A Multidisciplinary Approach to Prevention (Pre-publication version)

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Abstract (205 words)

Cardiovascular disease accounts for 17,500 deaths globally representing nearly one half of all non-communicable disease deaths. The World Health Organisation has set nine lifestyle, risk factor and medicines targets to achieve by 2025 with the aim of reducing premature mortality from non-communicable diseases by 25%. To succeed in this we need to equip our global health professional workforce with the skills to support patients and their families with making lifestyle change and concordance with cardioprotective medication regimes at every opportunity. Success depends on collegiate working through effective interdisciplinary team based care characterised by shared goals, clear roles, mutual trust, effective communication and measurable processes and outcomes with the patient and family at the centre of care. Nurses are the largest sector of the health professional workforce and their role in prevention should be optimised. Nurse coordinated care is proven to be effective, especially where they work in an interdisciplinary way with other health professionals like doctors, pharmacists and psychologists who provide equally important expertise to support holistic care. Successful care models are those that comprehensively target all adverse lifestyles and risk factors responsible for the development of cardiovascular disease. These characteristics should be reflected in the standards and core components of prevention and rehabilitation programmes.

Key words (3-10)

Interdisciplinary, multidisciplinary, team-working, patient centred care, nurse-led, cardiovascular prevention and rehabilitation, cardiovascular disease.

Background

Non-communicable disease (NCD) burden accounts for 38 million deaths worldwide with three quarters of these occurring in low and middle income countries[1]. Cardiovascular disease (CVD) accounts for 17.5 million of these deaths and remains one of the biggest global health challenges. However, the scope of the disease burden faced by individual countries varies according to where they are in demographic and epidemiological transitions[2]. High income countries have experienced a decrease in age-specific death rates from cardiovascular disease unlike low and middle income countries[3]. The growth and ageing of the global population tends to offset such favourable trends. In Europe, only central and western regions have seen reductions in age-specific cardiovascular death of a sufficient magnitude to offset such demographic forces[4]. These data provide us with compelling evidence of the need to focus on CVD prevention.

Major risk factors that contribute to global mortality and disability-adjusted-life years are tobacco smoking, high systolic blood pressure, high blood cholesterol, high fasting plasma glucose and raised Body Mass Index[5,6]. All are potentially amenable to favourable change to reduce the global burden of CVD. The INTERHEART Study, which was conducted in 52 countries representing all continents of the world and including over 15,000 cases and 14,000 controls, confirmed that the risk factors for first myocardial infarction are similar in high, middle or low income countries alike. Nine risk factors were measured: smoking, lipids, self-reported hypertension or diabetes, obesity, diet, physical activity, alcohol consumption and psychosocial factors. In combination they accounted for 90.4%(99% CI 88.1 to 92.4) of the population attributable risk (PAR) for myocardial infarction.

The contribution of unhealthy lifestyles to this burden is enormous and the need for a healthcare workforce equipped with the knowledge and skills to lead effective CVD prevention to reduce this burden is absolutely vital to ensure that potential gains can be realised.

At a formal meeting of the member states in Geneva in 2012, the World Health Organisation (WHO) set nine lifestyle, risk factor and medicines targets with the aim of reducing premature mortality from NCDs by 25% by 2025. In order to achieve this

goal, the World Heart Federation (WHF) has emphasised the need to focus on tobacco cessation, secondary prevention and hypertension control. It has also called for coalition building across health disciplines and, in particular, to "optimize the scope of nurses' and allied health professionals' practice to contribute to prevention and control of non-communicable diseases, including addressing barriers to that contribution" [7].

If we are to succeed in achieving the WHO and WHF goals then collegiate working, through the sharing of ideas and responsibilities in a positive way, is an imperative for health professionals and all those involved in the delivery of health and social care, which should be focused on providing services around the convenience of patients and their families. This demands prioritizing their needs first rather than those of institutions and staff.

This approach is endorsed and promoted in clinical practice guidelines such as those produced by the European Society of Cardiology (ESC). In the most recent version of the Joint European Societies' Guidelines on the Prevention of Cardiovascular Disease in clinical practice, multidisciplinary approaches are recommended in relation to behaviour change strategies and in relation to delivering preventive services in primary care[8].

Definitions for multidisciplinary and interdisciplinary team working

The way in which healthcare is delivered has evolved in response to changing needs of patients. The ageing of the population and increased life expectancy has resulted in patients with complex health needs. To provide safe and effective care, there has been a move away from multidisciplinary teams, in which individual specialists, often independently, work in relative isolation, to interdisciplinary teams.

Distilling the essence of the best in interdisciplinary/multidisciplinary care models requires first defining what each has to offer and also developing a common definition of what we mean by these terms. Whilst it is acknowledged that 'multidisciplinary' relies on the use of knowledge and skills from different disciplines, it does not necessarily refer to an interaction between the disciplines. On the contrary, 'interdisciplinary' infers interaction and collaboration. Applying these terms

to the concept of team working in clinical care leads to a further understanding of the differences between the two, as defined by Bernard-Bonnin et al[9]:
‘An interdisciplinary team aspires to a more profound level of collaboration (than a multidisciplinary team), in which constituents of different backgrounds combining their knowledge mutually complete different levels of planned care’

Interdisciplinary teams, thus, bring together individuals with specialist knowledge and skills to work together to provide co-ordinated care through an agreed treatment plan[10]. No single profession can provide the knowledge, skills and resources to meet the needs of today's patient with complex health needs so contributions from all team members are valued; patient and support person, physician, nurse, social worker, physiotherapist, occupational therapist, dietician, pharmacist, physical activity specialists, psychologist and dietician. Figure 1 shows a definition of team-based care[11].

Figure 1. Definition of Team-based Care

Team-based health care is the provision of health services to individuals, families, and/or their communities by at least two health providers who work collaboratively with patients and their caregivers – to the extent preferred by each patient – to accomplish shared goals within and across settings to achieve coordinated, high – quality care (Naylor[11])

Five key principles underpin effective team-based care; shared goals, clear roles, mutual trust, effective communication and measurable processes and outcomes[12]. Effective team based care is central to effective CVD prevention but once goals have been set and action plans agreed then the patient and the family have to integrate the new behaviours, to manage lifestyle recommendations and medication regimens, into their everyday life.

In considering the variety of disciplines required for cardiovascular care, it is important to emphasise that a broad perspective is required which includes all professional groups working within the delivery of cardiovascular care. This would include doctors, nurses, allied health professionals, pharmacists and psychologists.

Defining patient and family centred care

An essential component of interdisciplinary team working is the concept of placing patients and families at the centre of care. Although there is no consensus on a definition of person and family care there is a useful review and concept analysis to guide clinical practice[13]. The activities reported as being central to person centred care include the involvement of the patients and wider support network in their care, the provision of health information, emotional and physical support and the recognition that it is patients' responsibility to manage their own health[13].

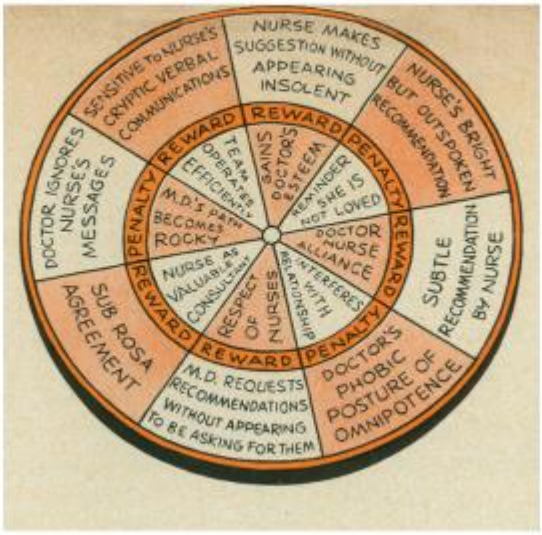
In the context of CVD, effective prevention requires the patient to make lifestyle changes and manage cardio-protective medications to promote their heart health. Person and family centred care acknowledges that patients and their family are at

the centre of the process and there should be collaboration and shared decision making. A person centred approach to care is important because it has been shown to have a positive influence on self-management behaviours and patients' satisfaction but further research is required to better understand how person centred care impacts on clinical outcomes[14]. From the patient perspective it is important that the magnitude of lifestyle change is 'realistic' and reflects a life that is perceived as 'worth living'[15]. An interdisciplinary team-based approach with the patient and family at the centre of a shared decision making process is important in the development of an achievable action plan with clear goals that align with patients' values, goals and preferences.

Team dynamics and the scope of practice

Excellence in the delivery of care depends heavily on interdisciplinary team-based working and positive working relationships between the different professionals involved. Conventional images of nursing and the understanding of the scope of their role varies enormously in different regions of the world. Throughout history, nurses have been portrayed in the media as 'angels', 'doctors' hand maidens', and even as 'sex objects' However, in many regions, the benefits of providing nurses with the opportunity to expand the scope of their practice has driven opportunities for advanced and specialist practice especially in northern European countries, North America, Australia and New Zealand. As nurse education has evolved, many countries now require nurses to undertake bachelor's level degrees in their initial preparation for clinical practice. For the most part the dynamic between nurses and doctors described by Stein[16] in his portrayal of the 'Doctor Nurse game' (see Figure 2) is thankfully now for nostalgia rather than a clinical reality. Stein described how nurses were required to play an elaborate game, in order to appear beholden to the absolute knowledge and power of the physician, whilst at the same, for example, ensuring that they secured appropriate prescribed medications for their patients.

Figure 2. The Doctor Nurse Game[15]



Nurses in many countries have now taken on expanded roles, including becoming autonomous consultants responsible for the management of a patient case load. Legislation in North America and the UK supports independent medication prescribing for nurses following appropriate educational preparation[17]. For the most part, physicians' responses to such developments have been positive, recognising that interdisciplinary working has improved care provision and made it more efficient.

However, the role of nurses in many countries is still seen as one of being subservient to physicians and nurses are not viewed as autonomous practitioners. In some cases they are prevented from practicing to the full extent of their potential and training and resources are potentially wasted. The migration of health care professionals across countries has had a destabilising effect on the workforce which impacts upon health care delivery; for example, many doctors and nurses are leaving low to middle income countries to seek better standards of living and working conditions in higher income countries. Finding ways to recruit and retain the existing healthcare workforce in low to middle income countries must be an imperative. In her keynote address to the International Council of Nurses in 2015, the WHO Director General Margaret Chan drew attention to these issues[18] calling for nurses, the largest healthcare workforce worldwide, to join the fight against NCDs. She blamed

archaic legislation which places unnecessary limits on the scope of practice, deficiencies and variations in standards of education and training and unwillingness on the part of, not only physicians, but also nurses themselves, to embrace policy which facilitates expansion of nursing roles, to take on these responsibilities. Allied Health Professionals also face similar challenges to nurses in defining and developing their roles and accessing post graduate education and continuing professional development.

The ESC Council on Cardiovascular Nursing and Allied Professions (CCNAP) strategic plan includes ensuring quality and standardisation of education for cardiovascular nurses and providing support to nurses to play a significant role in clinical guideline implementation, to advocate for their patients and families to receive evidence based care, and to develop positive professional and working relationships with their health professional colleagues to ensure quality of care. In 2015 at Euro Heart Care, the annual Congress of CCNAP, in Dubrovnik, both 'The CCNAP core curriculum for the continuing professional development of nurses working in cardiovascular settings'[19] and the 'Be Guidelines Smart' initiative[20] were launched. The initiatives provided a 'map' to inform nurse education and a 'tool kit' to support for the implementation of clinical guidelines; both emphasised the need for interdisciplinary working.

The provision of appropriate competency based education for the health professional is an important catalyst to effective preventive care. An understanding of behaviour change techniques and ways of effectively delivering these interventions are especially important to deliver safe and effective care to reduce the CVD burden. Ongoing professional development is required to support health professionals in maintaining and updating their competencies. Each member of the interdisciplinary team plays an important role in supporting patients and their support networks in modifying their lifestyle and managing their cardio protective medications successfully and safely.

Models for clinical practice

There are several factors to consider in organising the way in which prevention efforts can be most appropriately co-ordinated. Considerable focus has been given

to the development of clinical practice guidelines which provide us with much needed evidence about which aspects of preventive care are effective. However less emphasis has been given to how clinical guidelines can be most effectively implemented in clinical practice and the impact of the organisational culture and context on this process. Findings from the Euro Aspire surveys[21,22,23] indicate that there is considerable room for improvement in closing the gap between recommended guidelines on CVD prevention and the realities of clinical practice. For example, in the third survey[24], less than half of patients were advised to attend a cardiovascular prevention and rehabilitation programme. This varied enormously across participating countries, and according to diagnostic category, with those diagnosed with angina but not having an intervention, being less likely to be advised. If advised, more than 80% across countries reported attending a service.
There are several approaches to CVD secondary prevention which vary by country. Nurse coordinated care (NCC) is one approach and programmes typically include sessions on risk factor management with multidisciplinary consultation and shared decision making[25]. It is suggested that the effective components of NCC include nurse led prescription and/or titration of drug therapy using algorithms, individualised behavioural counselling with action plans and goal setting supported frequent follow up, either face-to-face, or by telephone[25]. There is also evidence to support nurse prescribing in the control of blood pressure in people with hypertension but this is not consistent across all countries[26].

A recent meta-analysis of RCTs of secondary prevention and cardiac rehabilitation programmes conducted since 2010[27] showed no effect on total mortality. However, the authors conducted two sub-analyses, the first of trials that addressed 6 or more risk factors and the second of trials that included prescribing and management of cardio-protective medications. They found a significant reduction in all-cause mortality, 0.63 (95% CI 0.43; 0.93) and 0.35 (95% CI 0.18; 0.70) respectively (see Figures 3 and 4).

Interestingly, the majority of these successful programmes were nurse coordinated (See Tables 1 and 2).

Table 1: Characteristics of studies showing an effect on total mortality which included medical monitoring and prescribing

Author	Study name and country	Population	Intervention	Follow up
Jorstad 2013[28]	RESPONSE, The Netherlands. Multi-centre.	696 post ACS patients	On top of standard cardiac rehabilitation, 12 month nurse led behavioural and medication prescribing	24 months
Krebs 2013[29]	Wellington, New Zealand	34 post ACS and hyperglycaemia	On top of standard cardiac rehabilitation, nurse promoted GP consultations	24 months
Moreno-Palanco 2011[30]	MIRVAS, Spain. Single centre.	247 post ACS; CVA	Nurse led lifestyle modification and medication review	36 months

Table 2: Characteristics of studies showing an effect on total mortality which addressed 6 or more risk factors

Author	Study name and country	Population	Intervention	Follow up
Cohen 2014[31]	RESICARD, France. Multi centre.	502 post ACS	12 month nurse and dietician led smoking, dietary and physical activity consultation	24 months
Jorstad 2013[28]	RESPONSE, The Netherlands. Multi-centre.	696 post ACS patients	On top of standard cardiac rehabilitation, 12 month nurse led behavioural and medication prescribing	24 months
He 2012[32]	China. Single centre.	263 post PCI patients	12 month behaviour change and telephone consultation	24 months
Moreno-Palanco 2011[30]	MIRVAS, Spain. Single centre.	247 post ACS; CVA	3 year nurse led lifestyle modification and medication review	36 months
Saffi, 2014[33]	Brazil. Single centre	74 post ACS patients	15 month nurse-led lifestyle counselling	24 months
Stewart 2015[34]	NIL-CHF, Australia. Single centre	624 CHD, DM, PAD, CVA patients	3 year nurse led home and clinic visits and referral to pharmacists, dieticians, CR, exercise programmes	51 months

For example, in the Spanish and Dutch studies[28, 30], specialist nurses in the intervention arms followed up patients after ACS and stroke with a series of visits. Nurses were involved in facilitating healthy behavioural changes, monitoring cardiovascular risk factors, initiating and titrating medications, and promoting adherence. They were not necessarily the prescribers.

Figure 3. Comprehensive v. less comprehensive programmes[27]

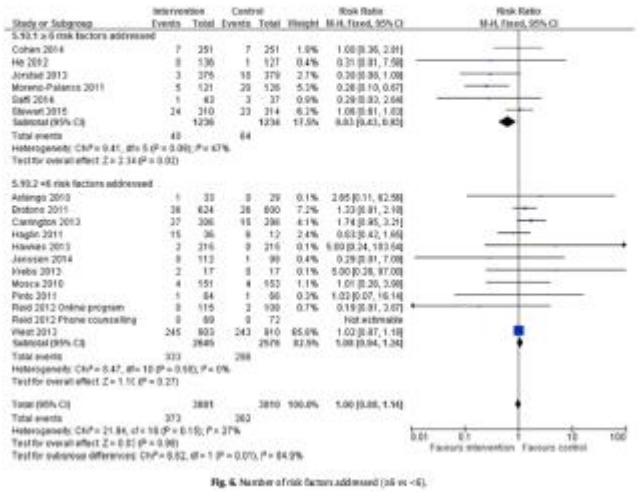
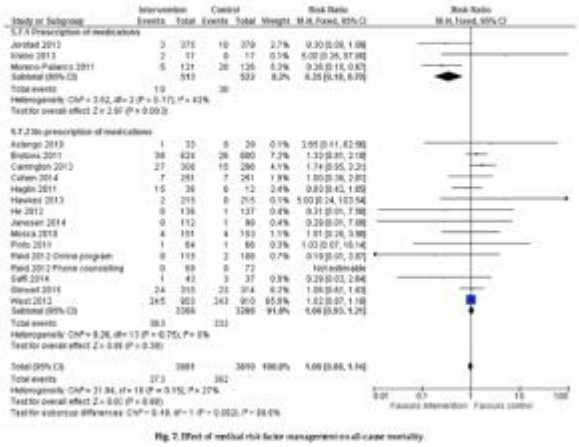


Figure 4. Including medical prescribing v. no prescribing[27]



Whilst the nurses leading the programmes worked closely with physicians, the involvement of other disciplines was allowed but they were not part of an interdisciplinary model of care and their input was not measured. A more effective approach may have included the addition of specialists as an integral part of a nurse led interdisciplinary team. However, in the Dutch study, for example, the intervention was designed to be practical and feasible so that it could be easily integrated into routine clinical care. The Spanish study achieved an absolute risk reduction of cardiovascular morbidity by 28.5% and of total mortality by 11.9%. The Dutch study achieved a reduction of 17.4% in estimated 10 year cardiovascular mortality (SCORE or Framingham risk functions) and found reduced hospitalization and better risk factor control compared to the usual care arm. As observed improvements in lifestyle parameters are not reflected in the primary outcome[35, 28] (SCORE or Framingham risk functions), the overall impact of the intervention may have been underestimated.

In the programmes investigated above, nurse led models were shown to be effective in improving implementation of clinical practice guidelines. Whilst there was evidence of interdisciplinary working between physicians and nurses in these studies,

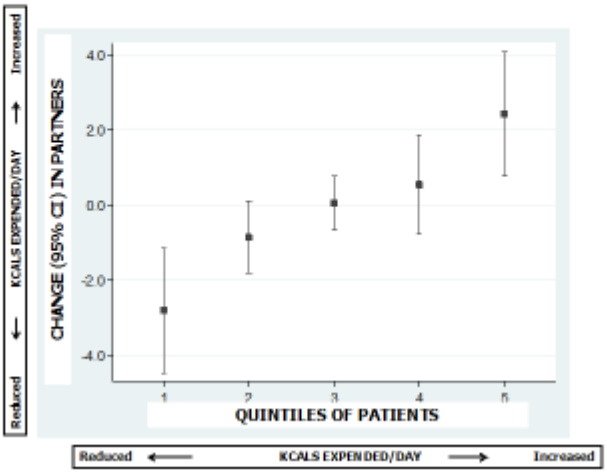
expertise from other disciplines was not integrated into team working and if their input was used, it was not measured.

An interdisciplinary model

A trial that has not been included in these meta-analyses is the EUROACTION cluster RCT because it did not measure mortality or other 'hard' cardiovascular outcomes.

Across six northern, eastern and southern European countries, 3088 coronary patients and 1183 partners were randomised. The trial tested an innovative patient and family centred preventive cardiology programme for newly diagnosed coronary patients and their spouses which aimed to manage them to achieve European lifestyle, risk factor and therapeutic goals. The programme was led by specialist nurses supported by dieticians and physical activity specialists as part of an interdisciplinary team[36]. The intervention demonstrated impressive results, in particular for diet, physical activity and blood pressure. For example, 72% (680/944) of patients in the intervention arm compared to 35.2% (349/991) in usual care achieved the European fruit and vegetable goal at one year (p=0.004); and 53.8% (507/942) compared to 19.6% (194/992) achieved the European physical activity goal (p=0.002). Achievements in lifestyle parameters were reflected in proportions reaching the blood pressure goal with 65.3% (615/942) achieving the goal in the intervention arm compared to 55.2% (547/990) in usual care (p=0.04). Spouses also made impressive changes and there was evidence of concordance for change in couples (645) who attended the initial assessment in the intervention arm after they completed the programme (440) and at the one year follow up (419)[37] with correlation coefficients at one year of r=0.61 for fruit and vegetables consumption, r=0.40 for energy expenditure, r=0.21 for change in BMI and r=0.22 for change in WC. Patients who made the most impressive changes in their lifestyle habits were married to the partners who did the same. Figure 5 shows an example of this dynamic for concordance for change in energy expenditure as measured by a seven day physical activity recall.

Figure 5. Mean changes (with 95% CI) in spouses for moderate intensity physical activity grouped according to the extent of change in the corresponding patients (BL to 1 year) [37].



This model was subsequently rolled out into clinical practice in the UK NHS as the My Action programme, which integrated secondary and primary prevention in nurse-led community based programmes, and also in Galway the west of Ireland[38] through a collaboration between the Irish Health Authority and a Charity Organisation[39]. In the UK managing the transition from traditional cardiac rehabilitation to a new way of working was challenging. However, in the flagship programme in Westminster, an area of London with mixed ethnicity and a high variation of deprivation, patients and their families achieved healthier lifestyles and improved risk factor control and more effective prescribing of cardioprotective medications[40]. In addition, cost effectiveness and cost saving have also been demonstrated for the My Action programme[41].

Key professional organisations such as the ESC and The British Association for Cardiovascular Prevention and Rehabilitation (BACPR) recognise the importance of interdisciplinary working. The BACPR has outlined the need for an interdisciplinary approach in their standards and core components (See Figure 6) in order to achieve better outcomes in cardiac patients following an event.

Figure 6. BACPR Standards and Core Components of Cardiovascular Prevention and Rehabilitation[42]

However, the reality of clinical practice, as reported by the National Audit for Cardiac Rehabilitation (NACR) [43] shows that we are far from achieving this in the UK (See Figure 7).

Figure 7. NACR Report 2016[43]

Staffing profile for CR programmes across the UK

CATEGORY	ENGLAND		NORTHERN IRELAND		WALES		UK TOTAL	
	N	%	N	%	N	%	N	%
NURSE	214	97	12	92	18	100	247	97
PHYSIOTHERAPIST	143	65	12	92	16	89	173	68
DIETITIAN	112	51	9	69	9	50	132	52
PSYCHOLOGIST	32	14	4	31	0	0	36	14
SOCIAL WORKER	2	1	0	0	0	0	2	1
COUNSELLOR	16	7	0	0	2	11	18	7
DOCTOR	21	10	2	15	0	0	23	9
HEALTH CARE ASSISTANT	33	15	2	15	0	0	35	15
SECRETARY	134	61	9	69	10	56	154	60
ADMINISTRATOR	19	9	0	0	0	0	19	7
EXERCISE SPECIALIST	124	56	0	0	7	39	131	51
OCCUPATIONAL THERAPIST	72	33	4	31	12	67	89	35
PHARMACIST	85	38	10	77	5	28	102	40
PHYSIOTHERAPY ASSISTANT	59	27	2	15	2	11	64	25
	N=221		N=13		N=18		N=255	

The audit defines ‘multidisciplinary’ as having at least two different disciplines, although the amount of time contributed from each additional discipline is not specified. UK Audit data shows that most of the rehabilitation programmes were nurse led and the input from other disciplines such as dietician, psychologists, physiotherapists and exercise specialists is ill defined. For example whilst the audit reports that a dietician is included in 52% of rehabilitation programmes in the UK, this input may be one single educational group session. Similarly 68% of programmes state that they have a physiotherapist as part of the team but many of those working in hospital based settings may be employed in acute care and will have to prioritise this above their work on prevention and rehabilitation programmes. It is rare for programmes to include a clinical psychologist in the team (14%) even though morbidity from anxiety (28%) and depression (20%) is significant in the patient population included in the report when they entered a programme.

If we are to be successful in secondary prevention we need to provide cardiovascular prevention and rehabilitation programmes that are equipped with the interdisciplinary teams that reflect the composition of those that have been successful in RCTs. Without this investment we may be providing substandard programmes with a limited effect in improving patient outcomes.

Conclusion

In conclusion we have established the need for a coalition between physicians, nurses, pharmacists, psychologists and other allied health professionals to win the battle against NCDs. The distinction between multidisciplinary and interdisciplinary team working has been explained. Nurses have been shown to be effective coordinators of preventive care, especially when working in an interdisciplinary way with medical colleagues and other allied health professionals. The most effective models of preventive care are those that adopt a total risk management approach (i.e. they address all of the risk factors which impact on cardiovascular health) using behavioural counselling with action plans and goal setting approaches and proven therapeutics supported by frequent follow up, either face-to-face, or by telephone approaches. Nurse led prescription and/or titration of drug therapy using algorithms also has significant potential but requires competency based education. The need to maximise the full potential of the nurse’s scope of practice in prevention and

rehabilitation, through appropriate education and opportunities, has been acknowledged. Standards and core components developed for prevention and cardiac rehabilitation should reflect these requirements.

Authors' contribution:

Authorship: CJ and FA contributed equally to the conception and design of the work and to the drafting of the manuscript. Both critically revised the manuscript. Both gave final approval and agree to be accountable for all aspects of work ensuring integrity and accuracy

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