

1. Introduction

Primary care research in Malaysia is conducted in government health clinics, general practices and the community. Research articles that appeared in the indexed journals (e.g. *Medical Journal of Malaysia*, *Asia Pacific Journal of Public Health*) are accessible via PubMed. However, many primary care research papers from developing countries are not indexed by PubMed¹ because these papers were submitted to non-indexed journals. Furthermore, many local publications remained relatively unknown to the research community because they are published in the form of thesis, dissertations, monographs, reports or proceedings that are kept in university libraries, government institutions and professional societies.

Currently, there are limited records of research bibliographies in Malaysia. Lim KG's Review of Diseases in Malaysia² focused primarily on hospital based clinical problems. Two other collections of primary care research have been compiled in Malaysia^{3,4}. However, these bibliographies are far from comprehensive. Critical reviews of primary care research conducted in other countries provide a useful baseline for research development in primary care,⁵⁻⁷ but, this may not be relevant to Malaysia.

Primary care is a latecomer to medical research locally and the quality of research is highly variable. Therefore, it is imperative to have a comprehensive resource of primary care research, not only to keep track of the trend and scope of research, but, more importantly, to set direction for future primary care research that creates knowledge useful for clinical practice and for advancement of the discipline.

1.1 Aim and Objectives

The aim of this book is to produce a primary care bibliography and the other objective is to evaluate research output in Malaysian primary care settings from 1966 to 2003.

1.2 Methodology

Scope of the literature collection. We included both indexed and non-indexed publications of research works conducted in Malaysian primary care settings, i.e. general practice clinics (private), health centres (publicly funded) and community (e.g. schools, factories.). Original research and review articles that contained useful local data were included. The year of publication included was from 1966 to 2003. The search was performed manually, electronically and through personal contacts.

Sources of literature. Articles were obtained by searching electronic databases (such as PubMed and local university databases), bibliographies, medical journals, dissertations, proceedings, reports, monographs and books. The key words of our search included “community based”, “general practice”, “primary care” and “outpatient clinics”. We hand searched the collections of literature at the following locations: medical libraries, department of family medicine and community medicine of three universities (University of Malaya, National University Malaysia, University Science Malaysia); Family Health Development Division, Ministry of Health; Institute of Medical Research; Institute of Public Health; and Academy of Family Physicians of Malaysia. We attempted to improve the literature collection by writing to all authors whom contact addresses are available. We also personally contacted known primary care researchers through telephones and emails to provide an exhaustive list of their publications.

Selection criteria. All publications (abstracts and full texts) retrieved were reviewed by the authors independently based on the following criteria:

- Primary care setting (including community eg. schools, health centres, general practice clinics, hospital based outpatient clinics)
- Research conducted in Malaysia
- Subject matter – relevant to primary care
- Human subjects
- Types of research: Original research; review articles with important and relevant local research findings
- Period: 1st January 1966 to 31st December 2003

In cases where there was uncertainty whether the paper met the criteria, three of the primary care researchers reviewed the paper again and a decision made by consensus.

Classification. The project commenced in year 2003 and ended in year 2006. All selected publications were entered into a bibliographic software *Reference Manager version 10*. The researchers looked through all abstracts and coded each publication using a structured checklist that included: subject headings, special groups, location of study by states, study design, publication types (journals, dissertations, reports, conference proceedings, abstracts), and year of publication. We used ICPC-2⁸ to generate a list of subject headings for our coding. A pilot study was first conducted to improve consistency of data coding among all researchers. Disagreement was resolved by consensus among researchers.

Conventionally, indexers tend to abbreviate authors' names using their last names followed by initials of first and/or middle names. This convention is suitable for Caucasian names (e.g. Rebecca George can be abbreviated as George R). However, this is inappropriate for most Malaysian names as many do not have surnames or family names. Indexing these local names into the conventional style may render the authors' names unrecognisable to their peers. Therefore, in this bibliography, operationally, the author's last name was written first followed by the initials of his or her first and middle names. For Malay, Indian, Sikh, Iban and Burmese authors, we used the name that appeared first as the preferred last name eg. For Malay names, Mastura Ismail is Mastura I; for Indian names, Indra Pathmanathan is Indra P; for Sikh names, Pervesh Kaur is Pervesh K; for Iban names, Kiyu Andrew Dawie Usop is Kiyu ADU; for Burmese names, Moe Htay is Moe H. For Sikh name starting with Singh, the name that appeared last was taken as the preferred last name, eg. Singh Prabha Joginder is Joginder SP. For Chinese names, surname or name appeared first on the list was taken as the last name followed by initials, eg. Lim Tuck Leng is Lim TL. If there was a Christian name, it would be initialized and placed in front of the first name e.g. Patrick Chan Wai Kiong is Chan PWK.

For Thai authors, the name that appeared last was taken as the preferred last name, eg. Veeranoot Nissapatorn is Nissapatorn V.

If the preferred name was different from the above but was known to the researchers, we would keep the preferred names as they were, eg. Khalid bin Abdul Kadir is Khalid BAK

Award titles (e.g. Tan Sri), honorary titles (e.g. Haji, Professor) and relationships (bin, binte, ak, a/l, a/p) were omitted.

1.3 Results and Discussion

1222 papers satisfied the selection criteria. There were 907 original articles and 207 theses/dissertations, 71 reports, 33 conference proceedings and 4 abstracts. The retrieved original articles were from 66 journals (30 of these journals are indexed in PubMed, contributing 565 articles).

Topics (Table 1)

We identified 1840 major topics covered by these 1222 papers. Number of publications on “Cardiovascular problem” (2.6%) and “Neoplasms” (2.3%), both major causes of mortality in this country, appear to be relative low when compared with “Infections” (18.0%). Some conditions which were common in primary care appeared to be inadequately covered, e.g. musculoskeletal problems (1.1%), skin problems (2.0%) and sexual health (0.4%).

Table 1: Topics

System	Subgroup	n	%
Blood	Anaemia	20	14.6
	Dengue	19	13.9
	Filariasis	14	10.2
	G6PD deficiency	4	2.9
	Haemoglobinopathy	12	8.8
	HIV/AIDS	22	16.1
	Lead poisoning	6	4.4
	Malaria	19	13.9
	Others	13	9.4
	Toxoplasmosis	8	5.8
Blood Total		137	100.0
Cardiovascular	Congenital heart disease	2	3.9
	Coronary artery disease	19	37.3
	Heart failure	1	2.0
	Hypertension	25	49.0
	Others	4	7.8
Cardiovascular Total		51	100.0
Digestive	Abdominal pain	3	2.3
	Amoebiasis	3	2.3
	Cholera	8	6.1
	Diarrhoeal diseases	20	15.3
	Dyspepsia	2	1.5
	Gallstone disease	2	1.5
	Giardiasis	3	2.3
	Helminthiasis	34	26.0
	Hepatitis	17	13.0
	Hepatocellular carcinoma	2	1.5
	Oral cancer	5	3.8
	Oral health	8	6.1
	Others	7	5.3
	Peptic ulcer disease	5	3.8
Typhoid	12	9.2	
Digestive Total		131	100.0
Ear	Hearing loss	9	64.3
	Others	5	35.7
Ear Total		14	100.0
Endocrine/Metabolic/Nutrition	Breast feeding	20	7.7
	Diabetes	44	16.8
	Growth	20	7.7
	Infant feeding	8	3.0
	Lipid disorders	13	5.0
	Malnutrition	13	5.0
	Nutrition	66	25.3
	Obesity	19	7.3
	Osteoporosis	2	0.8
	Others	12	4.6
	Thyroid diseases	21	8.0
	Vitamin/mineral	23	8.8

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System	Subgroup	n	%
Endocrine/Metabolic/Nutrition Total		261	100.0
Eye	Conjunctivitis	2	9.1
	Others	9	40.9
	Retinopathy	6	27.3
	Visual loss	5	22.7
Eye Total		22	100.0
Female Genital	Breast cancer	9	10.8
	Cervical cancer	12	14.5
	Contraception	34	41.0
	Menopause	6	7.2
	Menstrual disorder	2	2.4
	Others	4	4.8
	Sexually transmitted infections	16	19.3
Female Genital Total		83	100.0
General	Adolescent health	14	6.7
	Child health	16	7.7
	Family practice	12	5.8
	Health promotion	5	2.4
	Health system research	50	23.9
	Immunisation	12	5.7
	Injury	23	11.0
	Others	44	21.1
	Poisoning	5	2.4
	Prescribing	8	3.8
	Primary health care	13	6.2
	School health	3	1.4
	Traditional/complementary medicine	4	1.9
	General Total		209
Infections	Acute respiratory infections	14	4.0
	Amoebiasis	17	4.9
	Cholera	8	2.3
	Conjunctivitis	2	0.6
	Dengue	19	5.5
	Diarrhoeal diseases	19	5.5
	Filariasis	14	4.0
	Fungal infection	4	1.1
	Giardiasis	3	0.9
	Helicobacter pylori	1	0.3
	Helminthiasis	36	10.3
	Hepatitis A	1	0.3
	Hepatitis B	19	5.5
	HIV/AIDS	22	6.3
	Leprosy	10	2.9
	Leptospirosis	8	2.3
	Malaria	20	5.8
	Measles	7	2.0
	Nipah virus infection	7	2.0
	Others	36	10.3
Poliomyelitis	3	0.9	

System	Subgroup	n	%
	Rubella	2	0.6
	Schistosomiasis	8	2.3
	Sexually transmitted infections	24	6.9
	Skin infection	5	1.4
	Toxoplasmosis	8	2.3
	Tuberculosis	14	4.0
	Typhoid	12	3.4
	Typhus	5	1.4
Infections Total		348	100.0
Male Genital	Erectile dysfunction	3	15.8
	Others	1	5.3
	Sexually transmitted infections	15	78.9
Male Genital Total		19	100.0
Musculoskeletal	Backache	2	9.1
	Gout	1	4.5
	Others	10	45.5
	Rehabilitation	7	31.8
	Systemic lupus erythematosus	2	9.1
Musculoskeletal Total		22	100.0
Neoplasm	Breast cancer	9	20.5
	Cervical cancer	12	27.2
	Hepatocellular carcinoma	2	4.5
	Nasopharyngeal cancer	11	25.0
	Oral cancer	5	11.4
	Others	5	11.4
Neoplasm Total		44	100.0
Neurological	Dementia	1	2.7
	Down's syndrome	2	5.4
	Headache/migraine	5	13.5
	Meningitis/Encephalitis	9	24.3
	Others	12	32.5
	Parkinson's disease	2	5.4
	Seizure/Epilepsy	5	13.5
	Vertigo/giddiness	1	2.7
Neurological Total		37	100.0
Occupation	Agricultural workers	8	6.1
	Armed forces	15	11.5
	Factory workers	11	8.5
	Healthcare workers	30	23.1
	Medical Students	2	1.5
	Migrant workers	23	17.7
	Office Workers	4	3.1
	Others	33	25.4
	Teachers	4	3.1
Occupation Total		130	100.0
Pregnancy	Abortion	6	5.0
	Anaemia	8	6.7
	Breast feeding	21	17.5
	Congenital heart disease	1	0.8
	Contraception	34	28.4

System	Subgroup	n	%
	Health system research	1	0.8
	Hypertension	2	1.7
	Infertility	1	0.8
	Others	16	13.3
	Postnatal depression	3	2.5
	Pregnancy - others	26	21.7
	Urinary tract infection	1	0.8
Pregnancy Total		120	100.0
Psychological	Alcoholism	5	4.7
	Depression	12	11.1
	Drug abuse	8	7.4
	Others	47	43.5
	Psychosis	4	3.7
	Suicide	5	4.6
	Tobacco use	27	25.0
Psychological Total		108	100.0
Respiratory	Acute respiratory infections	14	14.1
	Asthma	34	34.4
	Nasopharyngeal cancer	11	11.1
	Others	18	18.2
	Rhinitis	8	8.1
	Tuberculosis	14	14.1
Respiratory Total		99	100.0
Sexual Health	Erectile dysfunction	2	28.6
	Others	3	42.8
	Sexual health	2	28.6
Sexual Health Total		7	100.0
Skin	Eczema/dermatitis	9	23.7
	Fungal infection	4	10.5
	Leprosy	10	26.3
	Others	9	23.7
	Psoriasis	1	2.6
	Skin infection	5	13.2
Skin Total		38	100.0
Social	Child abuse	5	13.5
	Domestic violence	3	8.1
	Drug abuse	8	21.6
	Others	21	56.8
Social Total		37	100.0
Urinary	Glomerulonephritis	1	5.9
	Others	5	29.4
	Renal impairment	1	5.9
	Urinary incontinence	2	11.8
	Urinary tract infection	5	29.4
	Urolithiasis	3	17.6
Urinary Total		17	100.0
Grand Total		1,934	

Locations of research (Table 2)

We identified 1254 locations where these researches were done. Although all Malaysian states were represented, three states predominate: Wilayah Persekutuan (Kuala Lumpur, 25.3%), Kelantan (10.7%), Selangor (9.9%). This is probably due to the locations of the main universities and research centres in these states.

Table 2 Locations of research

Location	n	%
Wilayah Persekutuan	364	25.3
Kelantan	154	10.7
Selangor	143	9.9
Sarawak	63	4.4
Perak	59	4.1
Pulau Pinang	53	3.7
Pahang	51	3.5
Negeri Sembilan	43	3.0
Terengganu	43	3.0
Kedah	41	2.9
Johor	39	2.7
Sabah	33	2.3
Melaka	26	1.8
Perlis	7	0.5
Malaysia	109	7.6
West Malaysia	26	1.8
NA	184	12.8
Grand Total	1,438	100.0

The locations are based on the classification written in the articles.

Journal source (Table 3-7)

There are 313 papers published in indexed international journals and 45 in non indexed international journal. There are 267 papers published in indexed local journal and 594 papers published in non-indexed local journal/dissertations/reports. Out of the 913 journal publications, 585 (64.1%) were published in top 10 journals (see Table 7).

Table 3 Journal source: International indexed journals

Journal names	n	%
1. Southeast Asian J Trop Med Public Health	126	40.3
2. Asia Pac J Public Health	45	14.4
3. Singapore Med J	42	13.4
4. Asia Pac J Clin Nutr	30	9.6
5. Ann Acad Med Singapore	16	5.1
6. Asian Pac J Allergy Immunol	12	3.9
7. J Singapore Paediatr Soc	8	2.6
8. Asian Med J	7	2.2
9. J Trop Pediatr	4	1.3
10. Bull World Health Organ	4	1.3
11. Asian J Infect Dis	4	1.3
12. Asia Pac Popul J	4	1.3
13. J Trop Med Hyg	2	0.6
14. Trans R Soc Trop Med Hyg	1	0.3
15. Singapore J Obstet Gynecol	1	0.3
16. Sex Transm Dis	1	0.3
17. Nepal Med Coll J	1	0.3
18. Mod Med Asia	1	0.3
19. J Infect Dis	1	0.3
20. Ecol Food Nutr	1	0.3
21. Ann Trop Med Parasitol	1	0.3
22. Acta Paediatr Jpn	1	0.3
Grand Total	313	100.0

Table 4 Journal source: International non-indexed journals

Journal names	n	%
1. Neurol J Southeast Asia	11	24.4
2. International Medical Research Journal	9	20.0
3. ASEAN Journal of Clinical Sciences	7	15.6
4. Far East Medical Journal	7	15.6
5. Journal of the Asean Federation of Endocrine Societies	5	11.1
6. ASEAN Journal of Psychiatry	3	6.7
7. Asian-Oceanian Journal of Pediatrics and Child Health	2	4.4
8. Asia Pacific Family Medicine	1	2.2
Grand Total	45	100.0

Table 5 Journal source: Local indexed journals

Journal names	n	%
1. Med J Malaysia	201	75.3
2. Malays J Pathol	20	7.5
3. Trop Biomed	20	7.5
3. Med J Malaya	14	5.2
4. Malays J Reprod Health	7	2.6
5. Bull Publ Health Soc (Kuala Lumpur)	5	1.9
Grand Total	267	100.0

Table 6 Journal source: Local non-indexed journals, dissertations, reports

Journal names	n	%
1. Dissertation	207	34.9
2. Malaysia's Health	44	7.4
3. The Family Practitioner	33	5.6
4. JUMMEC	31	5.2
5. Malaysian Journal of Medical Sciences	28	4.7
6. The Family Physician	28	4.7
7. Malaysian Journal of Nutrition	21	3.6
8. Journal of the Malaysian Society of Health	20	3.4
9. Jurnal Perubatan UKM	16	2.7
10. Annual Report, Ministry of Health	13	2.2
11. Malaysian Journal of Medical Laboratory Sciences	13	2.2
12. Kota Bharu Journal of Medical Sciences	12	2.0
13. Malaysian Journal of Dermatology	10	1.7
14. Medical Journal Penang Hospital	10	1.7
15. Malaysian Journal of Child Health	9	1.5
16. The Journal of the Malaysian Armed Forces Medical and Dental Corps	9	1.5
17. IMR Quarterly Bulletin	8	1.3
18. Proc Nutr Soc Mal	7	1.2
19. Malaysian Journal of Surgery	6	1.0
20. Proceedings of the Ninth Malaysia-Singapore Congress of Medicine	6	1.0
21. Proceedings of the Fourth ASEAN Forum on Child and Adolescent 22. Psychiatry	5	0.8
23. Report, Ministry of Health Malaysia	5	0.8
24. Proceedings of the Eighth Singapore-Malaysia Congress of Medicine	4	0.7
25. WFSBP Asian Regional Congress and Second Congress of the MASRP on Biological Psychiatry and Mental Health	4	0.7
26. Hospital Practice Seremban	3	0.5
27. Malacca's Health	3	0.5
28. Malaysian Journal of Psychiatry	3	0.5
29. Proceedings of the Fifth Malaysia-Singapore Congress of Medicine	3	0.5
30. Proceedings of the Seventh Malaysia-Singapore Congress of Medicine	3	0.5
31. Report, Public Health Institute, Ministry of Health Malaysia	3	0.5
32. Malaysian Journal of Public Health Medicine	2	0.3
33. NCD Malaysia	2	0.3

34. Proceedings of the First Scientific Conference Nutrition Society of Malaysia	2	0.3
35. Proceedings of the Twelfth Singapore-Malaysia Congress of Medicine	2	0.3
36. Proceedings of the Twenty-First Malaysia-Singapore Congress of Medicine	2	0.3
37. Second National Health and Morbidity Survey	2	0.3
38. Second Qualitative Research Convention Theory & Practice	2	0.3
39. Social Welfare Journal	2	0.3
40. Vector Journal	2	0.3
41. Environmental Health Focus	1	0.2
42. Mal Agric Res	1	0.2
43. Malaysian Journal of Science	1	0.2
44. Medical Practice Hospital Ipoh	1	0.2
45. Nuclear Science Journal of Malaysia	1	0.2
46. Pertanika J Soc Sci & Hum	1	0.2
47. Proceedings of the Sixth Singapore-Malaysia Congress of Medicine	1	0.2
48. Report	1	0.2
49. Second International Consultation on Erectile and Sexual Dysfunctions	1	0.2
Grand Total	594	100.0

Table 7 Top 10 Journals in this bibliography

Journal names	n	%
1. Med J Malaysia	201	34.4
2. Southeast Asian J Trop Med Public Health	126	21.5
3. Asia Pac J Public Health	45	7.7
4. Singapore Med J	42	7.2
5. The Family Practitioner	33	5.6
6. JUMMEC	31	5.3
7. Asia Pac J Clin Nutr	30	5.1
8. Malaysian Journal of Medical Sciences	28	4.8
9. The Family Physician	28	4.8
10. Malaysian Journal of Nutrition	21	3.6
Grand Total	585	100.0

Study design (Table 8)

Almost three quarters of these papers were either case series or cross-sectional studies. There were very few analytical observational studies, clinical trials or qualitative studies.

(Others refer to reviews).

Table 8 Study design

Study Design	n	%
Cross-sectional	757	62.0
Case Series	145	11.9
Clinical Trials	50	4.1
Case control	41	3.4
Cohort	16	1.3
Case Report	10	0.8
Qualitative Study	9	0.7
Others*	179	14.6
NA**	15	1.2
Grand Total	1,222	100.00

* Other types of publications such as reviews and reports

** Papers of which study designs were unclear

Age, gender and study setting (Tables 9-11)

The spectrum of research in this bibliography covered all age groups and both genders. However, there were few research focusing on the elderly, adolescents and men's health. Studies were done in various primary care settings. Community and hospital outpatient clinics were more commonly chosen while only 2.7% of the studies were conducted at the private GP clinics.

Table 9 Age group

Age Group	n	%
All Adults	506	41.4
All	293	24.0
All Children (0-18)	200	16.4
Elderly	32	2.6
Adolescent	18	1.5
NA	173	14.1
Grand Total	1,222	100.00

Table 10 Gender

Gender	n	%
All Gender	849	69.5
Female	165	13.5
Male	42	3.4
NA	166	13.6
Grand Total	1,222	100.00

Table 11 Settings

Setting	n	%
Community	308	25.2
Hospital Outpatient	183	15.0
Health Centre	94	7.7
Schools	71	5.8
Private GP	33	2.7
Others*	345	28.2
NA	188	15.4
Grand Total	1,222	100.00

* Combinations of settings or no specific settings mentioned

Time trend (Fig 1 & 2)

There was a progressive increase in the number of papers published for each successive five-year intervals and for most topics. Certain areas such as infections 18.0% and endocrinology/metabolic disease/nutrition 13.5% had more publications. This could be attributed to a need for research in these areas as compared to others seen by researchers depending on societal and time trend.

Fig 1 Number of publications over time

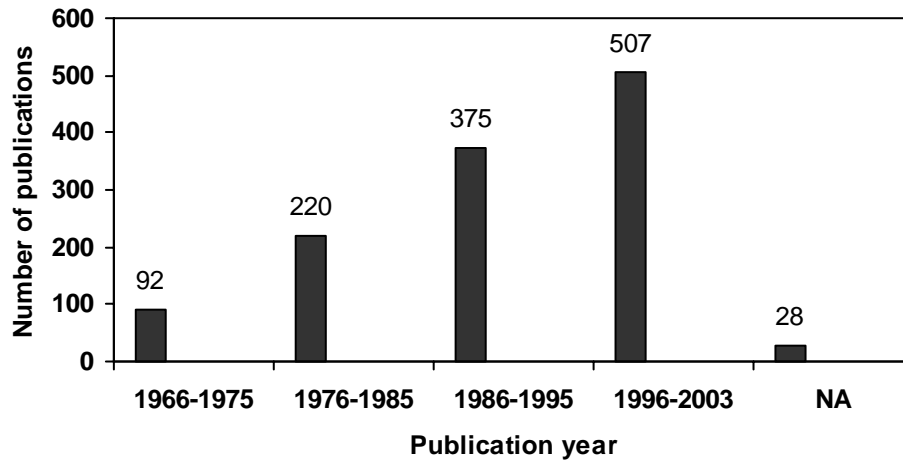
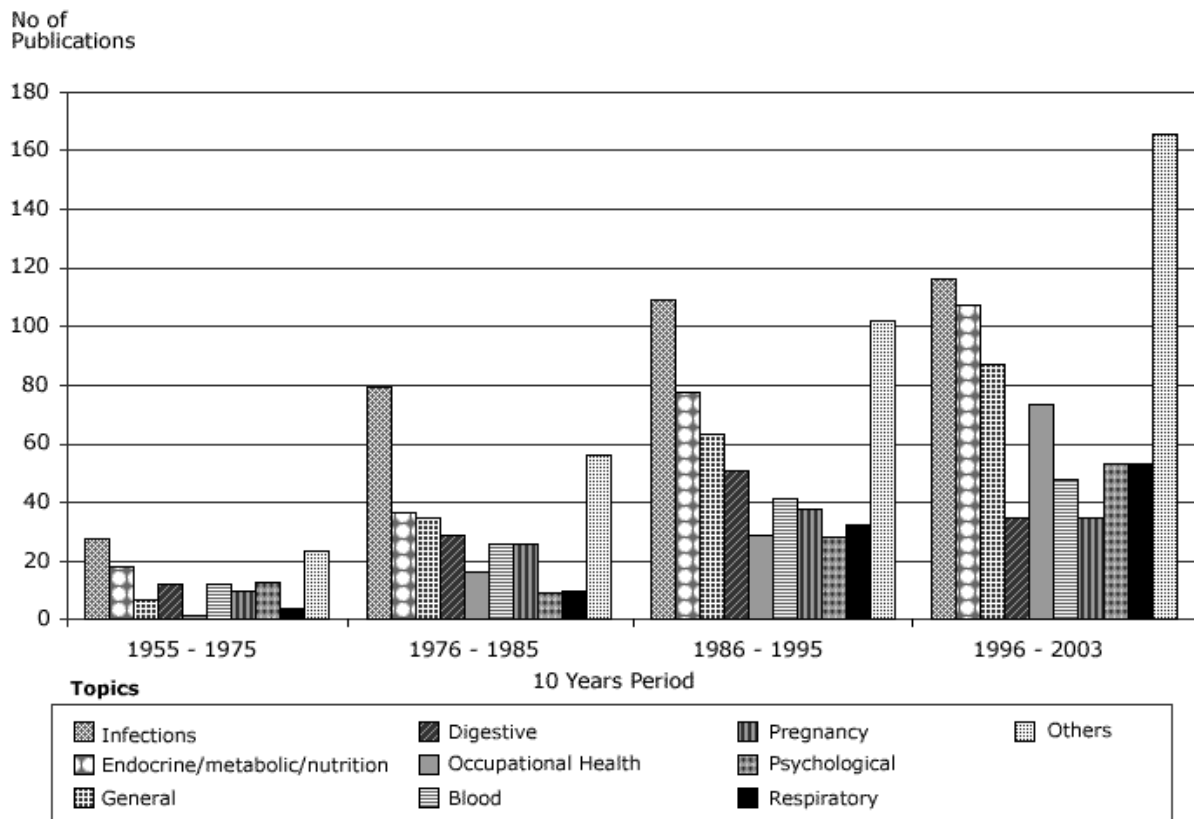


Fig 2 Trends of publications in terms of topics



1.3.1 Problems identified

We have identified several areas of difficulties while trying to compile the bibliography. Firstly the author’s name was not consistent, that is, the same authors may write their names in different way in different publications. Where possible, we tried to identify these inconsistencies and grouped their publications together under the same author’s name. This

rule, in particular, applied to the names of Malay and Indian authors as we cannot ascertain the preferred last name to be used for indexing.

Secondly, most papers were not indexed and, therefore, could not be searched electronically and had to be done manually. This process was time consuming and costly.

Thirdly, most institutions did not have a complete collection of journals.

Some studies did not specify the study design; some did not have a clear research question while others had incomplete abstracts. This hindered the process of data entry and analysis.

This collection may not be as comprehensive as we would like it to be because we were limited by the lack of time and manpower. In addition, many researchers that we contacted did not respond to our request for their publications. We hope to update our bibliography in the near future by performing a more comprehensive search, both manually and electronically. We also intend to make it more readily accessible by creating an electronically searchable bibliography on the web.

1.4 Conclusions

This bibliography provides a useful resource for the research community in the country, especially researchers who have special interest in primary care research, as currently there is a lack of comprehensive collection of literature in this area. This bibliography also allows easy access to research information. We hope that this project will serve as a catalyst for the formation of an Asia-Pacific database of primary care research ⁹ and eventually a global database. Finally, we hope to make this bibliography available electronically, linking to a search engine, so that it will benefit more researchers.

1.5 References

1. Mendis K, Solangaarachchi I. PubMed perspective of family medicine research: where does it stand? *Fam Pract* 2005;22:570-5.
2. Lim KG. *A Review of Diseases in Malaysia*, (2001). 2nd edition.
3. Teng CL. Subject Index of The Family Practitioner (1973-1988) and The Family Physician (1989-1993). *The Family Physician*. 1994;6(1 Suppl).
4. Malaysian Family Medicine Specialists Association. (2002). *Collection of Scientific Papers of Family Medicine Specialists 1997-2002*.
5. Ward AM, Lopez DG, Kamien M. General practice research in Australia, 1980-1999. *Med J Aust* 2000; 173: 608-611
6. Frey JJ. A literature analysis in family medicine and general practice. *Fam Med* 2000; 32(6): 398-402
7. Weiss BD. Publications by family medicine faculty in the biomedical literature: 1989–1999. *Fam Med* 2002; 34(1): 10-6
8. Classification Committee of World Organization of Family Doctors. *ICPC-2: International Classification of Primary Care*. Oxford: Oxford University Press, 1997
9. Liaw ST. Is an indexed database publications database for the Asia Pacific region feasible? *Asia Pacific Family Medicine* 2002; 1(1): 33-36