10 ng/ml could no longer be postulated as only 70% of men in this range presented with organ confined disease. Thus, once PSA level exceeded 4.0 ng/ml, prostate biopsy should be performed immediately. In fact, the acceptance rate of nearly 40% in this prospective randomised study showed that PSA screening was feasible in Switzerland which had one of the highest rates of Prostate Cancer in Europe.

Using nested case-control study design, John Concato et al evaluated the effectiveness of PSA, with or without DRE, in reducing mortality / improve survival in clinical practice at 10 Veteran affairs medical centres in New England.[18 Level 7] On contrary to the earlier

discussed studies, this study found no benefit of screening in primary analysis assessing PSA screening with all-cause mortality (p=0.72) nor in a secondary analysis of PSA and/or DRE screening with cause-specific mortality (p=0.68) after adjustments. Thus, screening for Prostate Cancer should not be endorsed as routine testing of asymptomatic men to reduce mortality. In Iran, younger age-group men (those above 40 years old) were taken as volunteers for screening instead.[19 Level 8] The PSA values between those with and without cancer were statistically significant (p=0.001). The values increased with age and the overall Prostate Cancer detection rate was 3.6%.

Xiaomeng Li et al did a study on Prostate Cancer via a mass screening in Changchun City of China.[20 Level 8] The cancer detection rate was 1.28%. PSA was noted to increase the detection rate of early stage of Prostate Cancer. In fact, there was significant correlation of age-adjusted PSA positive rate and age-adjusted cancer detection rate in six study groups (r =0.898, p <0.01). The participation rate for biopsy in the study was 61.05%. On contrary, a screening programme may be difficult to be implemented in the community especially when it involves further investigation like biopsy. In a study among patients attending clinics in the primary care in semi-urban Cape Town, prostate biopsies were obtained in only 19% of Black and 47% of Coloured men with a serum PSA of ≥4.0 ng/mL.[21 Level 8] This indicated that there was a significant problem in getting men with an elevated serum PSA level to undergo a prostate biopsy in the primary healthcare setting in South Africa. The study highlighted problems which may be encountered with patient compliance in a PSA screening protocol for the early detection of Prostate Cancer.

In cancer screening, optimal specificity depends on how many negative unnecessary biopsies is accepted in order to detect one case of cancer.[12 Level 2] Thus, specificity of a screening test is an indicator of the adverse effects of screening which include cost and inconvenience. One of the problems with PSA screening is that PSA is an organ-specific but not disease-specific marker. The main cause of elevated serum PSA concentration is actually benign prostatic hyperplasia and this may lead to unnecessary biopsy. Added costs, increased over-diagnosis and over-treatment can affect acceptability of screening

e.g. reduced participation at subsequent screening rounds. This is especially important in population screening where the prevalence of disease is low.

Marvella E. Ford et al looked specifically into the effects of false-positive Prostate Cancer screening results on subsequent Prostate Cancer screening behaviour.[22 Level 2] In the study, a false-positive screening result was defined as a screening result with 'abnormal / suspicious' labelling that did not result in a Prostate Cancer diagnosis within 14 months. Previous false-positive Prostate Cancer screening result was one of the predictors (p<0.001) of not returning for further screening in following trial year. This study also highlighted the importance of shared decision making between patients and their providers regarding risks and benefits of Prostate Cancer screening and follow-up options for abnormal screening results. Shared decision making may be especially important for African-American men in whom this particular cancer disproportionately affected. This statement was supported by a study in unscreened cohort of rural Nigerians.[23 Level 8] Like a study in South Africa[21Level 8], although the study subjects were screened for the first time, a high percentage of them that were referred for prostate biopsy defaulted the procedure because of not fully understood the need for investigation, symptom-free status or irrational morbid fear of possible side effects of procedure or diagnosis of cancer. Prostate Cancer awareness and education campaign was deemed to be useful in such situation. This was said so for the fact that that African-Americans record the highest Prostate Cancer incidence in the world and previous reports had reported very low rates of Prostate Cancer in this region.

Some studies mentioned or stressed on informed consent prior to the screening.[18 Level 7, 22 Level 2] John Concato et al recommended continuation of obtaining 'verbal informed consent' from men about screening for Prostate Cancer.[18 Level 7] Uncertainty of such screening should be explained to patients in the process. There were many ways to help patients on this issue. A study on patient education on Prostate Cancer screening and involvement in decision making showed exposure to educational decision aids significantly increased patients' involvement in decision making (p =0.03).[24 Level 3] In the RCT, the intervention groups were more informed and engaged in screening decision

than the controls. In fact, a study on local general practices in Sydney showed not only had the men receiving evidence-based information improved their knowledge (p=0.048), but they also had lower levels of decisional conflict on Prostate Cancer Screening (p<0.001).[25 Level 3]

Benign Prostate Hypertrophy (BPH) is a benign neoplasm of ageing men which requires long-term treatment of which the mainstay of first-line treatment has become pharmacotherapy. Although PSA is mainly used to screen or detect Prostate Cancer at an early stage, it can also used to a lesser extent for the management of BPH. The ability to use serum PSA level to predict a large prostate volume (PV) may be useful in deciding treatment for patients with BPH. The most accurate method for measuring PV is Transurethral Ultrasonography (TRUS).[26 Level 8] As it is not feasible to do TRUS in all patients, serum PSA has been suggested to estimate the PV. Three studies suggested that serum PSA can estimate prostate enlargement sufficiently and accurately to be useful for therapeutic management. In a multicentre study in South Korea, Byung Ha Chung et al evaluated the relationship between serum prostate-specific antigen and prostate volume among BPH cases[27 Level 8] The PV and PSA had an age-dependent log-linear relationship, the strength of which increased with age. In fact, PSA had good predictive value (Area Under the Curve being 76-81%) for various prostate volume thresholds (30, 40 and 50 mL). The correlation coefficient between PSA level and PV was 0.56. C.A. Mochtar et al found similar findings in their study in Netherlands.[28 Level 8] The authors noted that PSA has a good predictive value for assessing 'prostate enlargement' as the outcome of pharmacotherapy for BPH depends on baseline PV. In a similar but smaller study conducted in Taiwan, however, age was found not significantly correlate with serum PSA and PV.[26 Level 8] After log transformation the Pearson correlation coefficient between total PSA and volume of whole prostate gland, transitional zone and peripheral zone were 0.369, 0.377 & 0.272, respectively (p<0.001).

5.2 Effectiveness of Prostate Awareness Campaign

A few study focused on prostate awareness campaign. Alan Dolan et al. took qualitative approach on identifying men's perceptions and experiences on three workplace-based health promotion interventions to improve prostate health awareness.[29] [Level 8] The authors also explored their attitudes towards the workplace as an appropriate setting for men's health. Different methods i.e. posters, leaflets and, nurse intervention and men's health volunteers (peer educators) were used to create awareness. All study subjects generally received the interventions positively. In fact, the men were more interested in their health than usually assumed although only a few of them retained any messages contained within the posters. An important point to note was that men did not feel comfortable discussing health matters with colleagues due to male-dominated workplace 'culture' i.e. embarrassment and fear.

A local study used Prostate Health Awareness Campaign to study the prevalence of symptomatic Benign Prostate Enlargement among men aged 50 and above in Hospital Kuala Lumpur.[30] [Level 8] Although the campaign was announced in the mass media to educate the elderly male population regarding the importance of treatment of lower urinary symptoms, it only captured volunteers who attended the hospital and did not further evaluate the possibility of Prostate Cancer using PSA. Based only on abstract, a similar study was conducted in Singapore to educate elderly male population on troublesome urinary symptom/s.[31] At the same time, it attempted to detect possible Prostate Cancer and derive normal PSA level. Like the Malaysian study, this study also used both DRE and urodynamic parameters as study variables. It concluded that free prostate screening exercise generated publicity and succeeded in enhancing public awareness for better prostate health.

5.3 Cost-effectiveness of PSA

Only two studies on cost-effectiveness of Prostate Screening programme was found. However, information obtained was only from abstract of the studies. In the first study conducted in Sweden, costs taken into account were administration of the screening programme, loss of patient time, diagnostic measures and management strategies.[32] The author concluded that there was still no scientific evidence to support patients' benefit from such screening programme. The programme would probably be perceived as cost-effective if potentially curable patients gained on average at least one year of survival. In the second study of Spain, cost-effectiveness of two diagnostic strategies for Prostate Cancer in men with prostate-specific antigen (PSA) levels of 4-10 ng/ml and normal digital rectal examination (DRE) was assessed.[33] It was found that the use of percent free PSA prior to Transrectal ultrasound-guided prostate biopsy (TRUS-Bx) is the most cost-effective diagnostic strategy.

6. CONCLUSION

The PSA was found to be an efficient screening tool for Prostate Cancer including detecting it at early stage. This had been proven at population-based RCT, in repeated screening rounds and when DRE was done together with it. The screening programme was shown feasible to be integrated in routine clinical practice. Issue of false-positive screening result needed to be addressed thoroughly as not to make those at risk e.g. men of African descent, elderly, etc. defaulted subsequent screening or confirmatory diagnostic procedure. Pick up rate was low and varied i.e. in the range of 0.78 – 10.8. For this reason, health promotion in the form of counseling, educational aids and awareness campaign were strongly advocated. However, evidence on increasing survival from the cancer must be documented before a mass screening could be advocated as well. The true value of PSA screening can only be judged when the effects of screening on both mortality and quality of life are available. In short, there was insufficient evidence to support the effectiveness or cost-effectiveness of such campaign for mass prostate screening.

7. RECOMMENDATION

Based on the above review, prostate awareness campaign is being advocated but mass prostate screening using PSA is not recommended in such awareness campaign.

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1. APPENDICES

9.1 Appendix 1 - Level of Evidence Table

Level	Strength of evidence	Study design
1	**Good**	**Meta-analysis of RCT, Systematic review**
2	**Good**	**Large sample RCT**
3	**Good to fair**	**Small sample RCT**
4		**Non randomized controlled prospective trial**
5	**Fair**	**Non randomized controlled prospective trial with historical control**
6	**Fair**	**Cohort studies**
7	**Fair**	**Case-control studies**
8	**Poor**	**Non controlled clinical series, descriptive studies multicentre**
9	**Poor**	**Expert committees, consensus, case reports, anecdotes, laboratory study, animal study**

Source: Adapted from Catalonian Agency for Health Technology Assessment (CAHTA), Spain

9.2 Appendix 2 - Abbreviations

Ca. – Carcinoma

DRE – Digital Rectal Examination

PSA – Prostate-specific Antigen

RCCT – Randomized Clinical / Community Controlled Trial

Bx – Biopsy / biopsied

BPH – Benign Prostate Hyperthrophy / Hyperplasia