Research Clusters in Brunei Darussalam

RESEARCH CLUSTERS,
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INTRODUCTION
Since its inception in 1984, Universiti Brunei Darussalam (UBD) has made progress in many areas in the provision of quality education and in serving the country. Like many academic institutions around the world, research represents a very important aspect and it is one of the ways of judging the standard of an academic institution. In order to foster and promote research in UBD, the idea of research clusters, among others, was conceived in 2009.

It started with just five research clusters namely Environmental and Sustainable Development, Energy, Material Science, Technology and Society and Modeling and Simulation. The research cluster is multi- and trans-disciplinary in nature, drawing experts from various disciplines and collaboration with world class universities. Research cluster is an incubation period and any successful cluster will develop into research centres or institutes. The research clusters are also working closely with UBD/IBM (International Business Machines) Centre, Institute for Asian Studies and Sultan Omar ‘Ali Saifuddien Centre for Islamic Studies.

There are currently ten research clusters (detail of clusters is available at www.http://www.ubd.edu.bn/admin/deptgsr/researchclusters.html) covering many subjects from environment, sciences, health,
Ageing is a normal biological process and not a disease condition. However, it is a risk factor for many diseases. The human population is undergoing significant demographic changes towards an increasingly ageing population, more obvious in the Western or developed nations. It is projected that the global percentage of people aged 65 years and above will increase from 13.9 (2000) to 20.8 (2025) and 31.3 (2050) (World Population Ageing 1950-2050), a warping of over 200% increase in just 50 years. This trend is also seen in the developing nations, including Brunei Darussalam where the shape of the population pyramid is slowly changing. Thus, it would be expected that an increase in the number of people with age-related diseases would accompany these changes at the very least in the same proportion if the issue is not addressed aggressively. Towards this end a number of governments the world over which propitiously includes that of Brunei Darussalam and especially those of the advanced nations led by the United States and the United Kingdom have in the last quarter of a century focused more attention on ageing and ageing research and have increased research funding into ageing significantly.

Ageing Research Cluster (ARC)
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The need for research into ageing has become crucial to enable us to develop interventions that not only increase life expectancy but also foster enhanced function and improved quality of life. In pursuance of this for example, the United Kingdom House of Lords called for a direction of research that
addresses issues relating to various biological ageing processes. Consonant with this, the ARC have decided to use several approaches including epidemiology, holistic nursing as well as social scientific instruments and a gerontological rodent model, to investigate the phenomenon of ageing, its antecedents and associated factors in both health and disease. This essentially is to ensure that we are a part of the global community engaged in the discussion on ageing. Thereby we will be able to contribute meaningfully not only into prolonging life but also to an ever improving quality of life and gracefulfulness in ageing. To date, there is very little research done and no published data on ageing in a local setting.

The ARC was one of the last of the research clusters to be formed and its members’ maiden meeting was held on the 20th February 2010. The ARC aims to encourage and pursue research in ageing at the UBD and indeed in Brunei Darussalam as well as in the ASEAN sub-region.

At the moment ARC research activities are limited to humans. However it is planned to include both animate and inanimate entities and in the not too distant future we will have members with interests in plant and infrastructural ageing. The following constitute the range of ARC’s members’ research interests at the present time. This is expected to widen as the cluster’s membership increases and/or as the member’s research interests change or expand. Some of the areas being proposed are shown in Table 1.

**Cancer Research Cluster (CRC)**

Cancer is an important cause of mortality worldwide and with the ageing population, the trends are set to increase. With the introduction of health programmes such as hepatitis B vaccination, screening programmes (i.e. cervix, breast and colorectal cancer), stricter policies on tobacco and better awareness among the general public, cancer-related deaths for some of the cancers are expected to decrease. Despite this, cancer-related morbidity and mortality remain important public concerns.

A similar situation exists in our local setting. In 2009, cancer is the top cause of deaths in Brunei Darussalam followed by cardiac, and chronic diseases, specifically diabetes. The top five cancers in Brunei Darussalam in 2010 are shown in figure 2.

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**Table 1: Areas being proposed by the Ageing Research Cluster.**

- Ageing and the female reproductive system
- Epidemiology and statistics of the aging population and its implication towards chronic illness, health risks and quality of life
- Family support in ageing population
- Health and safety among the ageing population
- Healthy life style in ageing people
- Health promotion and the ageing population
- Neurobiology of ageing
- Public Health in relation to the quality of life among working Bruneian aged between 20-60
To date, similar to those on ageing, little has been researched or published regarding cancers in Brunei Darussalam. \(^{4-11}\)

The aims of the CRC are to integrate basic and clinical research towards a better understanding of cancers in the local setting. Through this we can make contribution. The mission of the CRC is to inform and empower the entire cancer research community by making discoveries in basic and clinical cancer research and by developing them into novel therapeutic interventions for patients afflicted with cancer. The immediate aims of CRC are shown in Table 2.

The future plans of the CRC include: the establishment of the Cancer Research Center at UBD, to carry out advanced scientific research in cancers, to develop life-saving and life prolonging interventions and finally to provide advanced training for physician-scientists and biomedical researchers in Brunei Darussalam.

### Table 2: Immediate aims of the Cancer Research Cluster.

- Identification of the genetic makeup of cancers in Brunei Darussalam:
  - This will involve the use of advanced molecular biology techniques to look at gene alteration (mutations) in key tumour genes in Bruneian cancer patients.
  - Identification of altered gene expression in cancer patients in local setting will be of great importance in early diagnosis of cancer and in implementation of novel approaches for cancer gene therapy.
- Understanding the environmental factors that may contribute to cancer development in Brunei Darussalam (i.e. Tobacco smoking, exposure to the sun and radiation, work place hazards).
- Understanding the role played by the immune system in protection from cancer among our local patients
- Implementation of new guidelines in patients care and management. These new guidelines may include the implementation of Islamic medicine in resolving the psychological problems suffered by cancer patients in Brunei Darussalam.
Obesity Research Cluster (ORC)

Weight disorder, especially obesity is an important cause of health related problems. Being overweight or obesity itself places a major burden on almost all major organ systems: endocrine, cardiovascular, musculoskeletal, respiratory, and the liver. It is a significant risk factor for non-communicable chronic diseases (Diabetes mellitus, hypertension, ischaemic heart disease and hyperlipidemia). Importantly obesity is also a risk factor for many cancers, notably breast, ovarian, esophageal, colorectal, liver, pancreas, gallbladder, stomach, endometrial, cervical, prostate, kidney, non-Hodgkin’s lymphoma and multiple myeloma. 12-16

Overweight and obesity is now a major public health issue worldwide. It is estimated that about 50% of men and 35% of women in Europe are currently overweight or obese. 16 In the United States, between 55.0 and 67.4% of adults are considered overweight and of this, 18.4 to 30.6% are obese. 17 Among children and adolescents, the prevalence of obesity is estimated to between 8.5% and 22% 18, 19, higher in some states compared to others.

Local studies down in our local setting have also shown that weight disorders are more common than we think. One study done in the hospital clinics setting showed that almost two third of the patient population are either overweight or obese. 20 A recent health survey done on government servants showed that just over forty percent were either overweight or obese. Of concern is the finding of a survey carried out in 2003 by the Ministry of education showing that one in four school children below the age of 12 years old was either overweight or obese.

The goal of ORC is to generate high-value evidence to inform policy decisions and contribute to the development, implementation, and evaluation of effective and efficient interventions for the prevention, control, and management of obesity and its consequences. To this end, ORC strives to conduct research involving inter-disciplinary, inter-cluster, inter-institutional, inter-sectoral, and international collaborations. ORC also actively ensures that priority is given to upstream, midstream, or downstream research with the greatest potential for accelerated translation into policy and practice.

ORC investigators are now engaged in epidemiologic studies of obesity prevalence

Table 3: Areas being proposed by the Obesity Research Cluster.

- Study of the association among high fat diet, obesity, and leptin levels in animals
- Study of the anti-obesity effects of traditional medicinal plants of Brunei Darussalam
- Study of the association between polymorphisms in leptin gene and obesity
- Assessment of the effectiveness of sympathetic autonomic modulation as an innovative technique to overcome the resistance against physical activity and food restriction in obese adults; and
- Assessment of the relationship between exposure to pesticides and diabetes mellitus among pesticide sprayers.
and patterns in Brunei Darussalam. Proposals submitted for funding through the Brunei Research Council, Department of Economic Planning and Development (JPKE), Science and Technology Round 3 Grants is shown in Table 3.

Some of these projects include investigators from the Ministry of Health (MOH); Jerudong Park Medical Center (JPMC); and Drexel University, USA. Also, ORC investigators from UBD and MOH are currently engaged in the development of a multi-national project entitled ‘Network for Urine Banking System in Asia’ (NUBSA) aimed at identifying novel biomarkers to help in the early detection of diabetic nephropathy. Besides Brunei Darussalam, other countries likely to join the Japan-based NUBSA include Bangladesh, China, Indonesia, and Thailand.

**Overview**

The formation of research clusters by UBD represents an important milestone and creates a great opportunity for researchers in our local setting. We, clinicians and allied health care workers should make full use and take advantage of the opportunity created to carry out research projects, especially those that require funding and back up of experts in these respective fields.

For researchers who are interested to join or have research proposals that may involve any of these three research clusters, they can contact the respective cluster leaders for further information (PAPRSB-IHS UBD website at http://www.ubd.edu.bn/academic/faculty/im/Research.htm). Alternatively, they can try to identify the research collaborators of PAPRSB-IHS and/or other faculties of UBD. Interested parties should discuss with the research clusters leaders regarding their proposals. If the proposal is interesting, a joint research proposal can then be written and submitted to the UBD graduate studies and research (GSR) office for S&T grants or UBD grants for processing. For those who are interested in collaborative research out of the scope of the three research clusters, they can visit the PAPRSB-IHS website (below) to explore the research interest areas of PAPRSB-IHS academic staff or contact the respective academic staff directly.

Generally, the proposal should be completed and submitted by the end of February every year, pending change in the evaluating process. There will be internal evaluation process and if necessary, the proposal will be sent for external review. UBD’s approved projects will be submitted to Brunei Research Council for funding. The period between submission and approval may take at least 6 months. Three years will be an acceptable period for completion of project as it coincides with duration of PhD candidature. Researchers will be expected to agree on terms and conditions of UBD’s Intellectual Property Policy. The Intellectual Property Policy is intended to safeguard research invention and innovation created at the university. Any proposal involving human beings will have to be approved by the Research Ethics Committee of either UBD or the MOH.
NOTES:
Doctor Oduola ABIOLA: Leader of the Ageing Research Cluster (ARC)
Professor Mohamed MABRUK: Leader of the Cancer Research Cluster (CRC)
Professor Mohammad Moshaddeque HOSSAIN: Leader of the Obesity research Cluster (ORC)
Associate Professor Zohrah HJ SULAIMAN: Deputy Vice Chancellor of Universiti Brunei Darussalam

REFERENCES
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- CANCER
- OBESITY
- AGING

**OTHER ON-GOING RESEARCH**

For interested researchers with research proposals that may involve any of the Research Clusters, please contact the respective cluster leaders for further information (information listed in the PAPRSB IHS UBD website at http://www.ubd.edu.bn/academic/faculty/im/Research.htm).