
RESEARCH COMMUNICATION

Cancer Screening Literature in the Period 2000-2002 : Pointers to Future Research Avenues

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Abstract

In order to determine which areas of cancer screening are currently receiving greatest emphasis in different parts of the world a Medline search of the literature for the period 2000-2002 was performed, concentrating attention on research into all aspects of efforts for early detection of tumours, with especial attention to methodology, motivation (including awareness of utility in the general populace and in minority groups), and intervention (professional training and general education). Focus on the skin, lung, cervix, breast, ovary + endometrium, oral cavity-oesophagus, gastric, colorectal, kidney + urinary tract and prostate, demonstrated large numbers of journals to be publishing papers in the field, with 10, 33, 130, 53, 24, 21, 6, 81, 12 and 58, respectively, in the period investigated, the grand total being 259. The average numbers of papers/journal ranged from 1.0-2.4 with only 15-35% appearing in journals with wide coverage. With the exception of oral, oesophageal and gastric cancer screening, an approximately 50% contribution in all areas was made by scientists in the US, followed by Europe (31% overall,) Asia (11%) then Australasia, Central and South America and Africa (3%, 2% and 1%, respectively). Clear differences were evident with the organ regarding specific topics receiving attention, most publications concerning the lung, ovary and urological tract dealing with detection methods. With the cervix and colorectum this topic accounted for half of the papers with especial attention to the relative advantages of the PAP smear, HPV testing and direct visual acetic acid (DVA) in the one, and FOBT and endoscopy in the other. Another major focus was found to be minority attitudes to breast, prostate and cervical screening in the US, whereas only few papers were found dealing with practical intervention, targeting professionals or screenees to increase participation in screening programs. The present approach suggested a number of areas requiring more attention, not least being the need for more comprehensive reviews across organs to allow the general reader a better understanding of the overall picture, and which avenues might best reward exploration in the future.

Key words: Cancer screening - publications - library penetration - geographical areas - organs - research themes

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Introduction

There is a very large body of literature regarding screening for premalignant lesions and a number of reviews have been published regarding screening principles (Parsonnet and Axon, 1996; Yoshida and Saito, 1996; Smith, 1999; Grimes and Schulz, 2002), and the various methods that are now available (Costa et al., 2000; Moore and Tsuda, 1999; Tsuda and Moore, 2002). There have been relatively few publications focusing on the overall picture, despite large numbers of papers concerning individual organs (Moore and Tsuda, 1999; Tsuda and Moore, 2002). The present investigation was therefore performed to determine which areas of cancer

screening are currently receiving greatest stress in different parts of the world, utilising a Medline search of the literature for the period 2000-2002. Attention was thereby concentrated on all aspects of efforts for early detection of tumours, including methodology, motivation (including awareness of utility in the general populace and in minority groups), and intervention (professional training and general education), with reference to cancers of the skin, lung, cervix, breast, ovary + endometrium, oral cavity-oesophagus, gastric, colorectal, kidney + urinary tract and prostate. An assessment of the research library penetration in Japan of those journals giving the widest coverage, here defined as papers relevant to three or more of the organs, was also included.

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Materials and Methods

The screening literature for the years 2000-2002 was accessed by Medline, using 'Organ (Skin, Lung, Cervical, Breast, Ovarian/Endometrial, Oral/Esophageal, Gastric, Colorectal, Kidney/Urinary, Prostate) Cancer Screening' as key words in the Title or Abstract, limiting the search to papers with abstracts available. These were down loaded onto computer and assessed for country of origin (referring to the affiliation of the first author, divided into 6 main regions: USA and Canada; Central and South America; Europe; Africa; Asia; Australasia), journal title, and research area(s) covered, for each of the organs targeted. Division was into methodology, motivation (awareness and participation, with subdivision into majority/minority populations) intervention (practical efforts to increase participation by targeting screening personnel or screenees) and others. Where one paper dealt with more than one topic they were counted in each of the relevant categories.

Numbers of journals featuring at least one screening

publication were counted and those with papers concerning three or more organs were further assessed in terms of their penetration into medicine-related libraries in Japan, listed in the 2001 edition of the 'List of Current Periodicals Acquired by the Japanese Medical, Dental and Pharmaceutical Libraries', published by the Japanese Society for Medical Libraries. To assess the relation between library penetration of these 'general' journals and other variables (impact factor, age and number of screening papers), correlation coefficients were generated with the JMP statistical software package version 3.1 (SAS Institute, Cary, NC, USA).

Results

A summary of the findings for numbers of papers for each organ and the countries of origin is given in Table 1. Clearly, despite the importance of screening for prevention purposes in the developing world, the number of published studies by authors in South and Central America, Africa

Table 1. Contributions of Areas of the World to the Referenced Screening Research Papers, 2000-2002

Area	Skin	Lung	Cervix	Breast	Ovary*	Oral**	Gastric	Colo-rectal	Urinary***	Prostate	Total
N Am#	7 (58)	43 (55)	120 (49)	64 (55)	23 (51)	9 (39)	1 (14)	90 (56)	6 (40)	75 (55)	438 (52)
C/S Am	0 (0)	0 (0)	10 (4)	0 (0)	0 (0)	1 (4)	0 (0)	2 (1)	0 (0)	0 (0)	13 (2)
Europe	2 (17)	12 (15)	80 (33)	42 (36)	19 (43)	9 (39)	2 (29)	38 (24)	5 (33)	52 (38)	254 (31)
Africa	0 (0)	0 (0)	7 (3)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	8 (1)
Asia	1 (8)	22 (28)	20 (8)	6 (5)	2 (4)	4 (18)	3 (43)	20 (12)	4 (27)	9 (7)	89 (11)
Aus	2 (17)	1 (1)	8 (3)	4 (3)	1 (2)	0 (0)	1 (14)	12 (7)	0 (0)	0 (0)	29 (3)
Total	12 (1)	78 (9)	245 (29)	117 (14)	45 (5)	23 (3)	7 (1)	162 (19)	15 (2)	136 (16)	840 (100)

Data are numbers of papers and percentages (in brackets). * Ovary and Endometrium; **, Buccal Cavity and Oesophagus; ***, Kidney and Urinary Bladder; #N Am, USA and Canada; C/S Am, Central and South America; Aus, Australia and New Zealand

Table 2. Spread of Journals Publishing Papers with Reference to Specific Organs

Organ	Paper No. (P)	Journal No. (J)	P/J	Papers General *	Percentage Coverage		
					Methods	Motivation**	Intervention***
Skin	12	10	1.2	4 (33#)	1 (8)	5/0 (42)	6 (50)
Lung	78	33	2.4	12 (15)	50 (64)	8/0 (10)	1 (1)
Cervix	245	130	1.9	86 (35)	117 (48)	29/32 (25)	15 (6)
Breast	117	53	2.2	19 (16)	38 (32)	29/29 (50)	16 (14)
Ovary	36	24	1.5	8 (22)	35 (97)	7/0 (19)	0 (0)
Oral	23	21	1.1	7 (30)	15 (65)	6/0 (26)	1 (3)
Gastric	6	6	1.0	2 (33)	4 (67)	3/0 (50)	0 (0)
Colorectal	162	81	2.0	29 (18)	86 (53)	33/7 (25)	15 (9)
Urology	15	12	1.3	5 (33)	14 (93)	1/0 (7)	0 (0)
Prostate	136	58	2.4	20 (15)	86 (63)	11/13 (18)	7 (5)

Data are numbers of papers and percentages (in brackets).

* Appearing in the 22 journals for which papers covering at least three different organs were published

** Research into areas related to awareness of utility and barriers

*** Research into measures to increase participation, targeting either screeners or screenees

Percentage of the total for the organ

and Asia outside of Japan (data not shown) is very small. Indeed, even Europe proved to be under-represented in almost all areas covered, relative to the United States / Canada on a population basis. Regarding numbers of publications, the cervix was the most common organ of interest, followed by the colon/rectum, prostate and breast, the other organs accounting for only 1-9% of the total.

Data for spread of journals publishing papers in the screening area, with attention to the subject of interest, are summarized in Table 2. The ratio of papers to journals was found to be very low for all organs, at 1.0-2.2, translating into an average of less than one paper in a year for each. The percentages of papers appearing in 'general' journals ranged from 15-35%. The penetration of these journals into Japanese libraries clearly correlated with impact factor ($p < 0.001$) and age (from the year of initial publication) ($p < 0.001$) (see Figure 1) but many of the journals with appreciable number of papers were only available to a small minority of libraries.

Regarding research area covered, the results suggested that even with organs for which screening methodology is well established, a great deal of effort is still being concentrated on generation of new or improved approaches. Whereas awareness and participation

(motivation) are receiving a moderate amount of attention, especially with regard to breast, cervix and colorectal cancers (in the United States almost half of the relevant papers concern minority groups and their lack of compliance with recommendations), very little research is being published as to how to best intervene to increase participation and screening coverage of the target populations.

Discussion

The present study clearly showed that while there is a large cancer screening literature it is spread over very many journals, the majority of which are targeting specialist audiences in terms of the organ. Penetration of libraries, at least in Japan, is poor in many cases, as emphasised earlier for new journals specialising in cancer prevention or molecular biology (Moore and Tsuda 1999a). The fact that a good correlation exists between age of a journal and its penetration of libraries is a reflection of how purchasing policy is determined. The link with impact factor is clearly of importance but since those with the greatest circulation would be expected to be most cited, simply because of their availability (Tsai,

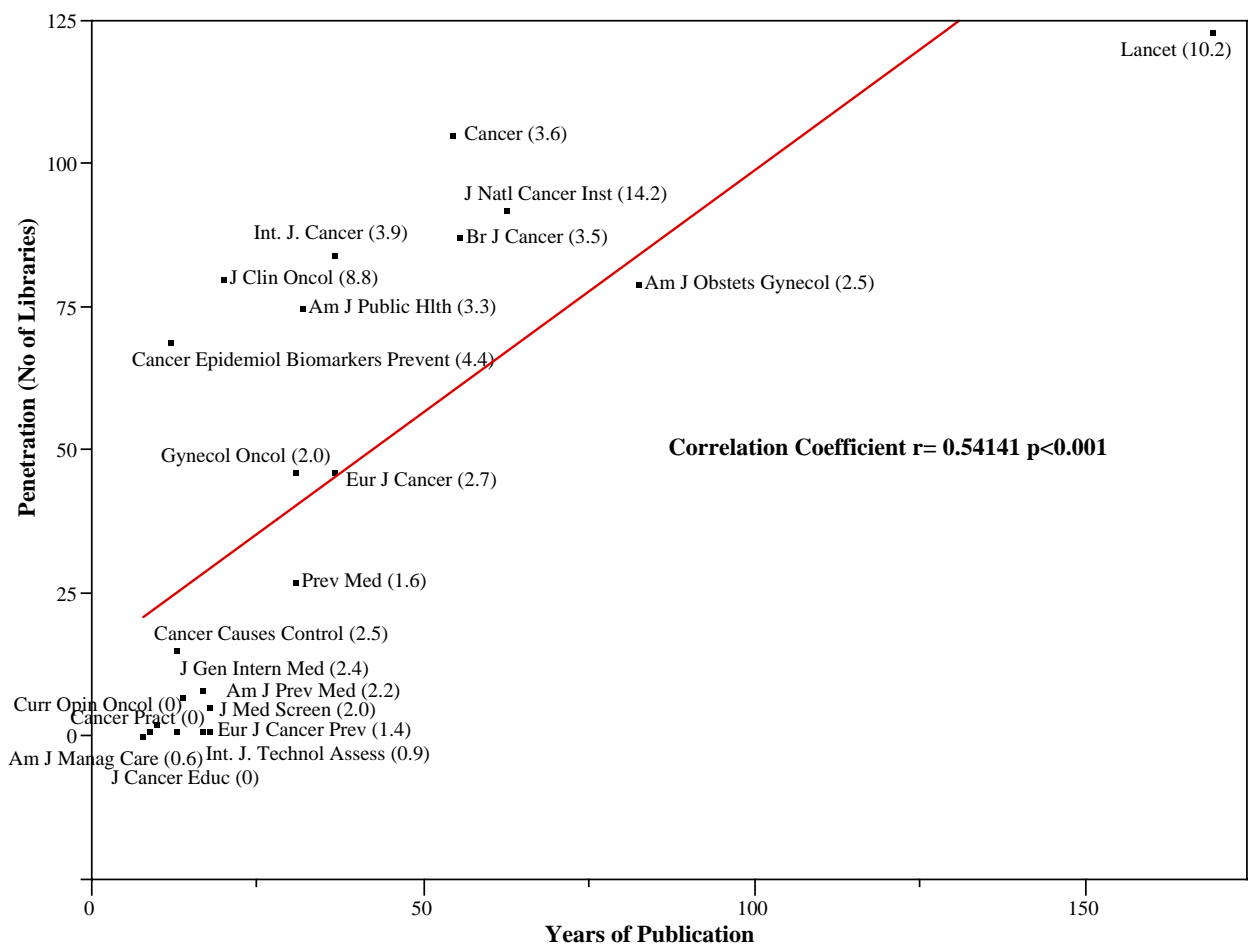


Figure 1. Correlation between journal age and penetration of medical libraries in Japan. (Values for impact factors are provided in brackets).

1998), drawing conclusions in this context is complicated. It is to be expected that the situation is far worse in the less developed countries of the world and the results therefore point to a need for more cross-organ reviews of screening practice in well-established journals to alleviate the obvious dependence on Medline to keep up to date with the literature (see Tsuda and Moore, 2002). This is particularly important in the context of the argument that screening may be most efficient and efficacious when practiced in community settings allowing multi-organ assessment at one and the same time (Qin et al., 1996; Mandelblatt et al., 1997; Sasamori et al., 1999). This is the basis of a Practical Prevention Program recently proposed for the Asian area (Tajima and Moore, 2001).

Regarding the contributions of different areas of the world, the relative lack of papers from countries outside of Europe, North America and Japan, is clearly a matter of concern, as earlier stressed by Patel and Sumathipala (2001) on the basis of findings for a similar assessment of publications in the area of psychiatry. They found that three journals published in Europe had a significantly higher proportion of international articles when compared to the three American journals, which demonstrated a gross under-representation of research from the non-developed world. In a recent editorial, Tajima and co-workers (2002) also pointed to the difficulties scientists in the developing world may experience in publishing their results. This problem will only be overcome if there are major changes in editorial policy or by greater cooperative research efforts to facilitate transfer of expertise.

Looking to the future of cancer screening research, the present study would suggest that, in addition to continued comparative type efforts to determine optimum methodological approaches in different settings, for example with direct visual as opposed to PAP smears or HPV testing for cancer of the cervix (Costa et al., 2000), there is much more scope for investigations focusing on intervention, especially on a community basis (Eaker et al., 2001; Stone et al., 2002). The problems of overdiagnosis also warrant more attention, as well as the related need for more education to facilitate active participation on the part of target populations in decision making (Sackett, 1997; Tsuda and Moore, 2002).

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