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INTEGRATION OF KNOWLEDGE: CONNECTING THE DOTS

DZULKIFLI ABDUL RAZAK

International Islamic University Malaysia IIUM, Gombak, Malaysia

Corresponding: dzulrazak@iium.edu.my

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ABSTRACT: Integration of knowledge and ideas in reality is increasingly becoming relevant as the call for transdisciplinary gains momentum in recent times especially in the face of many global changes. The search for long-term, sustainable solutions ought to be multidisciplinary in nature so as to provide transformative changes, rather than an incremental and linear alternative. For example, the severity of the climate crisis demands a change in the conventional framework to one that is more impactful with a radical outcome. Open innovative approaches that cover beyond technological outcomes to enable social, communal and institutional dimensions are imperative for a success sustainable change as the real-world drivers in the transformational process. This means the need for an integration of knowledge and ideas through both multi- and transdisciplinary approaches are crucial in delivering the oft quoted goal of “no one left behind” – a global objective in embracing the overarching goal for humanity as depicted in 2030 Agenda Sustainable Development Goals (SDGs)

KEYWORDS: *Sustainable Development Goals (SDGs), Integration, Eurocentricity, Islamisation, Sejahtera*

1. INTRODUCTION

Integration of knowledge and ideas in reality is increasingly becoming relevant as the call for transdisciplinary gains momentum in recent times especially in the face of many global changes. The search for long-term, sustainable solutions ought to be multidisciplinary in nature so as to provide transformative changes, rather than an incremental and linear alternative. For example, the severity of the climate crisis demands a change in the conventional framework to one that is more impactful with a radical outcome. Open innovative approaches that cover beyond technological outcomes to enable social, communal and institutional dimensions are imperative for a success sustainable change as the real-world drivers in the transformational process. This means the need for an integration of knowledge and ideas through both multi- and transdisciplinary approaches are crucial in delivering the oft quoted goal of “no one left behind” – a global objective in embracing the overarching goal for humanity as depicted in 2030 Agenda Sustainable Development Goals (SDGs) (1). At its core, the 2030 Agenda is aimed towards the 5Ps - People, Planet, Prosperity, Peace and Partnership in an integrated way connecting the dots with 17 SDGs that caters to the 5Ps. It highlights how the SDGs are an intertwined framework instead of a group of siloed goals since the progress on one P must balance and support progress of another. Delivery on the 5Ps greatly depends on promoting

and protecting the Dignity and Justice of the People, especially the poor and marginalised so that “no one *is* left behind” with an urgent call to action in a global partnership.

Similarly, other global threats to humanity too require broad-based complex problem-solving strategies unlike the traditional, siloed and incremental options. In other words, integration of knowledge and ideas as a transdisciplinary approach ought to be mainstreamed and recognised as a future-proof basis for quantum change. This article draws on the experience of the International Islamic University Malaysia (IIUM) to reflect upon the experiences involved in pushing the boundaries of knowledge and translating ideas through transdisciplinary undertakings aimed at developing and providing a wider range of alternatives to move forward. It involves a paradigm shift to co-create a “new” identity by integrating knowledge and ideas continuously. In so doing, explores new perspectives across the board, cutting across several related issues as well as challenges. Adopting a dynamic and progressive learning structure by aligning it to transdisciplinarity, and removing limitations facilitates the accomplishment at the desired integration of knowledge and ideas.

In the book *Consilience: The Unity of Knowledge* (2) by renowned socio-biologist E. O. Wilson, the author discussed methods that have been used to unite the sciences and the need to further unite them with the humanities. The word *consilience* (*eonsilience* refers literally to “a jumping together” of knowledge) was originally coined as the phrase “consilience of inductions” by William Whenwell (1841-1866). The word is said to come from Latin *consilient* from assimilated form of *com-* “with, together” and *-siliens* “jumping” (as in resilience) (3).

2. WHY INTEGRATION?

Wilson uses the term *consilience* (also convergence of evidence or concordance of evidence) to describe the synthesis of knowledge from different specialised fields of human endeavour. Basically, the text is said to a well-written manifesto for inter-disciplinary studies where Wilson proposes that fields of study may have become too rigid and isolated, at the expense of the “unity” of human knowledge. He argues for a wider relationship between arts, sciences, histories and religions.

In science and history, *consilience* is the principle that evidence from independent, unrelated sources can “converge” on strong conclusions (4). That is, when multiple sources of evidence agree, the conclusion can be very strong even when none of the individual sources of evidence is significantly so on its own. Most established scientific knowledge is supported by a convergence of evidence: if not, the evidence is comparatively weak, and there will probably not be a strong scientific consensus.

The principle based on unity of knowledge (whereby all the sciences form a unified whole), measuring the same result by several different methods should lead to the same answer (5). It should not matter whether one measures distances within the Giza pyramid complex by laser rangefinder, by satellite imaging, or with a metre stick – in all three cases, the answer should be approximately the same. For the same reason, different dating methods in geochronology should concur, a result in chemistry should not contradict a result in geology, etc. When results from different strong methods do appear to conflict, this is treated as a serious problem to be reconciled. For example, in the 19th century, the Sun appeared to be no more than 20 million years old, but the Earth appeared to be no less than 300 million years (resolved

by the discovery of nuclear fusion and radioactivity, and the theory of quantum mechanics); or current attempts to resolve theoretical differences between quantum mechanics and general relativity.

Integration of knowledge and ideas can also draw on contemporary theories of knowledge democracy that emphasise the importance of what the authors refer to as ‘co-construction of knowledge’ (6). It argues for the respect for knowledge-creating powers of local people and local organisations, and those arguing for transdisciplinarity and sustainability in higher education. It rightly highlights that knowledge creation has been liberated from the monopoly of universities, but it can be complex requiring in many ways a paradigm shift ‘with new forms of knowledge or recovered indigenous forms of knowledge coming to the fore.’ This in turn can lead to ‘much more relational (and less individualistic and scientific) modes of knowing, doing and being.’ As noted, it pushes the boundaries way beyond the oft-mentioned academic axiom of ‘publish-or-perish’ towards as holistic outcome in order to realise ‘The World We Want’ as envisaged by UNESCO.

In so doing, the integration of knowledge and ideas, according to Seanarae Smith (7) requires the activation of prior knowledge to aid in the comprehension of the concepts and ideas presented in the various types of text. Those who are sighted gain knowledge about many ideas or concepts through seeing things in the environment or participating in a variety of activities on a daily basis, thus providing them with lots of prior knowledge about concepts or ideas. Generally, therefore, to meet the goals of integration of knowledge and ideas one must be provided with meaningful experiences to assist them in the understanding of concepts or ideas in various text genres. This includes the use credible sources and materials (like braille for those needing one) as well as the appropriate technology. This is to enable the activation of the prior knowledge, and how to use resources that could further expand the knowledge in an integrated way and creating novel ideas.

2.1 Islamic perspectives

From the Islamic perspective, Saphic Omer (8) provides a refreshing interpretation when he wrote: “They [Muslims] need to revive the notions of holistic knowledge and education as vehicles of absolute and transcendent truth. The concepts of integration, rather than separation; inclusiveness, rather than contraction; harmony, rather than dichotomy; cooperation, rather than conflict; comprehensive excellence, rather than mediocrity; and dynamism, rather than lethargy, are the main thrusts that need to be subtly interwoven into the fabric of Islamic education. While doing so, sporadically learning from others and other systems in the East and the West should never be frowned upon. It yet should be welcomed, as wisdom is the lost property of a believer; wherever he finds it, he takes it – as expounded by the Prophet (pbuh).”

More importantly: “It is grossly inappropriate that the worldview, teachings and values of Islam are taught in Islamic departments and syllabi, but elsewhere it is business as usual, whereby alien-to-Islam ideologies and value systems are directly or indirectly applied and promoted. It is equally inappropriate that in the latter, Islamic precepts and solutions are indeed consulted, but only as secondary, inferior, outmoded and symbolic options. Imposed foreign irreconcilable paradigms remain nevertheless favoured and in force. Islam must not be a footnote in Muslims’ educational obsessions and systems.”

“It is high time that the thinking, according to which Islam is only for the purely religious sciences, purely religious institutions and establishments, and purely religious people, be rescinded once and for all. It is really astonishing why after all the events and episodes of the past century, Muslims still cannot come to terms with the fallacy and absurdity of such a philosophy. The philosophy was served as a poisonous chalice by the colonial masters and their numerous collaborators for their well-known agendas and programs. At present, such thinking is an unmistakable sign of intellectual and spiritual backwardness.”

Consequently, therefore, "integration of knowledge begets the harmony, peace, coherence and consistency of being. Whereas separation of knowledge and fallings-out between its diverse segments ultimately beget the disharmony, inconsistency, contradiction and despondency of being.”

Omer raises the dilemma as to “why in most parts of the Muslim world there still cannot be place, nor opportunity, to integrate in the realm of humanities Islam’s paramount principles of man, life, society, humankind, gender issues, history, geography, environment, law, politics, aesthetics and ethics; why in social sciences there is no room for integrating Islam’s overriding values and doctrines concerning human and social development, human behaviour and wellbeing, economics, psychology, health, sustainable development, justice, equality, linguistics, society, culture and epistemology; why in the diverse fields of science there is no place for incorporating Islam’s perhaps most fundamental tenets and teachings in connection with life and death, universe, earth, ecology, biology, matter, astronomy, mathematics and ethics.”

3. THE WEIRD WORLD

In response to this, we need to come to terms with the notion that is world today is largely Western-centric, best described by the acronym WEIRD, that is, Western- or White-biased, Economic-centric, Industry-driven, Reputation-obsessed and consequently Dehumanising, or a resultant inhumane world (9). The Covid-19 pandemic makes this clear for each item in the acronym. Yet the discussion today has not shifted much from what is considered "weird" in the real sense of the word. The pandemic controversies affecting humanity across the planet are the latest that comes to mind.

Both Muslims and non-Muslims around the world are increasingly thinking, planning, and working like the Westernised. The ideological orientation of modern western civilisation as determined by the Renaissance (14th-16th century) and the Enlightenment (Age of Reason) (17th-19th century) formed the larger framework of WEIRD. The first and second Industrial Revolutions in the 18th-19th century, and the 19th-20th century respectively were their immediate (ill)-consequences which at the same time, presented a future scenario of dynamic processes and continuous advances to shape the “new” world. Ideologies like capitalism and socialism were then introduced to further fracture the fabric of humankind, followed by modernism and postmodernism as the so-called culmination and a perfect embodiment of everything that represent the new civilisation and all its implications. Authors Naomi Oreskes and Eric Conway in the book, *The Collapse of the Western Civilisation* (10), points to the decaying state of affair with the emerging Anthropocene era (11) as well as the on-going Sixth Mass Extinction (12). These could be understood as crucial signals as to the end of history and the last human not least because knowledge(s) in all forms and genres failed to be integrated to arrive at a better understanding.

“Islamisation” is often used to argue as an option and an alternative method of inquiry to that of the West or WEIRD. It is a platform that offers different answers to questions about equality and justice, rights and duties, accountability and responsibility - or what it means to be human in an Islamic sense. Islam is not just a religion, but a complete way of life (*ad-din*) leading to a higher order lifestyle and civilisation. It produces a way of looking at the world and creating it into a holistic and integrated way of knowing, being, living and doing. Since for Muslims knowledge (*‘ilm*) is sacred regardless of the magnitude of the challenges they are in, seeking them and living by their provisions is the goal as the vicegerent of God on earth, or *Khalifah*. It is an obligation (*amanah*) to be fulfilled for *rahmatan lil ‘almin* (mercy to all). For Islam, knowledge is synonymous with faith, light, and virtue. Ignorance is the opposite. As Islam does not distinguish between spiritual and material realms, the mind-matter or physics-metaphysics divide does not exist in Islam. The binary complements each other for the realisation of a higher order of truth, meaning, and experience for which the world was created.

4. EUROCENTRICITY

Thus, being Islamic is another way of perceiving the world in its own right. The categories of knowledge emerging from the West, such as the natural sciences, social sciences, and humanities, are both a product and an embodiment of this desire to know; or want to ask questions in exploring knowledge and ideas in the context of human history within the Muslim faith. Some scholars even proposed re-examining the relationship between Muslim civilisation and the written word described as the Islamic heritage ~~to be re-read~~ and subjected to a critical analysis. Others have shown that many Western categories of knowledge are inherently Eurocentric because they promote Western growth and material prosperity at the expense of the rest of the world, in contrast to the precept of *rahmatan lil ‘alamin* (13). Though many of these have evolved and changed due to the pressure of the over time, but some have become more, not less, Eurocentric driven by the advances of (high) technology. Notably the notion of “white” artificial intelligence. Just as the notions of modernity represent a more sophisticated form of Eurocentrism than colonialism, the evolution of knowledge categories has made them likewise.

So not surprising that Eurocentrism prevails everywhere, if not so easily discerned. The West is likely to stay given its advanced science, technology, and warfare, at least its stranglehold on the minds of many of the former colonies. Similarly, Muslims could not reject everything served by and in the name of the West and its civilisation, by living aloof from what is going on. While it is impractical for Muslims to reject them altogether and start over in relation to these aspects, sadly, most are not even aware of the mindset crisis that they are in. This is despite, according to Samuel P. Huntington of *The Clash of Civilizations and the Remaking of World Order* fame: “The West won the world not by the superiority of its ideas or values or religion [...] but rather by its superiority in applying organized violence. Westerners often forget this fact; non-Westerners never do.” (14). Although Islam does not sanction religious formalism, theological fatalism, and defeatism, likewise, Muslims cannot import, and accept and ape everything that of the West, especially like that described by WEIRD. To do so, would tantamount to renouncing Islamic worldview, ethics, and values and disavowing Islamic identity as form colonialism. That said, Muslims could reject unforgiving components and integrate the compatible ones in the attempt to live as expected of good Muslims instead. In this, the Andalusian experiences at the height of the Muslim civilisation around the 10th century served as a remarkable example in the present era.

More specifically in the context of the Bayt al-Hikmah or the well-known House of Wisdom (15) referred to as a major public academy and intellectual centre beginning from the 10th century Baghdad (16). Then many of the intrinsic aspects and qualities of Greek (western) civilisation that were unproblematic were readily adopted. Aspects that are deemed problematic were rendered "useful", after undergoing the appropriate assessments and modifications before being they are integrated into the Islamic knowledge ecosystem. Today, this is generally understood as "Islamisation" of knowledge and ideas, a term coined in the early 1980s. But have in there much earlier to the days of the Prophets of Islam (pbuh). The more problematic ones were subjected to the more complex and intensive "Islamisation" process. Only features that were found to be irreparably un-Islamic, were kept outside of the Islamic knowledge domain as measured by the "revealed" Islamic sources and those interrelated based on the credibility of the evidence(s).

5. VARIETIES OF ISLAMISATION

The concept of Islamisation of knowledge which gained momentum in the 1980s can also be attributed to the changing global consciousness due to the "resurgence of Islam" barely some 10 years before. It somewhat coincided with the First World Conference on Muslim Education in Makkah in 1977 (17). Since then more scholars have been engaged deeply in this epistemological, social and political issue. Secularism and the great speed with which secularisation has engulfed the Muslim world stirred Muslim intellectuals from their indifference and motivated them to act. The amount of discussion that was generated led to an extensive body of literature on the subject spanning the social, human, and natural sciences, and driving a pathway to an integration of knowledge and ideas internationally.

Despite the massive discussion and literature, they have not struck a common chord among themselves. All scholars speak the same language, and their intentions and goals are expressed in similar identities. But their methods, approaches, and strategies remain irreconcilable somehow. According to Abdul Rashid Moten in his book, *Varieties of Islamisation* (18), it is almost impossible to find two scholars who agree on the mere definition of the Islamisation of knowledge, its scope, and approach. Another notable feature is the "acceptance" of definition and methodology of Islamisation that lasted only so long as its proponent holds an authoritative position in an organisation or institution. Otherwise, this phenomenon renders instability and disagreement on the framework which seriously hampered the progress in harmonising the various meanings, definitions, and interpretations related to the Islamisation project, and impeding the integration process at the same time, even among the relevant scholars. Some from among them eschewed a strictly inclusive and exclusive position, while others speak of a broader label intended to convey the more general sense of the term, and its priorities (19). That said, most would agree that modern education is defective as it downplays morality and values and relies excessively on empiricism with little or no consideration for spiritualism. Meaning that Islamic revivalism initiated on the "Islamisation of knowledge" is not a mere slogan, a symbol, or empty rhetoric.

Of late, the State of Perak's Sultan Nazrin Shah was reported to say that "higher education today in general has failed to instil integrity in scholars, which has led to corrupt leaders and has hampered national development." He said that development of the nation needs holistic progress in all areas which looks beyond economics and infrastructure (20).

"We must be clear that a nation's development is linked not only to how much money we have or how many modern buildings and highways we can construct.

"There are countries with the finest state-of-the-art buildings that money can buy, yet where unemployment and poverty – in the sense of economic as well as spiritual poverty – are still widespread," reminded Sultan Nazrin. During the Perak state-level *Maulidur Rasul* 1438H celebration, the Sultan said: "When power was regarded as an opportunity to fulfil personal interest and not as a trust, the functioning of the government would be impaired and ultimately resulted in its downfall and collapse of a civilisation."

In this regard, universities in Muslim countries in particular should take heed of this seriously to produce a generation of scholars who would probe the boundaries of knowledge and synchronise modern knowledge with the teachings of the Qur'an and sunnah in a holistic rather than piecemeal manner. These institutions must strive to achieve correct perspectives of life, the universe, and human. *Tawhīd* and its concomitant principles of equality, integration (*ummah*), knowledge, justice, and the decision by consultation come to play an important role in the story of humankind in the future. It argues that Islam is a way of life in which spiritual and temporal lives are fused, and has something important to offer about how society should be ordered and implemented in some sustainable and transformative ways. Today, when Muslims stand at the crossroads of their cultural and civilisational consciousness and performance, the subject of integration of knowledge and its sciences becomes overriding. It perhaps denotes the most critical issue that must be addressed and resolved. There is no aspect of human physical, emotional, psychological and spiritual existence that Islam did not address, one way or another. A complete [integrative] paradigm has been revealed by the Omniscient Creator and Sustainer of humans, life and universe. Using it as a developmental blueprint is incumbent upon all Muslims (8). In a nutshell, the WEIRD needs to quickly give way to a more wholesome, inclusive, sustainable or *sejahtera*, equitable and resiliency (WISER) framework that will lead to a just and humane world as a higher purpose of life. It calls for social cohesiveness and intellectual solidarity that public could benefit from through a meaningful integration of knowledge and ideas, humanely.

6. SEJAHTERA

Sejahtera as cited above is another integrative concept coming from the traditional or indigenous cultural practices. It has a more complex and comprehensive meaning than the word "wellbeing" – as often rendered which is uni-dimensional in character. *Sejahtera* is indeed a multi-layered (read, integrated) concept that conveys a deeper meaning than any single word could convey. As such, it has no equivalent in other languages, neither can it be accurately translated into different languages due to its close cultural leaning and nuances to the local Malay(sian) tradition.

To understand it from a one-dimensional perspective is to miss the whole point and can even give a very distorted meaning instead. What would be most sorely missed is the qualitative-cum-intangible aspects that are today's major concern. Health, especially mental health, for example, is not just about the absence of disease or illness that may be quantifiable, one way or the other. Instead it a unified knowledge and idea which is universally recognised as the state of socio-emotional being, sans "physical" diseases, that could lead to a situation of *tidak sejahtera* (non-*sejahtera*; read, depression, stress, violence) without any clear signs and symptoms until perhaps it is too late to deal with. In the days of the Covid-19 pandemic, the

elements of *sejahtera* must be fully understood, internalised and practised because it is the fountainhead of good values/virtues that are innately human (and spiritual/divine too) that will lead to a righteous and balanced way of life in nurturing the “whole” human person. In no uncertain terms it forms the basis of the Malaysian national education system from pre-school to the university in a continuous, holistic and integrated manner (as enshrined in the national education philosophy.)

Until this happens integratively, *sejahtera* in all its forms and taglines are nothing but empty clichés with an outcome that may fall terribly short of what the word is supposed to truly convey in the context of local and indigenous knowledge qualitatively as a way of life embracing in-depth values and virtues. Indeed, quality of life (QoL) as a concept is another area where *sejahtera* is predicated on as “socio-economic wellbeing” alone is inadequate to address the issue (21). It fails to grasp the full meaning of the “whole” human person as a life form. “Life” as in QoL is invariably related to the “spiritual being” first rather than the material being as economically defined, understood and determined. ~~In short~~ Otherwise, values/virtues such as happiness, love and mutual respect, to name a few, that “makes” the person human is totally marginalised, if not lost. Any learning centres therefore should aim to achieve *sejahtera* in creating a better world and an even better future for the entire humanity in the context of mercy to all as mentioned above. Learning is not just about what we want to be or work in the future, but also including the learning about nature and environments around us as part of the WISER (22) framework.

In summary, like all traditional worldviews, *sejahtera* is about the rebalancing life on the planet earth until the end of our time (23). It is not a concern directed to a particular, but all people the world over. Foremost, it is about keeping a fine balance in all the ten aspects that make up *sejahtera* described as SPICES. ‘S’ referring to the *Spiritual balance*, ‘P’ stands for *Physio-psychological balance*, ‘I’ for *Intellectual balance*, ‘C’ representing *Culture balance*, also *Cognitive balance*, ‘E’ pointing to *Ecology, Ethical, Environmental and Economic balances* and lastly, ‘S’ - *Societal balance*. In all, SPICES is in itself about maintaining an overall balance integratively covering aspects of life as a whole which is truly necessary to co-create a well-balance life that we all sought after.

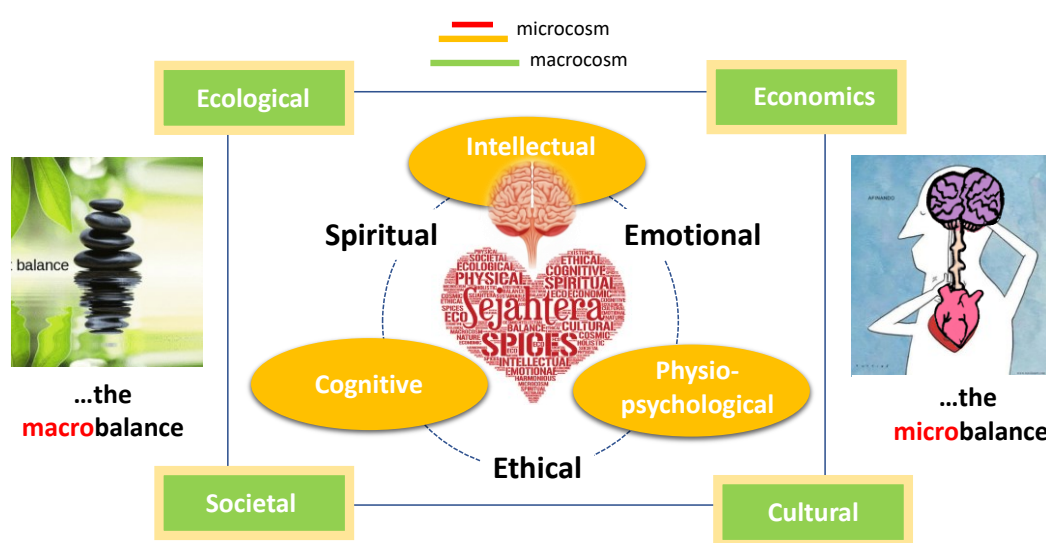


Fig. 1. The 10 elements (SPICES) of *Sejahtera* (21)

The ‘SPICES’ approach, which goes beyond the 5Ps (People, Planet, Prosperity, Peace and Partnership) as linked to the 17 SDGs raises wider awareness and participation among the community about the pre-existing indigenous concept of sustainability in their culture allowing for better cultural connectedness to the idea and philosophy (albeit forgotten) since time immemorial. Integrating the concept through co-creation and co-learning with the community would give all parties a sense of ownership, even kinship, and make the changes easier to implement. In this sense, the integration of knowledge and ideas must be open to broadening the knowledge system by integrating relevant traditions or even indigenising the knowledge base as part of the process to decolonise of knowledge (24). It underscored that indigenous knowledge and wisdom have had their own uniqueness, strength, and relevance for the local community over the years, long before the Brundtland Report was commissioned.

It is human-centric in that it spans the macrocosmic-microcosmic nexus. It is macrocosmic because it relates humans to the external environment – nature and fellow beings, including other species. It is microcosmic because it embraces the ‘self’ and the inner (esoteric) dimensions, including spiritual consciousness. Taken together the status of *sejahtera* can be described as a balanced lifestyle as shown in Figure 1. Not only must each aspect be in balance in itself, but also each must be in balance with all the rest to achieve an overall state of well-being that is lasting (sustainable) over generations. The last point is pertinent because it implies that sustainability is not a new concept that emerged in the 1980s following the well-acknowledged Brundtland Report. Arguably, sustainability and integration, is an ancient concept in many indigenous traditions that has been overtaken and lost in the drive toward modern (unsustainable) development. Ultimately, development becomes purely a physical venture and no longer focuses on building ‘collaborative relationships’ between humans, the community, the environment, and the ‘creator’ to co-exist as an enduring lifestyle. In so doing, the fine state of balance is severely offset by a hefty price tag for future generations. In short, the embodiment of *sejahtera* goes beyond the conventional 5Ps.

7. CONCLUSION

In order to have the fullest impact on community, local and global, knowledge can no longer be fashioned into siloes of all sorts and styles. In so doing, becomes disconnected, and irrelevant in seeking better solutions for humanity and its shared heritage. In much of the Asia-Pacific region, this can still be traced in several communities – old and new, traditional and modern, central and peripheral (25). This is the reality that many have forgotten, if not totally lost, due to commodification of knowledge in the pursuit of material growth that dehumanises the human persons. Knowledge is predicated more for “livelihood” driven by the logic of economics, rather than for higher purpose of living driven by the vital forces of life based on humanitarian values, dignity and justice as its ultimate outcome through peaceful co-existence in a holistic, balanced and harmonious ways. The International Journal of Integration of Knowledge is an attempt to provide such a platform that cuts through all the artificial barriers of disciplines. It aims “to promote excellence by providing avenues for multidisciplinary [including transdisciplinarity] perspectives” in co-creating new and novel knowledges (sic) discourse to connect all the dots for the betterment of human lives and civilisation as advocated by the IIUM vision statement in conjunction with its 40th anniversary.

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EXPLORING THE TRADITIONAL THERAPY FOR CATARACT BASED ON THE MALAY MEDICAL MANUSCRIPT: A SCOPING REVIEW

NUR SYAHIRA SALEHUDDIN AMIN, NUR AMANINA M. TUSIDAN,
AND NOOR EZAILINA BADARUDIN

*Dept. of Optometry and Visual Science, Kulliyyah of Allied Health Sciences,
International Islamic University of Malaysia, Pahang*

**Corresponding author: ezai@iium.edu.my*

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ABSTRACT:

In the ancient medical manuscripts, there were many medical remedies and ingredients used to treat certain diseases. However, the presence of *materia medica* in medical manuscripts to treat cataract is still intriguing and has not been fully explored. This review aims to identify the most common material medica and its formulation in treating cataract in the Malay medical manuscript as well as to identify its published scientific support.

Method: This study involves a qualitative descriptive analysis on Malay Medical Manuscripts and articles of scientific journals to obtain data, based on a scoping review.

Results: The common *materia medica* in cataract treatment stated in the Malay Medical Manuscripts are citrus and biles. The frequency of both ingredients being mentioned in the manuscripts are 3 times each across 6 Malay Medical Manuscripts, which contain 10 formulations on cataract.

Conclusion: The commonly mentioned material medica in the manuscript such as citrus and biles may become a potential material for further scientific investigation in treating cataract.

KEYWORDS: *Cataract, Malay Medical manuscripts, Citrus, Biles.*

1. INTRODUCTION

Manuscript is an old book or handwritten document on various topics in the times before printing was invented to record the findings, lifestyle and historical events then. Manuscripts are also proof of the achievements of one civilization. Malay manuscripts are proof of the achievements of Malay civilization and one important document to be explored is the Malay Medical Manuscripts (MMM).

According to the World Health Organization (2021), cataract is one of the leading causes of vision impairment and blindness with 94 million people diagnosed globally. Mohamad Aziz Salowi et al. (2015) mentioned that cataract is one of the leading causes of blindness in Malaysia with 39% in prevalence. Chew et al. in 2018 suggested that the percentage of getting blind due to untreated cataract in Malaysians who are more than 50 years old is 58.6%.

As specified by the World Health Organization (2022), cataract is a clouding of the lens of the eye that normally affects vision and commonly causes blindness and visual impairment. The current sole treatment for this condition involves surgery where the cataractous lens is removed and replaced with an artificial intraocular lens. However, not all cataract patients are suitable to undergo such surgical procedure especially those with high risk of post-surgery complication such as pseudoexfoliation in Somalia and India, onchocerciasis in Sudan, and angle-closure glaucoma in Asia (Gogate & Wood 2008). Furthermore, there is no alternative or non-surgical treatment provided for treating cataract at present. Hence, the objective for this review is to identify the commonly stated *materia medica* in treating cataract from MMM and also to identify the published scientific proof to support the usage of the said material medica in treating cataract through scoping review.

2. MATERIALS AND METHODS

Qualitative descriptive analysis was employed as a study design with comparative analysis conducted through scoping review. Scoping review is a method used to synthesize research evidence and categorize existing literature in a certain field in terms of its nature, features, and other categories.

Selection of Malay Medical Manuscript for data extraction

The selection of the manuscript was based on its readability, physical condition, and completeness. Readability refers to the handwriting and condition of ink which indicates whether the text is readable. Physical condition refers to the manuscript's physical state in which a frail manuscript may not be included. Completeness refers to the continuation of the text from a page to a page that ensures the pages' correct order with no missing text. Based on the above-mentioned criteria, *jawi* written "Kitab Tib. MS 747", MSS 3136 and "*Pelbagai Azimat dan Perubatan 58 Hal Lengkap*", were selected. In addition, translated books on the MMM by Mohd Affendi Mohd Shafri namely "*Kitab Perubatan Melayu Sari Segala Ubat: Tabib Dirajja Kesultanan Pontianak*", "*Kitab Perubatan Melayu Al-Rahmah Fi Al-Tibb Wa Al-Hikmah: Abbas Kuta Karang Aceh Dar Al-Salam*" and "*Kitab Perubatan Melayu Tayyib Al-Ihsan Fi Tibb Al-Insan Pembukaan Mata Hati pada Bicara Mengubati: Wan Ahmad Ibn Wan Muhammad Zayn Al-Fatani*" were also chosen.

The word "*Fasal ini*", indicates different chapters and diseases in the manuscript. The phrase "*Sebagailagi*" represents other formulations for the same disease. Therefore, the formulation mentioned in the manuscript was extracted, tabulated, and numbered using the Fx format. The F refers to the formulation while x refers to the number of the formulation (depicted in the table of results). The common ingredients were chosen based on the frequency of the ingredient being mentioned in the manuscripts.

Comparative analysis through scoping review

After the extraction of data, each plant, animal, and mineral scientific name was identified through the Google search engine. The comparative analysis was accomplished by using Google Scholar, PubMed, ResearchGate, and ScienceDirect where the keywords including "plant scientific name", "animal scientific name", "mineral scientific name", "cataract" and "eye" were used to identify the relevant articles. The resulting articles were screened by their title at first and then by their abstract, before being further analysed, regardless of the types of studies and not excluding ethnopharmacology study or an empirical experiment, as long as the articles were related to the mentioned ingredients as a treatment of cataracts.

2.1. RESULT

Data extraction

Based on the MMM, the most common ingredients to treat cataracts are citrus and biles. Five thousand articles were displayed by the search engine using the respective keywords. However only 5 of them studied the relation between citrus and cataract and hence chosen to be discussed in this review. While for bile, only one research relates it to cataracts. There are 10 formulations with 29 ingredients mentioned across six MMM for the treatment of cataracts. There are a total of ten formulations identified, with one single formulation and 9 compounded formulations from the Malay medical manuscript.

1. Translation of the formulations

Table 1 Translation of the formulations.

Formula	How to use	References
F1	<p>Take fruits of moringa, roots of <i>keremak</i> and the rhizome of turmeric. Burn the items on a piece of dulled machete and mix with nutmeg and key lime juice. Rub on the eyelid, and let it seep into the eye bit by bit.</p> <p><i>Ambil buah kelor, akar keremak, ibu kunyit bakar bersama parang puting kemudian diasah dengan buah pala dan air limau dan sapukan kepada mata biar masuk sedikit demi sedikit ke dalam mata.</i></p>	Mohd Shafri (2021)

Formula	How to use	References
F2	<p>Peeled the Buffalo eye citron and cut it into three pieces and mixed it with three pieces of coarse salt. The mixture is boiled and left overnight outside. The mixture is to be used as eyewash in the morning.</p> <p><i>Sebagai lagi ubat mata kabur ambil limau kerbau kupas kulitnya belah tiga bubuh garam tiga buku maka rebus setelah masak maka embunkan kemudian pagi-pagi basuhkan pada mata biar masuk pada mata itu sedikit jika berselaput sekalipun baik juga, insyā Allāh Ta'ālā mujarāb.</i></p>	Mohd Shafri (2021)
F3	<p>To make the eyeliner: mix the <i>tutiya</i> that has been broken into pieces with the juice from kaffir lime and a quarter of piper. After that, blend everything with “<i>pheut kakap</i>”. Apply it as eyeliner or blow it into the eye. Stop applying the medication if pain occurs for two to three nights until the pain goes away. Then, continue using it as eyeliner.</p> <p><i>Diperbuat celak ini: diambil tutiya dipecah-pecah akan dia dengan air buah limo yakni buah mentul dan satu rubu dirham lada. Setelah itu maka dipipis semuanya dengan pheut kakap, kemudian maka dibubuh akan celak atau dihambur pada matanya. Dan apabila hasil daripadanya sakit atau bertikam-tikam yang sangat dalam dua mata, maka hendaklah dinanti jangan dibubuhi akan dia sekira-kira qadar dua malam atau tiga malam hilang sakitnya. Setelah itu maka diulangi pakai bercelak dengan dia hingga sembuh, in shaa Allah Taala.</i></p>	Mohd Shafri, and Muhammad Yahya (2017)

Formula	How to use	References
F4	<p>Fill in the goat's bile with seven white pepper seeds, then neatly tied and placed at the center of the house ridge for seven days. One white pepper seed is to be crushed with water and used as an eyedrop. This is to be performed one seed per day, both morning and evening, and shower with it twice a day until day seven.</p> <p><i>Masukkan 7 butir lada sulah ke dalam hempedu kambing kemudian gantung pada tulang bumbungan rumah sampai 7 hari kemudian lumatkan lada sulah dan tambahkan sedikit air kemudian titikkan pada mata. Apabila sampai tujuh hari ambil lada sulah itu sebutir pirik lumat-lumat beri air sedikit maka titikkan pada mata itu pagi dan petang sebutir sehari dan mandinya dua kali sehari hingga tujuh hari mujarāb.</i></p>	Mohd Shafri (2021)
F5	<p>Pound <i>lu'lu</i> or <i>aqiq</i> stone. Use it as eyeliner every morning and evening 5 days in a row or use <i>misk</i> or <i>kulit gewang</i> that has been “grilled” and pounded then use it as eyeliner or use rooster blood or its biles that are put in the eyeliner case that is made of silver or with <i>qatuna</i> seed that is finely pounded for one dirham then mixed it with one dirham of sukkar or quince seeds and peeled cotton seed and finely pound the sukkar stone and mixed it altogether or with <i>anzarut</i> for children’s eyes. Use it as eyeliner.</p> <p><i>Apabila dicelakkan mata itu dengan lu'lu yang ditumbuk atau; dengan batu 'aqiq yang ditumbuk, dicelak pada tiap-tiap pagi dan tiap-tiap petang lima kali di dalam lima hari berturut-turut atau; dengan misk atau; dengan kulit gewang yang dibakar dan ditumbuk, dicelak dengan dia padahal ia panas beberapa kali atau; dengan darah ayam jantan beberapa atau; hempedunya yang dibubuh di dalam bekas pencilak daripada perak atau' dengan biji qatuna iaitu biji aling lengkung yang ditumbuk halus-halus satu dirham dan dicampur dengan sukkar satu dirham; atau dengan biji</i></p>	Mohd Shafri (2019)

Formula	How to use	References
	<i>safarjal; dan biji kapas yang dikobek kulit keduanya dan sukkar batu ditumbuk sekaliannya halus-halus dan dicampur dan dicelak dengan dia dan ini mujarab sahah atau; dengan anzarut pada mata kanak-kanak yang tumbuh nescaya memberi manfaat sekaliannya itu</i>	
F6	<p>Take kulit lawang and chew. Take a thin piece of cloth and patch it on the eyelids. Blow the chewed kulit lawang from outside with one full blow. Repeat the steps until the cataract is gone.</p> <p><i>Maka ambil kulit lawang, mamah, ambil kain yang nipis, maka tampalkan pada kelopak mata. Maka hembus dari luar dengan kulit lawang yang dimamah itu sehabisnya nafas kita sehingga hilanglah maka berhenti. InsyaAllah ta'ala 'afiyat olehNya.</i></p>	Nadzirin (2021)
F7	<p>Take a fistful of “kayu kelumpang” root about the size and length of a finger. Then, take white incense, keep in mouth, and blow the kayu kelumpang root to the affected eyes for seven days. When the eye clouding becomes thinner, do not stop until it vanishes.</p> <p><i>Sebagailagi ubat mata bular maka ambil akar kayu kelumpang kira-kira besar jari dan panjang segenggam. Maka ambil kemenyan putih, kulum kemenyan, maka hembus akar kelumpang itu kepada bular mata itu barang tujuh hari. Apabila ada nipis sedikit, jangan khali sehingga hilanglah, maka sudah. InsyaAllah ta'ala.</i></p>	MSS 3136 (no date). [Kitab Tib]. Pusat Kebangsaan Manuskrip Melayu (MSS 3136). Perpustakaan Negara Malaysia, Malaysia.
F8	<p>Take dill and false daisy, and blend them with milk from a breastfeeding woman with a child that has not grown teeth yet. Then squeeze it into the affected eyes.</p> <p><i>Atau ambil adas manis dan bunga urang-aring yang gugur, maka pipis. Airnya air susu kanak-kanak yang belum tumbuh gigi. Maka perahkan pada mata itu. InsyaAllah ta'ala 'afiyat olehNya.</i></p>	Nadzirin (2021)

Formula	How to use	References
F9	<p>This is the remedy for cataracts. Take aloe vera, peel off the skin, then slice into seven parts. Wash seven times, seven more slices, then wash them and pour water together with a bit of alum. Put it on the affected eyes. Do not hope for a speedy recovery and do not give up. InsyaAllah will be granted recovery.</p> <p><i>Sebagailagi ubat bular. Bahawa ambil lidah buaya, maka kupas buang kulitnya, kemudian hiris tujuh hiris, maka basuh 7 kali lagi, 7 hiris 7 kali lagi, dibasuh kemudian bubuh air pula, maka bubuh tawas sedikit kepada mata yang tumbuh itu dan jangan menghendak segeranya hilang hingga jangan jemu daripada berubat. InsyaAllah ta'ala 'afiyat olehNya.</i></p>	Nadzirin (2021)
F10	<p>Take the skin of a young chelated banana, used it as eyedrop. After that, take “pegaga kelusak” leaves also used it as eyedrop.</p> <p><i>Ambil kulit pisang kelat yang muda titikkan pada mata itu setelah sudah maka ambil daun pegaga kelusak perahkan pada mata itu pula akan penawarnya sebagai lagi hikmah akannya.</i></p>	MS 747 (no date). [Kitab Tib]. Pusat Kebangsaan Manuskrip Melayu (MS 747). Perpustakaan Negara Malaysia, Malaysia.

2. Comparative analysis

Out of the plant-based, animal-based and mineral-based ingredients mentioned in the formulations for cataract, only four material medica have scientific evidence related to cataract, namely *Moringa oleifera*, *Curcuma domestica* Loir, *Citrus hystrix* and *Lates calcifier*. Each ingredient was further analysed in comparison with contemporary studies.

Table 2 List of ingredients for the most common ingredients and their pharmacological actions found in contemporary studies that are related to cataract.

Disease	Formulation number	Ingredients			Type of study	References
		Vernacular name	Part	Scientific name		
Cataract	F1	<i>Kelor</i> (Moringa)	Fruit	<i>Moringa oleifera</i>	Used to delay hydrogen peroxide induced cataract formation (in vitro) Used for anticataract in glucose induced cataract.	Qi et. al (2019) Kurmi et. al (2014)
		<i>Keremak</i> (Morning glory)	Roots	<i>Ipomea digitata</i>	No evidence	-
		<i>Kunyit</i> (Turmeric)	Rhizome	<i>Curcuma domestica</i> Loir	Therapeutic potential of curcumin in eye diseases (Review)	Radomska-Leśniewska et. al (2019)
		<i>Buah pala</i> (Nutmeg)	Fruits	<i>Myristica fragrans</i>	No evidence	-
		<i>Limau nipis</i> (Key lime)	Juice	<i>Citrus aurantifolia</i>	No evidence	-
	F2	<i>Limau kerbau</i> (Buffalo eye citron)	Fruit	<i>Citrus medica</i>	No evidence	-

Disease	Formulation number	Ingredients			Type of study	References
		Vernacular name	Part	Scientific name		
		<i>Garam</i> (Salt)	-	<i>Sodium chloride</i>	No evidence	-
	F3	<i>Tutiya</i>	-	<i>Copper sulphate</i>	No evidence	-
		<i>Buah limo/ limau purut</i> (Kaffir lime)	Juice	<i>Citrus hystrix</i>	Used as antidiabetic, and anti-cataract (in vivo)	Umran et. al (2020)
		<i>Lada</i> - cannot be identified as the authors did not mention the specific type of “lada”.	Fruit	<i>Piper</i>	No evidence	-
		<i>Ikan kakap</i> (Snapper)	Biles	<i>Lates calcifier</i>	Therapeutic uses of animal biles in treating various eye diseases (Review)	Wang and Carey (2014)
	F4	<i>Kambing</i> (Goat)	Biles	<i>Lates Capra aegagrus hircus</i>	No evidence	-

Disease	Formulation number	Ingredients			Type of study	References
		Vernacular name	Part	Scientific name		
		<i>Lada sulah</i> (White pepper)	Fruit	<i>Piper nigrum</i>	No evidence	-
	F5	<i>lu'lu</i> (Pearl)	-	-	No evidence	-
		<i>Batu aqiq</i> (Quartz)	-	<i>Silicon dioxide</i>	No evidence	-
		<i>Misk</i> (cannot be identified)	-	-	No evidence	-
		<i>Kulit gewang/ siput Mutiara</i> (Pearl oysters)	Shells	<i>Pinctada maxima</i>	No evidence	-
		<i>Ayam jantan</i> (Rooster)	Blood	<i>Gallus gallus</i>	No evidence	-
		<i>Ayam jantan</i> (Rooster)	Biles	<i>Gallus gallus</i>	No evidence	-
		<i>Qatuna</i>	Seed	<i>Plantago ovata</i>	No evidence	-
		<i>Safarjal</i> (Quince)	Seed	<i>Cydonia oblonga</i>	No evidence	-

Disease	Formulation number	Ingredients			Type of study	References
		Vernacular name	Part	Scientific name		
		<i>Kapas</i> (Cotton)	Seed	<i>Gossypium hirsutum</i>	No evidence	-
		<i>Anzarut</i>		<i>Astragalus sarcocolla</i>	No evidence	-

3. DISCUSSION

Based on the MMM, there are several ingredients that have been used to treat cataract with citrus and biles as two most commonly mentioned. Only six MMM were available when this review was conducted. Due to this limitation, citrus and biles that are repeated three times each in the MMM become the most common ingredients mentioned in the respective manuscripts. There are three types of citrus that have been mentioned which are *Citrus aurantifolia*, *Citrus medica*, and *Citrus hystrix*. Citrus fruits have long been valued as part of a nutritious diet which is a rich source of nutrients that contains higher amounts of vitamin C, citric acid, minerals, and flavonoids (Baghurst, 2003). According to Turner and Burr (2003), "Citrus fruits contain a variety of vitamins, minerals, fibre, and phytochemicals such as carotenoids, flavonoids, and limonoids, which appear to have biological activities and health benefits."

Kulkarni et. al (2017) suggested that the ethanolic extract from orange peel possessed antioxidant and anticataract activity due to the presence of flavonoids. The scientific name of an orange is *Citrus aurantium*. The study was conducted by incubating the isolated goat lenses in artificial aqueous humor and divided into four experimental groups. The photographic evaluation was done to measure the incubation lens opacity. The authors found that there was significant inhibition of cataractogenesis of the lens with the presence of orange peel extract. This study suggested that the ethanol extract of orange peel possesses anticataract activity.

A study by Nakazawa et. al (2019) showed that an extract of α -glucosyl hesperidin from citrus plant significantly reduced the severity of selenite-induced cataracts in a rat. Hesperidin is a natural flavonoid with powerful antioxidant properties. In this experiment, the α -glucosyl hesperidin was dissolved in the phosphate-buffered saline and later fed to the rats via a feeding tube. The authors believed that oral consumption of α -glucosyl hesperidin was able to delay the onset of selenite-induced cataracts as the hesperidin could significantly reduce the number of cells undergoing apoptosis in the lens epithelial cells. Furthermore, hesperidin-standardized *Citrus hystrix* leaf flavonoids-rich extract (CLE) had also shown a significant reduction in diabetic cataract development (Umran et. al 2020).

According to Kaur et. al (2017), a diet rich in antioxidants, Aldose Reductase Inhibitors, antiglycation agents, and inhibitors of lens epithelial cell apoptosis can prevent the formation

of cataracts. Citrus is one of the fruits that contain all the dietary phytochemicals that have been mentioned. From this literature review, the authors believed that oral administration of citrate has the potential to delay the development of cataracts.

The Blue Mountains Eye Study (BMES) by Tan et. al (2008) suggested that the higher intakes of antioxidants such as vitamin C or the combined intake of antioxidants such as vitamins C and E, beta-carotene, and zinc had long-term protective associations against the development of nuclear cataract in the older population. BMES is a population-based cohort study of vision, common eye, and systemic conditions in a population aged 49 years old and above. After 5 and 10 years, the surviving participants attended follow-up examinations to answer questionnaires regarding self-administered food frequency and have detailed eye examinations including retinal and lens photography to collect medical and demographic history.

The next common material medica that has been mentioned in the MMM is biles. There are three types of animal biles which are fish bile, goat bile, and chicken bile. According to Wang and Carey (2014), biles contain bile acids, bile pigments such as bilirubin and biliverdin, cholesterol, proteins, and also antioxidants such as bilirubin, glutathione, vitamin E, and melatonin. From their research of Chinese *materia medica*, it is reported that fish bile is effective to treat cataracts. The author also mentioned that the patient will take the medication in the form of pills. Specifically, the mentioned fish in the Chinese *materia medica* is the black carp fish. Modern research on animal biles for the treatment of cataracts is still limited. Only one article is found that relates biles to the treatment of cataracts.

There are dissimilarities between the traditional and contemporary suggested cataract treatment. Generally, the formulations in MMM involve more than a single ingredient whereas the contemporary formulation requires only a single ingredient. Therefore, the extraction methods are different. Due to current advances in technology, researchers can conduct experiments on one single ingredient and even focus on only one single molecule extraction, which allows the researchers to focus on the effect and benefits of a specific ingredient. In contrast, during ancient times, researchers were experimenting with many ingredients to determine the best formulation for the best result. Route of medication is also different between them where the MMM mostly suggested for topical application and not orally as mostly suggested in the contemporary medication, since oral consumption has the most effective effect on the improvement. Nevertheless, oranges, *Citrus aurantifolia* and other types of citruses do share similar phytochemical between them and the most important one for cataracts is named flavonoid.

4. CONCLUSION

At present, there is no article mentioning the side effects of citrus and biles as a treatment for cataracts. In this modern era, it is highly recommended for scientists to conduct more research on these two ingredients, especially clinical trials on humans to identify the effectiveness of these ingredients on cataract treatment.

The aim of this review is to identify the common material medica and its formulation in treating cataract in the MMM as well as to identify its published scientific support. Perhaps

the pharmacological aspects would be further investigated in subsequent studies. The findings from this study may become the first important step in identifying and recognizing natural resources in treating cataracts.

There are still no other options for the treatment of cataracts apart from surgery. Based on the MMM, the most common ingredients to treat cataracts are citrus and biles. Out of 5000 papers related with citrus and cataracts, only five papers were chosen to be discussed in this review. While for bile, only one research relates it to cataracts. There are 10 formulations with 29 ingredients mentioned across six MMM for the treatment of cataracts. Continuous studies are highly recommended to investigate the effectiveness of these two ingredients in non-surgical cataract treatment.

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PATIENT CHARACTERISTICS AND RISK FACTORS CONTRIBUTING TO DISEASE PROGRESSION AMONG HOSPITALISED PATIENTS WITH COVID-19: LESSON FROM MALAYSIA

NURUL SYAFIQAH OTHMAN, CHE SURAYA ZIN, NOR HIDAYAH MOHD TAUFEEK

Department of Pharmacy Practice, Kulliyah of Pharmacy, International Islamic University Malaysia (IIUM), Jalan Sultan Ahmad Shah, 25200 Kuantan, Pahang, Malaysia

**Corresponding author: nsyafothman@gmail.com*

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ABSTRACT:

Background: Patients who were hospitalised with severe COVID-19 infection could progress to severe conditions due to various factors, whereas some patients may recover to mild conditions quickly. There was limited information regarding characteristics and factors affecting disease progression in this population in Malaysia. This study aimed to investigate patient characteristics and risk factors contributing to disease progression among COVID-19 patients during hospitalisation.

Methods: A retrospective cross-sectional study using electronic medical record data from COVID-19 patients admitted to two public hospitals in East Coast Malaysia from February 2020 to August 2021 was conducted. This study included patients with asymptomatic or mild condition (stage 1 – stage 3) upon hospital admission and progressed to severe condition (stage 4 – stage 5) during hospitalisation.

Results: A total of 163 patients were included (57% male) with the age of (mean±SD, 62.3 ±14.0 years). Multivariable logistic regression associated with COVID-19 disease progression included elderly (OR, 1.06; 95% CI, 1.04, 1.08; $p = \leq 0.05$), diabetes mellitus (OR, 2.27; 95% CI, 1.27, 4.06; $p = 0.006$), chronic kidney disease (OR, 4.87; 95% CI, 1.92, 12.38; $p = 0.001$), and presented with more than three COVID-19 symptoms (OR, 9.80; 95% CI, 6.08-15.81, $p = \leq 0.05$).

Conclusion: Risk factors for COVID-19 disease progression included elderly patients, comorbidities of diabetes mellitus, chronic kidney disease or more than three COVID-19 symptoms. Close monitoring and early intervention should be implemented for these patients to prevent the disease progression and poor prognosis.

KEYWORDS: *COVID-19, disease progression, risk factors, patient characteristics, Malaysia*

1. INTRODUCTION

The coronavirus disease (COVID-19) is an infectious disease caused by severe acute respiratory syndrome-related coronavirus 2 (SARS-CoV-2) [1]. As of 11th April 2022, rapid transmission of this virus has caused 499 million COVID-19 cases with 6 million deaths worldwide [2]. Most COVID-19 patients were asymptomatic or having mild symptoms such as fever and cough and commonly have a good prognosis without needing specific treatment [3]. Generally, less than 50% of patients had a fever upon hospital admission, but over the course of disease, majority of patients (89%) had fever during the hospitalisation [4]. However, COVID-19 infection is aggressive that it can worsen the condition of infected patients rapidly. Some patients including the elderly and those with medical conditions are hospitalised for having deteriorated condition or at high risk of developing severe illness. Previous reports from China, New York and Italy showed that majority hospitalised patients were among elderly and/or with underlying comorbidities such as hypertension and diabetes. In severe cases, these patients developed shortness of breath, hypoxia and progressed to critical conditions such as acute respiratory distress syndrome (ARDS), acute respiratory failure, and septic shock [3]. Previous findings in Malaysia reported that those who developed complications were among patients who were initially diagnosed with severe and critical-stage COVID-19 [5].

In addition, some patients who progressed to a severe stage were commonly admitted to the intensive care unit (ICU) for close monitoring and treatment, whereas some of them died before ICU admission. As of 22nd May 2022, there were about 6 million reported deaths due to COVID-19 globally. Reported mortality rates were varied across the countries. Mortality analyses demonstrated that the upper middle-income countries such as South Africa, Brazil and Guatemala had higher mortality rate compared to high income countries such as Japan, France, and Portugal [7]. The differences in mortality rates could be due to the variation in the size and demographics of the tested populations, and their quality of healthcare system [7]. A recent systematic review reported that elderly, male, current smoker, and chronic comorbidities were significantly associated with mortality [8]. However, risk factors contributing to disease progression were not well-explored particularly in Malaysia. Hence, this study aimed to investigate characteristics and risk factors of patients who progressed from mild to severe stage to facilitate early detection and guide the physicians or clinicians to decide the best treatment plan and preventive measures for these patients.

2. METHODOLOGY

This was a retrospective cross-sectional study evaluating patient characteristics and risk factors contributing to disease progression among COVID-19 patients during hospitalisation. The study was conducted from February 2020 to August 2021 using the medical and prescription database of two public hospitals in East Coast Malaysia, Hospital Sultanah Nur Zahirah (HSNZ) Kuala Terengganu and Hospital Hulu Terengganu (HHT). The study received ethical approval from the Medical Research Ethical Committee, Ministry of Health, Malaysia (NMRR-20-1823-56013). There was no direct involvement of patients in this study, thus written informed consent was not required.

Sample size in this study was calculated manually by using formula derived from Kish (1965) [5]. It was based on the estimated prevalence of hospitalised patients among confirmed cases of COVID-19 in Malaysia who progressed from mild to severe stage, which was about

3.5% [6]. Confidence level in this study was set at 99% with 5% precision. The required sample size for estimation of proportion of hospitalised patients with 99% confidence interval was 90 patients.

COVID-19 severity was categorised into four stages (stage 1; asymptomatic, stage 2; symptomatic without pneumonia, stage 3; symptomatic with pneumonia, stage 4; symptomatic with pneumonia, requiring supplemental oxygen and stage 5; critically ill with or without organ failures) depending on patients' severity of symptoms [9]. This study included COVID-19 patients diagnosed with the asymptomatic or mild conditions (stage 1 – stage 3) upon hospital admission and progressed to severe condition (stage 4 – stage 5) during hospitalisation. Information extracted from the database included patient demographics; age, gender, smoking status, presenting COVID-19 symptoms, comorbidities, disease staging upon hospital admission and hospitalisation, and patient outcomes; number of patients admitted to ICU, length of hospital stay, and discharged alive or death. All extracted data was computed into Microsoft Excel 2020 and each patient was coded with a unique number to ensure data consistency. Data collection process was conducted independently by four research assistants and all data were compiled together in a single Excel worksheet according to patient code. In this study, age was categorized into 19-39 years, 40-59 years and ≥ 60 years [36]. Total number of COVID-19 symptoms per patient was calculated and further categorised into more than or equal to three symptoms and less than three symptoms. Meanwhile, comorbidities included were hypertension, diabetes mellitus, coronary heart disease, chronic obstructive lung disease, chronic kidney disease, and hyperlipidemia. As patients commonly presented with more than one comorbidity, Charlson Comorbidity Index (CCI) score was computed to calculate the comorbidity score in each patient.

Data analysis was performed using Stata version 13.1 (StataCorp. 2012. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP). Descriptive data were presented as frequency and percentage for discrete variables and as mean and standard deviation for continuous variables. Graph presentations were plotted using Microsoft Excel. Relevant information from STATA was exported to Excel to generate the graph. Multivariable logistic regression was used to analyze the associations between patient demographics and COVID-19 progression. Reported p values ≤ 0.05 were considered statistically significant.

3. RESULT

3.1. Patient characteristics

A total of 163 COVID-19 patients who progressed from mild to severe stage were included in this study and about half of the patients (57%) were male. The mean age of total patients was 62.3 ± 14.0 . Patients who aged more than 60 years recorded the highest proportion (62%), followed by 40-59 years (30%) and 19-39 years (8%). Few of them were smokers (8%).

Sixty-seven percent of patients included have comorbidities and majority had CCI score of 1-2 (44%). Hypertension (n=110) was the most common comorbidity presented, followed by diabetes mellitus (n=101), and chronic kidney disease (n=46).

Upon hospital admission, dry cough (n=106) was the main symptom predominantly presented among progressed COVID-19 patients, followed by fever (n=95) and fatigue (n=69). Other less common symptoms included shortness of breath (n=60), sputum (n=35), runny nose

(n=18), diarrhea (n=18), loss of smell/taste (n=14), myalgia (n=10), nausea/vomiting (n=10), chest discomfort (n=8), loss of appetite (n=7), sore throat (n=4), and headache (n=3). Overall, majority presented with ≥ 3 number of COVID-19 symptoms (64%).

Table 1: Patient demographic and clinical characteristics of patients progressed from mild to severe stage during hospitalisation

Baseline Characteristics	Number of patients (n)	%
Age group, years		
19-39 years	13	8
40-59 years	49	30
≥ 60 years	101	62
Gender		
Male	93	57
Female	70	43
Smoker	13	8

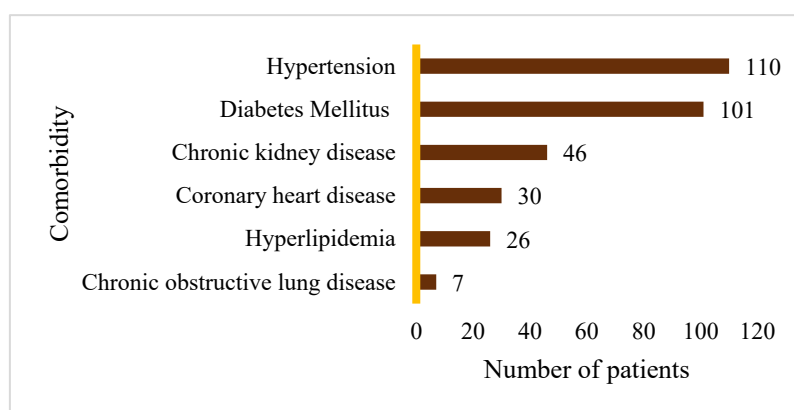


Fig. 1. Comorbidity among patients who progressed from mild to severe stage

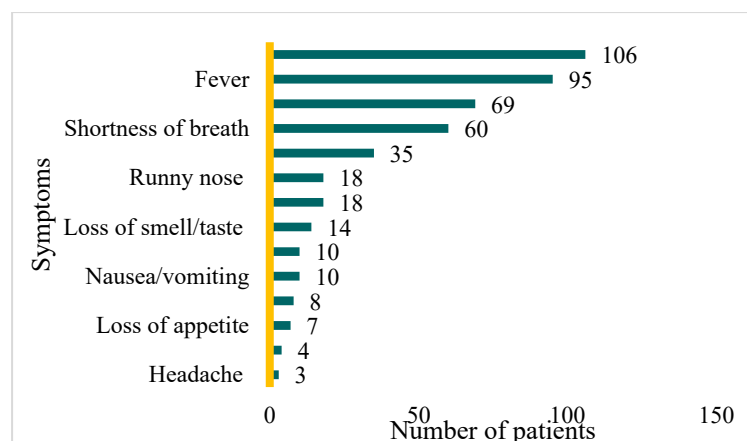


Fig. 2. The distribution of symptoms upon hospital admission among patients progressed from mild to severe stage

3.2. COVID-19 complications

Fifty-nine percent (n=96/163) patients who progressed from mild to severe stage had complication of COVID-19 infection. Acute kidney injury was the most frequently observed complication, followed by multiorgan failure and septicemic shock. For lung complications, only a few developed respiratory failures (2%) and acute respiratory distress syndrome (1%). Majority of them had only one COVID-19 complication (n=44), whereas others had two (n=28) or three complications (n=19).

Table 2: Complications of progressed COVID-19 patients

COVID-19 Complications	Total (n=163)
Acute kidney injury	36
Multiorgan failure	35
Septicemic shock	27
Acidosis	26
Secondary infection	18
Respiratory failure	14
Acute respiratory distress syndrome	13
Sepsis	7
Heart failure	1
Coagulopathy	1

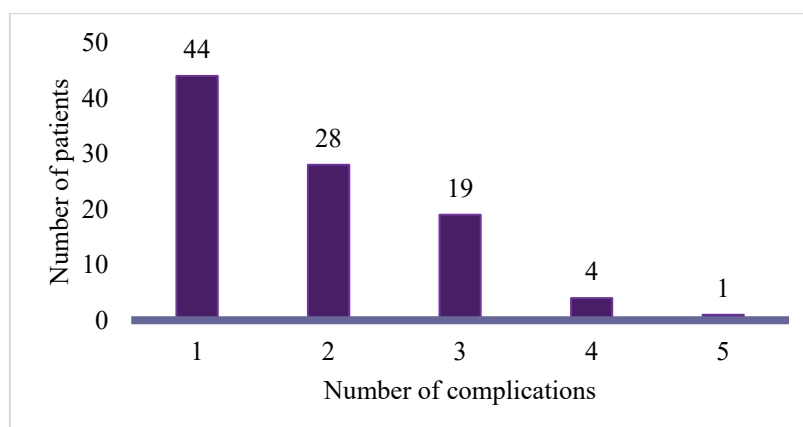


Fig. 3. Number of complications among progressed COVID-19 patients

3.3. Clinical outcomes

Out of the 163 patients, 55% of them were admitted to ICU (n=90). The mean \pm standard deviation for length of hospital stay was 11 ± 9.7 days. Among these patients, 74% died and 26% discharged alive.

3.4. Risk factors associated with disease progression

In univariable logistic analysis, there were significant associations between disease progression and specific underlying factors including age, hypertension, diabetes mellitus, coronary heart disease, chronic kidney disease, hyperlipidemia, CCI score, and more than or equal to 3 symptoms presented. The odds of disease progression to severe stage among COVID-19 patients for elderly was 8% higher than non-elderly patients (OR, 1.08, 95% CI 1.06-1.09, $p = \leq 0.05$). Patients presented with hypertension, diabetes mellitus, coronary heart disease, chronic kidney disease or hyperlipidemia were 7.37, 9.61, 7.94, 18.35 and 3.09 times more likely to progress to severe stage, respectively. In addition, the higher the CCI score, the higher the odds of disease progression (OR 1.97, 95% CI 1.74-2.24, $p = \leq 0.05$). Patient presented with more than 3 COVID-19 symptoms were significantly associated with disease progression (OR 7.83, 95% CI 5.45-11.26, $p = \leq 0.05$).

Multivariable logistic regression model showed that only age (OR, 1.06; 95% CI, 1.04, 1.08; $p = \leq 0.05$), diabetes mellitus (OR, 2.27; 95% CI, 1.27, 4.06; $p = 0.006$), chronic kidney disease (OR, 4.87; 95% CI, 1.92, 12.38; $p = 0.001$), and presented with more than 3 COVID-19 symptoms (OR, 9.80; 95% CI, 6.08-15.81, $p = \leq 0.05$) were remained to be significantly associated with COVID-19 progression.

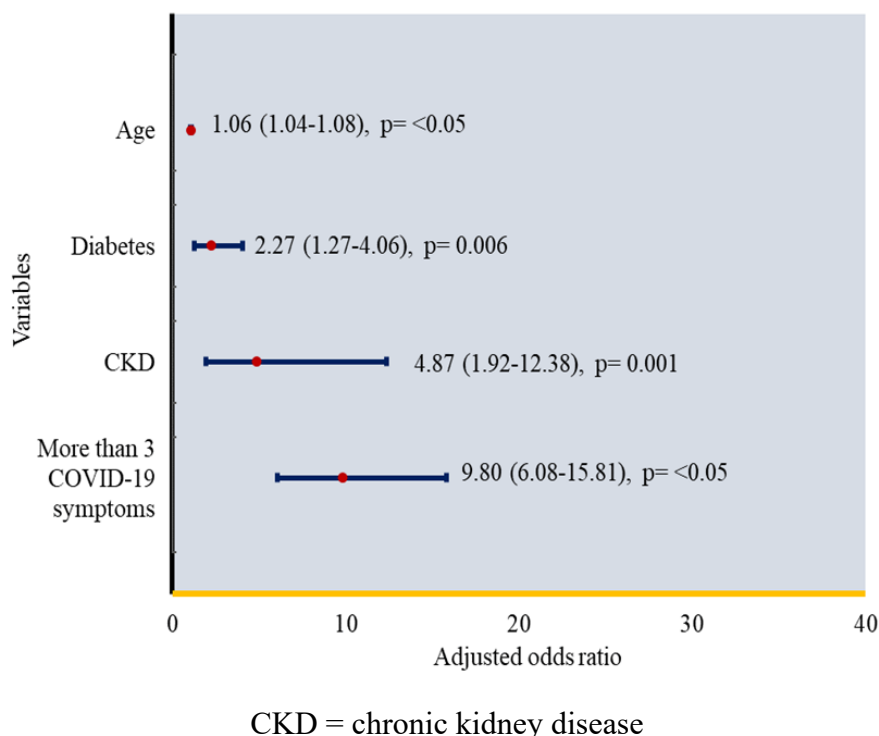


Fig. 4. Multivariable logistic regression of risk factors for COVID-19 progression

Table 3: Univariable and multivariable logistic regression of disease progression among COVID-19 patients

Risk factors	Crude OR	P value	Adjusted OR	p value
Age, years	1.08	(1.06, 1.09)	1.06	(1.04, 1.08)
Gender				
Male	1.12	(0.80, 1.57)		0.524
Female	1			
Smoker				
Yes	1.51	(0.80-2.85)		0.203
No	1			
Comorbidities				
Hypertension				
Yes	7.37	(5.12, 10.60)	1.17	(0.68, 2.03)
No	1			
Diabetes mellitus				
Yes	9.61	(6.65, 13.88)	2.27	(1.27, 4.06)
No	1			
Coronary heart disease				
Yes	7.94	(4.53, 13.91)	1.43	(0.65, 3.14)
No	1			
Chronic lung disease				
Yes	0.99	(0.44, 2.26)		0.990
No	1			
Chronic kidney disease				
Yes	18.35	(10.39, 32.39)	4.87	(1.92, 12.38)
No	1			
Hyperlipidemia				
Yes	3.09	(1.85, 5.17)	0.81	(0.41, 1.59)
No	1			
Charlson Comorbidity Index (CCI)	1.97	(1.74, 2.24)	1.19	(0.96, 1.48)
Number of Symptoms Presented				
≥3 symptoms	7.83	(5.45, 11.26)	9.80	(6.08, 15.81)
<3 symptoms	1			

4. DISCUSSION

This study found that elderly patients (≥ 60 years), patients who had diabetes, chronic kidney disease, and patients presented with three or more COVID-19 symptoms had high risk for disease progression from mild to severe stage [36]. Fifty percent of those progressed to a severe stage have also developed COVID-19 complications with acute kidney injury and multiorgan failure being the most common complications. This is in accordance with findings

from previous study which reported acute kidney injury as a common COVID-19 complication [6]. Nevertheless, COVID-19 is a multi-system disease that can cause multiple complications involving renal, respiratory, cardiovascular, neurological and gastrointestinal system [11].

The current study observed that age was a significant predictor for progressing from mild to severe disease by 1.06. This corresponds to the recent study conducted in the United States which found that advanced age emerged as risk factor for severe COVID-19 disease [12]. This can be attributed by the presence of multiple comorbidities, and deteriorating immune system among elderly [13]. Elderly patients are often associated with declining function of antigen-specific immune responses such as T and B lymphocytes and increased inflammatory mediators such as type 2 cytokines which cause prolonged inflammation and eventually severe conditions [14]. Declining immune function may reduce vaccine efficacy, decrease in immune surveillance and increase susceptibility to infections [13].

In addition, our study showed that the common symptoms that patients had included dry cough and fever. Patients who presented with three or more symptoms upon hospital admission appeared to be a significant factor of severe disease. A retrospective cohort study in Bangladesh also found a significant association between > 3 symptoms and mortality [15]. Our findings were also in line with previous studies which highlighted that fever and dry cough were the most common symptoms presented upon hospital admission [16-19]. It is highly likely that presenting with many COVID-19 symptoms such as fever, cough and shortness of breath imply severity of patient illness and affect quality of life. Hence, medical treatment and monitoring should be given immediately to control the intensity of illness and to prevent the COVID-19 progression to a severe state.

Our study indicated that higher number of male patients with COVID-19 were admitted to the hospital compared to females. However, gender was not significantly associated with disease progression and this finding is similar to a previous study conducted in Malaysia [6]. Other studies demonstrated that male patients had higher hospitalisation and mortality rate compared to female patients [20-21]. In contrast, a meta-analysis has emphasised male patients have been associated with adverse outcomes of COVID-19 in terms of high risk of severe disease and death [22]. This may be explained by the fundamental differences such as males have higher ACE2 expression, inferior immune response, and unhealthy lifestyle behavior, i.e., drinking alcohol and smoking compared to females [22]. Furthermore, females have higher number of CD4+ T cells, CD8+ T cells and B cell production than males which affect the ability to fight the COVID-19 infection [22]. Apart from that, females have more responsible attitude towards COVID-19 pandemic in which males have lacking self-awareness and undertaking preventive measures such as wearing mask, frequent hand wash and social distancing [23].

Another factor that is commonly associated with the severity among COVID-19 patients is smoking. Our study showed that the prevalence of smokers among patients with COVID-19 (8%) was slightly lower than a recent study conducted in Malaysia (9%) [6] probably due to smaller sample size. It has been reported that smoking was not significantly associated with severe disease [24-25]. However, a meta-analysis study has reported that smokers were among COVID-19 patients with increased risk for severe disease [26] and mortality [27]. In general, smoking is harmful in all patients as it weakens the immune system and susceptible to viral and bacterial infection [24].

The present study also found that the risk of patients with chronic kidney disease was 4.87-fold higher to develop severe COVID-19 than those without chronic kidney disease. This finding is supported by previous studies that showed chronic kidney disease patients with COVID-19 are prone to deteriorating outcomes including mortality [28-29]. In addition, Soares et al. (2020) have reported that COVID-19 patients with CKD have high risk of developing serious infection [17]. Furthermore, acute kidney injury is a common incidence in patients with chronic kidney disease [30]. This increases the risk of severity of COVID-19 disease and eventually resulted in a poor prognosis [30].

There are several explanations why chronic kidney disease increased the risk progression to severe disease. Physiologically, patients with chronic kidney disease have increased expression of ACE2 receptor in tubular cells. This enhances the binding of SARS-COV-2 towards the ACE2 receptor which eventually induce cytotoxicity and abnormal renal function [10]. Hence, both decreased kidney function and severe COVID-19 condition may deteriorate the patient's health to critical condition or death. Similarly in elderly patients, CKD is associated with decreased function of immune system such as monocyte, neutrophil phagocytosis, T-lymphocytes, and B lymphocytes [31]. These mechanisms may explain the high risk of disease progression among COVID-19 patients with CKD particularly in elderly patients as shown in the current study.

Other comorbidities that were measured by Charlson Comorbidity Index (CCI) in the current study showed that an increase in one CCI score was significantly associated with poor outcomes in COVID-19 patients in univariable analysis. This is consistent with another study by Kuswardhani et al. (2020) which found that an increase in CCI score has increased the risk of mortality by 16% [32]. Some studies have also reported on the significant association between hypertension and diabetes mellitus with the severity and mortality in COVID-19 patients [24, 33-34]. Although hypertension was the most common comorbidity among COVID-19 patients in the present study, it did not significantly associate with disease severity and mortality. This difference compared to other studies could be due to different variables in study population such as age and underlying medical conditions. On the other hand, diabetes was significantly associated with COVID-19 severity. The potential mechanism by which COVID-19 infection increases the risk for severe disease among diabetic patients was similar to chronic kidney disease. Among the mechanisms are increased in viral entry, decreased viral clearance, compromised immune system, hyperinflammation and cytokine storm [34].

The overall mortality rate among patients who progressed from mild to severe stage in the current study was 74%. This rate was higher compared to previous studies (15% - 8.3%) [6, 24]. This is probably due to the current study focused on those who progressed to the severe stage during hospitalisation while previous studies considered severe patients upon hospital admission. Therefore, some severe patients in previous studies may de-escalate to mild stage during hospitalisation which lower the mortality rate. Furthermore, higher mortality rate in the current study could be due to difference in the period of data collection whether it was in the early or later phase of pandemic. The later phase was associated with the emergence of more contagious Delta variant that has caused higher number of hospital admissions than earlier variants. During the data collection period of the current study, the COVID-19 vaccination rate in Terengganu particularly in Kuala Terengganu and Hulu Terengganu was low compared to other states that may contribute to the slightly higher mortality in the current study [35].

The findings in the present study will redound to healthcare and society's benefits as early identification and understanding the patient risk factors provide crucial information for healthcare resources allocation particularly the ICU beds. It emphasizes the knowledge about high-risk patients with poor prognosis. Patients who are at high risk should be given special attention even though they are diagnosed with mild stage upon hospital admission. They may develop severe condition during hospitalisation and eventually lead to the worst outcomes. However, a causal effect relationship cannot be established in this study due to limitation of a retrospective cross-sectional design. Nevertheless, this real-world data will be able to provide real-world evidence, which is important to optimize the valuable healthcare resources as well as to improve patient care. Identification of risk factors particularly elderly, diabetes, or chronic kidney disease, may guide an early clinical decision making in managing these patients. High-risk patients with COVID-19 infection must report themselves or seek medical consultation at early stage of disease. This also alerts the physicians or clinicians to perform aggressive preventive measures for these patients.

5. CONCLUSION

In conclusion, this study found that elderly patients, patients who had diabetes, chronic kidney disease, and presented with ≥ 3 symptoms of COVID-19 have a high risk to progress from mild to severe stage. Early identification of high-risk patients may provide insight into the clinical and policy guidelines in prioritization of pharmaceutical interventions and stratification for high-risk COVID-19 patients who are associated with poor outcomes. Furthermore, it will also guide the priorities and utilization of resources in implementing aggressive management to improve the patient outcomes.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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INTEGRATION OF KNOWLEDGE AT THE KULLIYAH OF ENGINEERING

NASSERELDEEN AHMED KABBASHI^{1*}, SANY IZAN IHSAN²,
AISHA HASSAN HASHIM³

^{1*}*Chemical Engineering & Sustainability Dept. Kulliyah of Engineering, International Islamic University Malaysia (IIUM), Gombak, Malaysia*

²*Mechanical and Aerospace Engineering Dept. Kulliyah of Engineering, International Islamic University Malaysia (IIUM), Gombak, Malaysia*

³*Electrical and Computer Engineering Dept. Kulliyah of Engineering, International Islamic University Malaysia (IIUM), Gombak, Malaysia*

**Corresponding author: nasreldin@iium.edu.my*

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ABSTRACT: The Kulliyah of Engineering (KOE) at the International Islamic University Malaysia (IIUM) has been one of the leading institutions in the country since 1994, offering engineering education to students from all over the world. With its wealth of experience, the KOE has established different strategic plans over the years to improve its academic standards. The faculty provides undergraduate and postgraduate programs in various fields of engineering, such as chemical, civil, electrical, mechanical, manufacturing, mechatronics, and computer engineering. Despite having an excellent academic curriculum, there is still a significant gap in the integration of knowledge across different courses, which could hinder the overall learning experience of the students.

To bridge this gap and provide a more comprehensive approach to education, there is a need to integrate knowledge from various courses and disciplines. This approach will enable students to understand the relationships between different areas of study and better equip them to solve complex problems in the real world. Integrating knowledge from various courses will not only improve the overall quality of education but also increase the employability of graduates as they will possess a diverse set of skills that are highly sought after in today's job market.

ABSTRAK: Kulliyah Kejuruteraan (KOE) di Universiti Islam Antarabangsa Malaysia (IIUM) telah menjadi salah satu institusi terkemuka di negara sejak tahun 1994, menawarkan pendidikan kejuruteraan kepada pelajar dari seluruh dunia. Dengan pengalaman yang kaya, KOE telah menetapkan pelan strategik yang berbeza selama bertahun-tahun untuk meningkatkan standard akademiknya. Fakulti ini menyediakan program sarjana dan siswazah dalam pelbagai bidang kejuruteraan, seperti kejuruteraan kimia, awam, elektrik, mekanikal, pembuatan, mekatronik, dan kejuruteraan komputer. Walaupun mempunyai kurikulum akademik yang cemerlang, terdapat jurang yang besar dalam pengintegrasian pengetahuan di antara kursus yang berbeza, yang boleh menghalang pengalaman pembelajaran keseluruhan pelajar.

Untuk menyelesaikan jurang ini dan memberikan pendekatan pendidikan yang lebih komprehensif, terdapat keperluan untuk mengintegrasikan pengetahuan dari pelbagai kursus

dan disiplin. Pendekatan ini akan membolehkan pelajar memahami hubungan di antara bidang pengajian yang berbeza dan mempersiapkan mereka dengan lebih baik untuk menyelesaikan masalah kompleks dalam dunia sebenar. Mengintegrasikan pengetahuan dari pelbagai kursus tidak hanya akan meningkatkan kualiti pendidikan secara keseluruhan tetapi juga meningkatkan kebolehpasaran graduan kerana mereka akan mempunyai set kemahiran yang pelbagai yang sangat dicari dalam pasaran kerja hari ini..

KEYWORDS: *Integration of knowledge, KOE, ethical responsibility*

1. KOE IIUM

In March 1994, the Kulliyah of Engineering (KOE) was established with a few departments. The Kulliyah's vision is to become a global center for innovative engineering education and research with values and professional ethics. Its mission is to be a top-tier center for engineering education and research that upholds moral principles. The goal is to advance society by providing top-notch academic and professional services that are innovative and competitive. The objectives are to create graduates with high professional ethics who are globally recognized, to deliver homegrown research products such as publications, patents, intellectual properties, and commercialization, and to provide first-rate services such as consulting, training, and continuous education that exceed customers' expectations.

The engineering programs offer an integrated and comprehensive education that transcends the boundaries of various fields. This is in line with the Kulliyah's philosophy, which is founded on a systems approach. The approach is based on the Islamic idea of tawhid, which harmonizes the spiritual and material aspects of life. The graduates will develop spiritual, intellectual, moral, and ethical qualities to establish an integral and harmonious relationship with Allah (the Creator), other people, and the environment, in addition to being professionally trained and competent. The multidisciplinary approach to engineering education will enable the graduates to manage changes in accordance with the worldview based on the principles of Islam and help them solve industrial and human problems. Engineers are concerned with time, economy, and values that characterize the application of scientific concepts, in addition to knowing them. In light of this, the Kulliyah cultivates close ties with businesses, governments, the IIUM community, and the general public. The Kulliyah has an obligation to carry out effective research programs that expand knowledge, in addition to its role as a teacher.

2. COLLABORATIVE LEARNING IN ENGINEERING EDUCATION

The initial revelation to the Prophet (PBUH) asserts that Islam is a religion founded on knowledge and education. Islam perceives education and learning as a divine command from Allah Subhanahu Wa-Ta'ala ([1], [2], [3], [4], and [5]). In essence, Islam divides knowledge into two categories: revealed knowledge and acquired knowledge (non-revealed knowledge) ([6], [7]). Revealed knowledge, which every Muslim must learn, includes an understanding of hijjah, zakat, and salah (prayer) [7]. Acquired knowledge, which is not mandatory in Islam, is the knowledge that one may obtain but is not required to. However, it may be essential for individuals to acquire this knowledge to thrive in their environment. Acquired knowledge may encompass practical and behavioral sciences, technology, medicine, biological sciences, and the arts, according to prominent Muslim intellectuals like Al-Attas. Knowledge gained through

these means helps individuals achieve practical goals in society ([8], [9], [10], and [11]). Both types of knowledge are required for the appropriate growth of society and individuals in the socioeconomic system. While acquired knowledge helps people manage society, revealed knowledge helps individuals manage themselves (self-management) ([12] and [13]).

In cognitive reorganization, knowledge integration emphasizes the growth of increasingly interconnected networks of concepts instead of a collection of disjointed ones [14]. Integrated knowledge ties together, relates, and unites ideas across a variety of contexts. Students integrate their knowledge by investigating, identifying, organizing, and synthesizing ideas and information to evaluate their experiences and find solutions to challenges.

2.1 What does education's integration of knowledge mean?

Knowledge integration is the process of combining previously unrelated knowledge structures into a cohesive whole. Developing a deep understanding of a concept requires pupils to create connected knowledge structures based on its primary notion.

To create a coherent explanation of scientific facts, it is essential to integrate new concepts and identify connections. This process is known as knowledge integration. The research compared student performance on knowledge-integration-focused inquiry exams to their performance on multiple-choice tests. Integrating revealed and acquired knowledge promotes the full development of a student's body, soul, and spirit. By using integrated curricula, students can gain a deeper understanding of course material and learn to apply what they have learned in real-world scenarios. Ultimately, this prepares them for future coursework, careers, and life.

Integrating knowledge involves combining fields of knowledge, ideas, and skills to create a more comprehensive and holistic understanding of a topic. This requires synthesizing information from various disciplines, experiences, and perspectives to create a more complete picture of a given subject.

Breaking down barriers between different disciplines and promoting interdisciplinary thinking are essential components of knowledge integration. This encourages the application of knowledge and skills from multiple fields to address complex problems. Understanding how different fields are interconnected and leveraging this understanding to generate innovative solutions is a critical aspect of knowledge integration.

In essence, the integration of knowledge encourages a more nuanced and sophisticated approach to learning and problem-solving by drawing on the best practices and insights from various fields and perspectives. This can lead to more creative and effective solutions that take into account a broader range of factors and considerations.

2.2 Environmental knowledge integration

Research on Knowledge Integration Environments has shown that constructing new knowledge is more challenging than simply learning new ideas. In order to gain new knowledge, Knowledge Integration Environments typically require us to challenge and modify our preexisting information and ideas. This upheaval can arise from a variety of sources, such as a colleague's feedback, a passage in a book, or an observation in a classroom that raises doubts about our current assumptions.

Each word associated with the Knowledge Integration process indicates a supporting action. For example, making predictions prompts critical thinking; connecting with coworkers or materials adds new ideas; comparing ideas enables us to identify key characteristics, and explaining helps us reflect on our ideas so that they form a cohesive whole. By helping your team to consider the types of activities that will enable you to elicit, add, distinguish, and reflect on essential concepts related to content and instruction, the Knowledge Integration Environment can provide a useful perspective for lesson study.

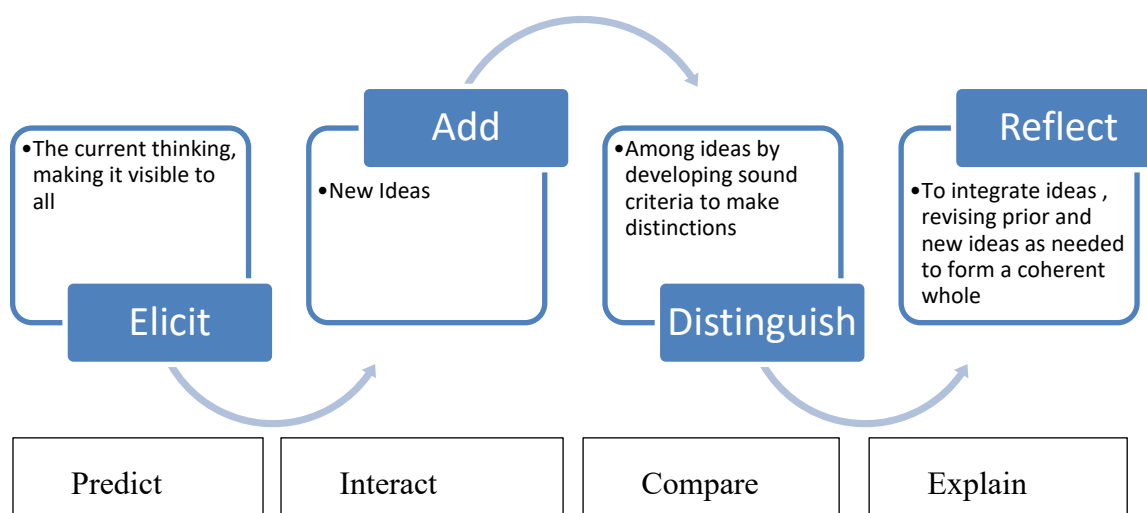


Fig 1: Knowledge Integration Framework, based on [15]

3. INTEGRATED OF KNOWLEDGE AT THE KOE

Since its establishment in 1994, the Knowledge Integration Environment (KOE) has been undergoing continuous development to align with international players in engineering education. The KOE periodically revises its strategic plan to ensure its relevance to international syllabi, societal needs, and Islamic values and ethics, in accordance with its vision and mission as well as those of the International Islamic University Malaysia (IIUM). The KOE has taken several steps to integrate knowledge to attain premier status, both locally and internationally.

In 2022, the KOE revisited its strategic plan and established a timeline for strategic measurement. Engagement with various members of the Kulliyah was conducted through performance reviews at each office and departmental level. The findings were then presented and deliberated in a strategic planning workshop, which included the Kulliyah Board members, executive members, selected senior members, and other members of the Kulliyah. Designing a strategic plan and integrating data and tools for the benefit of the KOE requires expertise from a variety of heterogeneous data sources and technologies. These days, integrating tools and data is a time-consuming and error-prone operation due to the variety of engineering data. Manual means or point-to-point integration are not advantageous to achieve

such goals, as they may be feasible for a small number of KOE communities and data sources but quickly become highly difficult. The likelihood of errors and the amount of work required for integration both increase as the number of parts grows. The suggested strategic plan has been tested and will guide the KOE for the coming years, as shown in Figure 2.

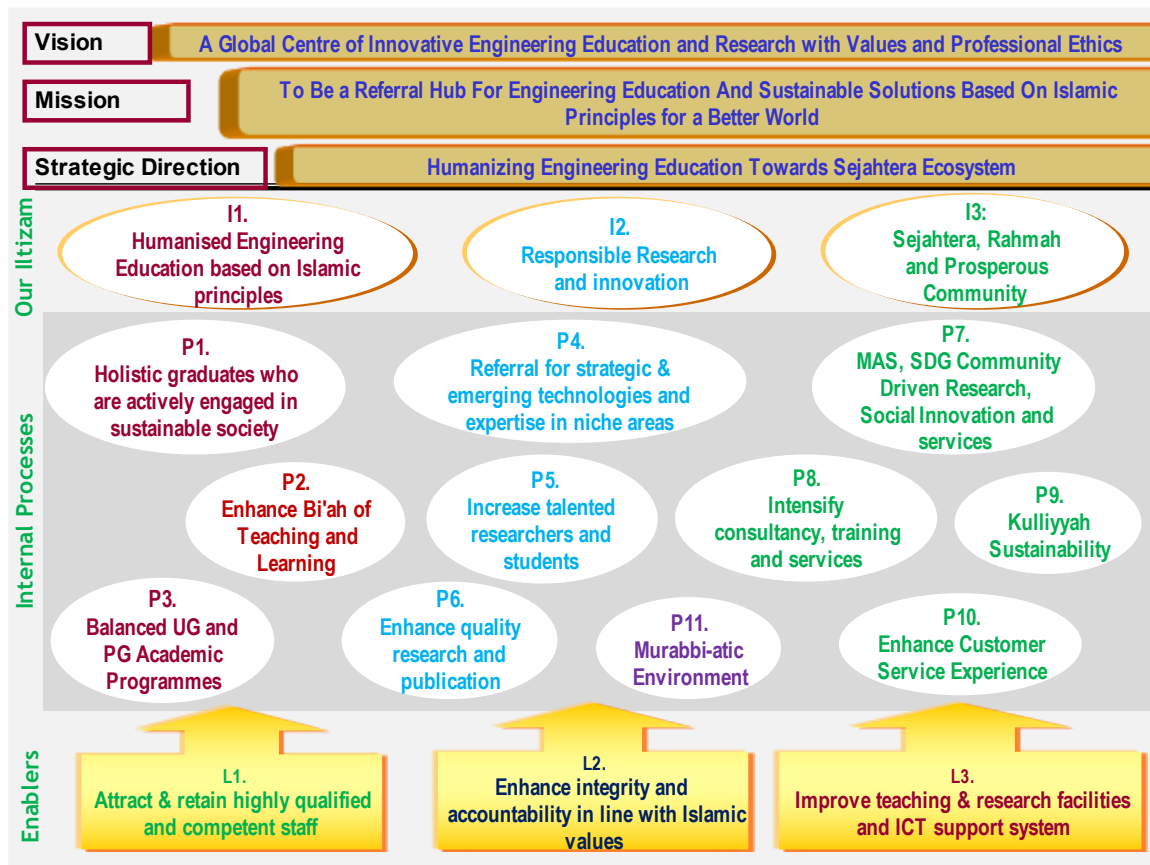


Fig. 2: KOE Strategic Planning and roadmap 2022-2024.

The ability to effectively participate in a learning process at a behavioral and motivational level is referred to as learning engagement. Students who are engaged in learning take ownership of their choices, use feedback, evaluate their personal conduct, and actively work towards continuous improvement, while accepting accountability and responsibility for their actions. The KOE aims to foster continuous and lifelong learning by setting learning goals, using feedback to develop effective strategies for improvement, and monitoring and adapting to changing learning needs and behaviors when faced with new settings or interactions with others.

3.1 Tangible Evidence of Integrating of Knowledge

Here are some examples of tangible evidence that demonstrate the integration of knowledge at the Kulliyah of Engineering, IIUM:

1. Interdisciplinary research collaborations: Faculty members and students from different engineering disciplines collaborate on research projects that tackle

- complex, multidisciplinary problems. For example, a team of mechanical, electrical, and civil engineering students could work together to design an energy-efficient and sustainable building.
2. Cross-disciplinary courses and programs: The Faculty of Engineering offers courses and programs that are designed to integrate knowledge from multiple disciplines. For instance, students may take a course on "Engineering and Society," which explores the social, ethical, and cultural dimensions of engineering.
 3. Industry partnerships: The Faculty of Engineering partners with industry to provide students with hands-on experience in applying their knowledge to real-world problems. For example, a team of Chemical engineering collaborated with IWK and succeeded in production of enzymes for large scale, as well as producing compost for the IIUM, Gombak campus. For instance, the faculty collaborated with a leading Malaysian engineering firm to provide students with internships and practical training in the design and implementation of sustainable infrastructure.
 4. International collaborations: The Faculty of Engineering has partnerships with universities and research institutions around the world. These collaborations provide opportunities for students and faculty members to work with people from different cultures and backgrounds and to learn from their perspectives and experiences.
 5. Innovative teaching methods: The Faculty of Engineering uses innovative teaching methods, such as project-based learning, flipped classrooms, and experiential learning, to promote integration of knowledge. These methods help students to connect theory with practice and to apply their knowledge in creative ways.
 6. Student clubs and organizations: The Faculty of Engineering has several student clubs and organizations that provide opportunities for students to work on projects and participate in competitions that require integration of knowledge from multiple disciplines. For example, the Robotics Club brings together students from electrical, mechanical, and computer engineering to design and build robots for various applications.
 7. Student Projects: The faculty encourages students to work on interdisciplinary projects that integrate knowledge from multiple fields. For example, students from different departments collaborated to design and build a solar-powered electric car, which required knowledge from electrical engineering as well as mechanical engineering.
 8. Islamic Perspectives: The faculty integrates Islamic perspectives into the engineering curriculum, providing students with a unique perspective on engineering that incorporates ethical and moral considerations. For instance, the course "Islamic Environmental Ethics and Engineering" explores the intersection of Islamic ethics and environmental science, helping students understand the broader implications of their work.

Overall, these examples demonstrate the commitment of the Kulliyah of Engineering, IIUM, to promoting integration of knowledge and to providing students with the skills and knowledge they need to tackle complex problems in a rapidly changing world.

3.1.1. Lower and Upper-level integrated knowledge

Lower-level integrated knowledge involves several important skills, including the ability to gather, review, analyze, organize, and interpret information relevant to solving problems. It

also involves synthesizing new knowledge with prior experiences and determining whether tried-and-true methods are appropriate for solving various problems. In addition, individuals with lower-level integrated knowledge demonstrate an understanding of how different pieces of knowledge are related and connected across different contexts.

Upper-level integrated knowledge, on the other hand, is characterized by the ability to interpret relevant information and make connections between different contexts in order to solve complex problems. Individuals with this level of knowledge also possess the ability to synthesize, integrate, and apply knowledge in creative and innovative ways, often resulting in the development of new perspectives and solutions to problems.

3.2 IIUM Integration of Knowledge Road Map

IIUM is one of the higher education institutions that offer an international model of Islamic education by efficiently integrating revealed and human knowledge. The International Islamic University Malaysia (IIUM) is a renowned institution of higher learning that has developed a unique roadmap called the Integration of Knowledge Road Map (IOK). The IOK is a distinctive approach to education that emphasizes the integration of various fields of knowledge to provide a holistic understanding of the world.

The IOK was first introduced in 1983 and has since been integrated into the university's curriculum. The IOK model emphasizes the integration of Islamic knowledge with other areas of knowledge such as science, technology, humanities, social sciences, and management. The purpose of this integration is to create a comprehensive understanding of the world that combines traditional Islamic knowledge with modern disciplines.

The IOK model also emphasizes the importance of critical thinking, creativity, and problem-solving skills. Students are encouraged to think critically and analytically to solve complex problems in various fields.

The IOK model has been widely recognized as a unique and effective approach to education. It has produced graduates who are well-rounded, knowledgeable, and equipped with the skills needed to succeed in a rapidly changing world.

In conclusion, the Integration of Knowledge Road Map is a unique approach to education that emphasizes the integration of various fields of knowledge to provide a holistic understanding of the world. The IOK model has been widely recognized as a distinctive and effective approach to education that produces well-rounded and knowledgeable graduates.

The Islamic way of life is the foundation for the staff, students, curriculum, syllabus, research, and community service, as shown in Figure 1.

3.2.1 Evidence of learning engagement

To ensure the learning engagement at the KOE here are some evidence points.

- Attendance: High attendance rates in lectures, tutorials, and other learning activities could indicate high learning engagement.
- Participation: Active participation in class discussions, group work, and other learning activities could indicate that students are engaged in the learning process.

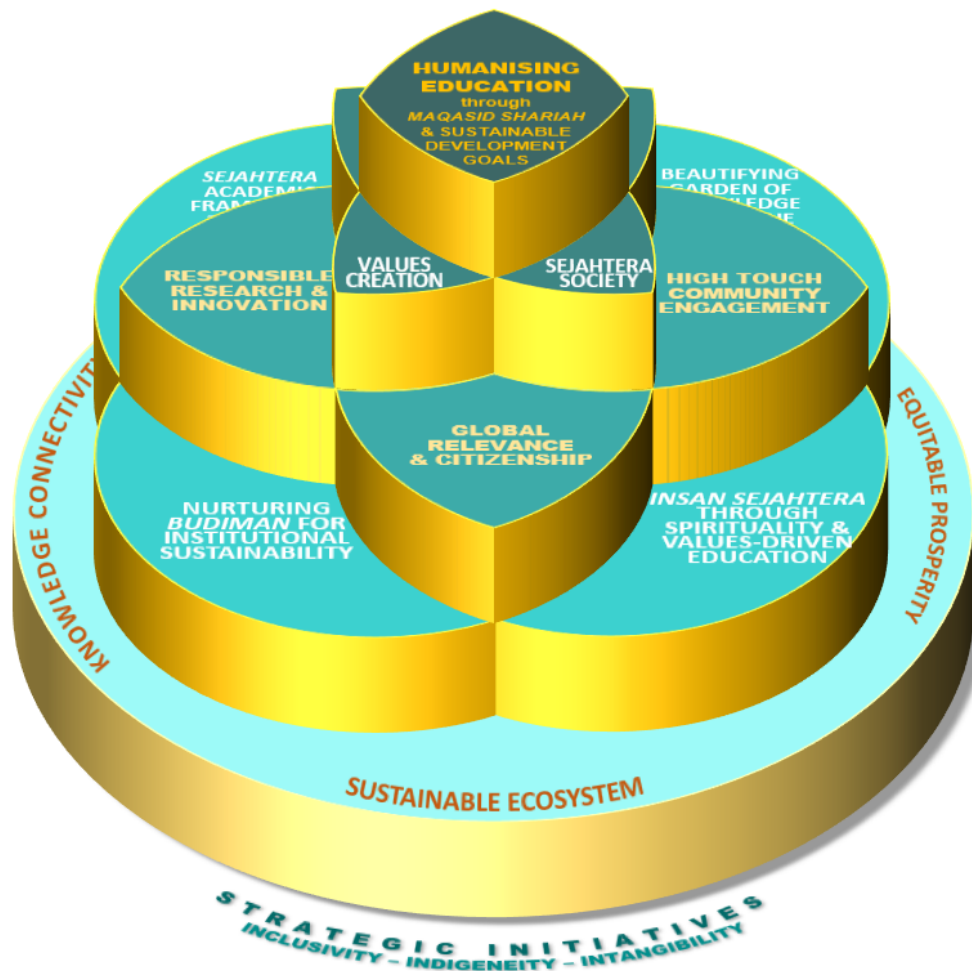


Fig. 1: IIUM roadmap 2021-2022.

- Assignments and projects: The quality and quantity of work produced by students could be an indicator of their level of engagement with the course material.
- Feedback: Students providing feedback on the course and their learning experience could indicate their engagement and interest in the course material.
- Collaboration: Students collaborating with their peers and faculty members on research, projects, and community outreach programs could indicate high levels of engagement and interest in their field of study.
- Involvement in extracurricular activities related to engineering: Students participating in engineering-related clubs, events, and competitions could demonstrate their engagement and passion for their field of study.
- Learning communities and social networking
- Performance reviews and plans for employees
- Ibadah camp

- ePortfolios
- Personal development talk
- Usrah programme
- Monthly spiritual talk.
- Annual reports and audits.

It is important to note that these factors may not be conclusive evidence of learning engagement on their own, but rather could be considered as part of a broader picture of students' engagement in their learning.

3.2.2 Lower and Upper-level learning engagement

Less sophisticated learning engagement involves setting learning objectives and working towards achieving them, using feedback to inform learning objectives and strategies for improvement, completing tasks and learning objectives independently, actively engaging in and taking responsibility for one's own learning and work, identifying and assessing knowledge, abilities, and skill gaps, and implementing improvement tactics.

On the other hand, a higher level of learning engagement entails identifying and evaluating one's own knowledge, skill, and ability gaps, and understanding how these gaps may impact one's perspectives, analyses, and interpretations. Actively engaging in learning and work with the aim of continuous improvement, accepting accountability and responsibility for both, building on learning goals to engage in continuous and lifelong learning, and using feedback to construct effective strategies for improvement.

4. INTEGRATING ETHICS AND SOCIAL RESPONSIBILITY IN ENGINEERING EDUCATION

Integrating ethics and social responsibility in engineering education is an important aspect of preparing future engineers to be responsible, ethical, and socially conscious professionals. The International Islamic University Malaysia (IIUM) can adopt several strategies to integrate ethics and social responsibility into engineering education.

Incorporate ethics and social responsibility courses: IIUM can incorporate ethics and social responsibility courses into the engineering curriculum. These courses can be standalone courses or integrated into existing courses. The courses can cover topics such as ethical decision-making, sustainability, social justice, and cultural awareness.

Encourage service-learning projects: IIUM can encourage engineering students to participate in service-learning projects that address social and ethical issues. These projects can be community-based, and students can work with community organizations or non-governmental organizations (NGOs) to solve real-world problems. These projects will provide students with hands-on experience in applying their engineering skills to solve problems while also addressing social and ethical concerns.

Establish industry partnerships: IIUM can establish partnerships with industry leaders to provide students with opportunities to learn from industry experts. Industry leaders can provide insights into ethical and social responsibilities in the workplace and share real-life experiences with students.

Promote research in ethics and social responsibility: IIUM can encourage research in ethics and social responsibility within the engineering faculty. Faculty members can conduct research on topics such as sustainable engineering, social justice, and cultural awareness. This research can provide valuable insights into ethical and social responsibilities in the engineering profession.

Create an ethics and social responsibility committee: IIUM can create a committee that focuses on ethics and social responsibility in engineering education. The committee can be comprised of faculty members, industry experts, and students. The committee can organize events, workshops, and seminars that address ethical and social responsibilities in engineering education.

5. INTEGRATING SUSTAINABILITY PRINCIPLES IN ENGINEERING CURRICULUM

Integrating sustainability principles in engineering curriculum at the International Islamic University Malaysia (IIUM) is an important step towards creating a more sustainable and environmentally conscious engineering profession. Here are some ways in which this integration can be achieved:

Incorporating sustainability topics in engineering courses: Engineering courses should include topics related to sustainability, such as renewable energy, green engineering, and sustainable design principles. This will provide students with a solid foundation in sustainable engineering practices and enable them to incorporate these principles into their future projects and work.

Providing hands-on experience with sustainable technologies: Students should have the opportunity to work with sustainable technologies and participate in hands-on projects that promote sustainable practices. This could include projects related to renewable energy systems, sustainable construction, and waste reduction.

Encouraging interdisciplinary collaboration: Encouraging collaboration between engineering and other disciplines such as architecture, business, and environmental science can lead to the development of more sustainable solutions. By working together, students can gain a deeper understanding of the interconnected nature of sustainability issues and develop solutions that address a range of environmental and social challenges.

Providing access to sustainable resources: Providing students with access to sustainable resources, such as textbooks, case studies, and research articles, can help them stay up-to-date with the latest sustainability practices and innovations. This can also help students develop a deeper understanding of the complexities of sustainable engineering and the challenges associated with implementing sustainable solutions.

Incorporating sustainability principles into assessment criteria: Finally, assessment criteria should include sustainability principles to ensure that students are evaluated on their ability to incorporate these principles into their projects and work. This will help ensure that sustainability remains a central focus of the engineering curriculum at IIUM.

6. CONCLUSION REMARKS

The integration of knowledge is a crucial aspect of engineering education, and the Kulliyah of Engineering, IIUM, recognizes this importance. By breaking down disciplinary boundaries and promoting collaboration and innovation, the Kulliyah of Engineering encourages students and faculty members to work together to tackle complex, multidisciplinary problems.

Through interdisciplinary research collaborations, cross-disciplinary courses and programs, industry partnerships, international collaborations, innovative teaching methods, and student clubs and organizations, the Kulliyah of Engineering provides tangible evidence of its commitment to integrating knowledge.

Overall, the integration of knowledge at the Kulliyah of Engineering, IIUM, prepares students to become skilled and knowledgeable engineers who are equipped to address the challenges of the 21st century. By embracing interdisciplinary thinking and encouraging the application of knowledge from multiple fields, the Kulliyah of Engineering fosters a culture of innovation, creativity, and excellence that benefits students, faculty members, and society as a whole.

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THE POTENTIAL EFFECTS OF AN ADAPTED NURSING DISCHARGE PLAN AMONG PATIENTS WITH HIP FRACTURES IN HOSPITAL MELAKA, MALAYSIA

NORLIZA KADIR¹, SASIPORN OUNJAICHON², AISHAIRMA ARIS³, THANDAR SOE SUMAIYAH JAMALUDIN⁴, MUHAMMAD KAMIL CHE HASAN^{4*}

¹*Institut Latihan Kementerian Kesihatan Malaysia Johor Bahru, Johor, Malaysia.*

²*Department of General Education, Royal Thai Army Nursing College, Bangkok, Thailand.*

³*Department of Nursing, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia*

⁴*Department of Medical Surgical Nursing, Kulliyah of Nursing, International Islamic University Malaysia.*

**Corresponding author: mkamil@iiu.edu.my*

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ABSTRACT:

Background: Patients with hip fractures frequently face the problem of a longer stay in the ward after surgery and being readmitted, falls, and being unable to carry out daily activities after discharge from the hospital. A nursing discharge plan is widely recognised as one of the strategies for addressing these issues. In Malaysia, however, it is unknown for patients with hip fractures. As a result, this study was carried out to investigate the impact of nursing discharge planning on patients with hip fractures in Hospital Melaka, Malaysia.

Methods: A total of 58 patients aged 50 years and above in the orthopaedic ward of Hospital Melaka were randomised using sealed envelopes to the intervention group (n = 29) and the control group (n = 29). The intervention group received an adapted nursing discharge plan with health education activities in the form of pamphlets and oral instructions within 24 hours of ward admission until discharge while the control group received routine discharge practices. Demographic data were taken from the study subjects while clinical data and length of stay in the ward were taken from the subjects' medical records before discharge. After one month discharged, data for ward re-admission rate and drop rate were taken from the subject's medical records while data for the subject's daily life activities were obtained through telephone calls using The Barthel Index survey form.

Results: The results of the study showed that the intervention group had a shorter ward stay (U = 254.00, $p = 0.008$) and a higher level of independence than the control group (U = 205.00, $p = 0.001$). The control group had 100% of subjects who were not able to be independent in daily activities of life compared to 75.9% of the intervention group ($p < 0.05$).

Conclusion: A nursing discharge plan including a health education component starting from the patient's admission to the ward until before the discharge should be considered in the nursing practice. It could facilitate better discharge outcomes for patients with hip fractures.

KEYWORDS: *Nursing, Discharge plan, Hip fracture*

1. INTRODUCTION

Hip fracture is defined as any type of fracture that occurs in the proximal part of the femur at the tip of the femoral head and 5cm below the small trochanter [1]. Incidence of hip fractures is common among the elderly due to osteoporosis and falls [2]. It had been projected that by 2050 there will be a 3.5-fold increase in the prevalence of hip fractures from 6000 fractures to almost 21,000 fractures occurring annually according to the Asian Federation of Osteoporosis Societies, with an expected rate of increase in Malaysia will be the highest among countries in this region [3].

The incidence frequency of these fractures increases by more than 100% every 10 years in line with increasing age after the age of 50 years [4]. However, in Malaysia, the incidence of hip fractures occurred as early as age 50 and above for every 90 per 100,000 population [5]. According to the National Orthopedic Registry Malaysia (NORM), the predominant cause of injury resulting in these fractures was a low-energy injury fall (83.1%) of the hip fractures while 7.8% was due to spontaneous fracture and 7.2% was due to accident fracture [6]. Older persons with hip fractures benefitted more from comprehensive care including interdisciplinary care and nutrition consultation, depression management, and fall prevention than simply interdisciplinary care [7].

A nursing discharge plan is a fundamental key to ongoing patient care and it is an important matter in early preparation for patients discharged from the hospital [8]. Proper and accurate nursing discharge planning is important to ensure that patients and families get an idea of how to continue patient self-care after being allowed to return from the hospital to avoid complications of continued hospital stay and re-hospitalization [9]. The evidence suggests that a discharge plan tailored to the individual patient probably brings about reductions in hospital length of stay and re-admission rates for older people admitted to hospitals with a medical condition [10].

Having to stay in the ward for long periods, frequent re-hospitalization and recurrent falls after discharge from the hospital and inability to perform ADL on their own are synonymous for patients with hip fractures [11]. Therefore, a nursing discharge plan is very necessary for these patients, to plan ongoing care to maintain and improve their health status even after they are discharged from the acute care phase in the hospital [11]. Evidence has shown that standardising discharge goals and implementation of high-reliability interventions focused on buy-in from key team members, pharmacy process redesign, subspecialty consult timeliness and feedback to frontline staff can reduce the length of stay without increasing re-admission rates [12].

Therefore, this study was conducted to examine the effect of nursing discharge plans on patients with hip fractures by identifying differences in length of stay, differences in ward re-admission rates, differences in fall rates and differences in daily living activities between intervention groups and control groups.

2. METHODS

A posttest experimental study design method was applied among patients with hip fractures in the orthopaedic ward of Hospital Melaka, Malaysia between January to May 2018. The study population were all patients admitted to orthopaedics wards. The inclusion criteria were patients aged 50 years and above, Malaysian citizens, able to communicate in Bahasa Malaysia

and undergo total/hemi arthroplasty surgery, dynamic hip screw and have a family who will continue care at home after discharge. Patients were excluded if diagnosed with dementia, stay in the intensive care unit after surgery and were discharged to a daycare or senior citizen care centre.

The sample size calculation for this study was done using the method of two mean formulas the mean difference between the groups was 8 and the standard deviation (SP) was 10.39 between the two interventions [13]. From the calculation, the sample size required for this study was 26 people for each group. A 10% increment rate was applied to reduce the risk of attrition rate, equalling up to 58 samples required.

Patients who met the criteria were described in the study and given a patient information form. If the patient was interested in participating in the study, a consent form was given to the patient. Then patients were divided into a control group and an intervention group according to the number of numbers in the sealed envelope received (29 = intervention, 29 = Control). Patients in the intervention group were then given an adapted discharge plan by Murphy et al. within 24 hours after the patient was admitted to the ward [14]. A leaflet with the contents of pain management, bed rest and toileting, wound and skin care, rest and sleep, rehabilitation and special considerations were explained for approximately 15 minutes. The contents from the English language to Bahasa Malaysia were validated by three content experts in the field of medicine, nursing and literacy. Patients were told to contact the researcher by phone for further health education if still needed as long as the patient was in the ward until discharge to improve the patient's understanding.

Ethical permissions were obtained from UKMREC (Reference No: UKM PPI/111/8/JEP-2017-664) and Medical Research Ethics Committee (Reference No: KKM.NIHSEC/P17-2003 (6)). Patients in the control group received a discharge routine with a supply of a pamphlet containing The Do's and Don'ts to prevent prosthesis dislocation. Patients in the intervention group were then given a study leaflet within 24 hours after the patient was admitted to the ward. The researcher also provided an oral explanation based on the content of the pamphlet. Patients were told to contact the researcher for further health education if still needed as long as the patient was in the ward until before discharge to improve the patient understanding. The patient was given the researcher's phone number to contact for that purpose. Before the patient was discharged, demographic data were obtained from the patient while clinical data and length of stay in the ward were taken from the patient's medical records. One month after the patient was discharged, data for re-entry to the ward and drop rates were taken from the patient's medical records. Meanwhile, data on daily activities of life after a month of discharge were obtained by the researchers through phone calls with patients and family members.

Measurement

Data for the patient's daily living activities were obtained through phone calls after one month of discharge using a survey question entitled The Barthel Index [13]. The reliability of this instrument is 0.89 (test and retest reliability) and 0.95 (reliability between raters). It contains 10 items that use the Likert Scale (5 scales). The total scores for all items ranged from 0-20. The high total score indicates that the patient can live independently. The total score was also categorized as follows i.e., Score 0 to 3: high total dependence, Score 4 to 7: complete dependence, Score 8 to 12: Moderate dependence, Score 13 to 19: Low dependence and 20: completely independent. The reliability of The Barthel Index for this study was $\alpha=0.949$.

All data analysis in this study was performed using IBM SPSS version 21. Descriptive analysis such as frequency and percentage were used when describing the demographic and clinical characteristics of patients as well as the data of the main variables namely the category of daily living activities. While continuous data i.e. key variables (length of ward stay, ward re-admission rate, drop rate and daily living activities (total score) of patients after discharge are described using either mean and standard deviation (if data are normally distributed) or median (if data not normally distributed). Mann-Whitney was used to look at differences in ward length of stay, ward re-admission rate, fall rate and daily living activities (total score) between the intervention and control groups. Meanwhile, Chi-square was used to measure the differences in categorical data for daily living activities between the intervention and control groups.

3. RESULTS

The demographic characteristics of the subjects for this study are presented in Table 1. For the intervention group, the majority of subjects were age category between 80 to 89 years ($n = 12, 41.4\%$), male ($n = 15, 51.7\%$), Malay ($n = 22, 75.9\%$), primary education ($n = 16, 55.2\%$), widowed ($n = 18, 62.1\%$), unemployed ($n = 27, 93.1\%$), have income below RM500 per month ($n = 12, 41.4\%$) and live together with family ($n = 28, 96.6\%$). Meanwhile, the majority in the control group aged between 70-79 ($n = 37.9\%$) and 80-89 years ($n = 37.9\%$), female ($n = 21, 72.4\%$), Chinese ($n = 17, 58.6\%$), also primary schooling ($n = 22, 75.9\%$), widowed ($n = 19, 65.5\%$) and unemployed ($n = 28, 96.6\%$), had higher incomes than the intervention group (RM500-1000, $n = 18, 62.1\%$) and living with family ($n = 29, 100\%$). Differences in demographic characteristics between the intervention and control groups are shown in Table 2. The results of this analysis showed that subjects between the two study groups did not differ significantly for all demographic characteristics ($p > 0.05$) except race ($X^2 = 14.724, p = 0.001$). The size of this difference was large ($\phi = 0.669$) based on Cohen's (1988) table.

Table 3 shows the clinical data for the subjects of this study. The majority of subjects for both groups had high blood pressure/ heart disease although the number was higher for the intervention group ($n = 21, 72.4\%$) than for the control ($n = 24, 82.8\%$). The type of fracture experienced was almost the same for both groups, namely in the capsule (intervention group: $n = 18, 62.1\%$ and control group: $n = 20, 69\%$). The mechanism of injury experienced was the majority reported low impact for both groups where the total percentage of the control group was higher ($n = 28, 96.6\%$) than the intervention group ($n = 25, 86.2\%$). The differences in these clinical data were however not significant ($p > 0.05$).

Table 4 shows the differences in ward stay, ward re-admission rates, fall rate, and daily living activities between the intervention and control groups. The length of stay in the ward for the intervention group was lower (Median = 9.00; mean rank = 23.76) than the control group (Median = 10.00; mean rank = 35.24). This difference was significant ($U = 254, p = 0.008$). The effect size of this difference is 0.34, meaning that the size of the difference is moderate based on Cohen's (1988) table. The results of the Mann-Whitney test analysis showed no statistically significant difference in ward admission rate between the two groups in this study (Intervention: Median = 0.00; mean rank = 28.5 and control: Median = 0.00; mean rank = 30.50): $U = 391.5, p = 0.154$). The results of the analysis showed that there was no significant difference in the fall rate between the intervention and control groups (Intervention; Median = 0.00, mean rank = 28.50; Control: Median = 0.00; mean rank = 30.50): $U = 391.5, p = 0.154$.

Table 1: Demographic characteristics of the subjects

Variables	Overall(n=58)	Intervention Group (n=29)	Control Group (n=29)
	n(%)	n(%)	n(%)
Age			
50-59	2 (3.4%)	2 (6.9%)	0 (0%)
60-69	11 (19%)	5 (17.2%)	6 (20.7%)
70-79	20 (34.5%)	9 (31.0%)	11 (37.9%)
80-89	23 (39.7%)	12 (41.4%)	11 (37.9%)
>90	2 (3.4%)	1 (3.4%)	1 (3.4%)
Gender			
Male	23 (39.7%)	15 (51.7%)	8 (27.6%)
Female	35 (60.3%)	14 (48.3%)	21 (72.4%)
Race			
Malay	30 (51.7%)	22 (75.9%)	8 (27.6%)
Indian	6 (10.3%)	2 (6.9%)	4 (13.8%)
Chinese	21 (36.2%)	4(13.8%)	17 (58.6%)
Others	1 (1.7%)	1 (3.4%)	0 (0%)
Educational status			
Illiterate	17 (29.3%)	10 (34.5%)	7 (24.1%)
Primary schools	38 (65.5%)	16 (55.2%)	22 (75.9%)
Secondary school	3 (5.2%)	3 (10.3%)	0 (0%)
Marriage status			
Married	20 (34.5%)	11 (37.9%)	9 (31%)
Divorced	1 (1.7%)	0 (0%)	1 (3.4%)
Widow	37 (63.8%)	18 (62.1%)	19 (65.5%)
Occupation			
Factory	2 (3.4%)	1 (3.4%)	1 (3.4%)
Labor/contract	1 (1.7%)	1 (3.4%)	0 (0%)
Unemployed	55 (94.8%)	27 (93.1%)	28 (96.6%)
Family/own income			
<RM500	18 (31%)	12 (41.4%)	6 (20.7%)
>RM500-RM1000	26 (44.8%)	8 (27.6%)	18 (62.1%)
<RM1000-RM5000	13 (22.4%)	9 (31%)	4 (13.8%)
>RM5000	1 (1.7%)	0 (0%)	1 (3.4%)
Living with:			
Alone	1 (1.7%)	1 (3.4%)	0 (0%)
Family	57 (98.3%)	28 (96.6%)	29 (100%)

Table 2: Differences in Demographic Characteristics between Study Groups

Variables	Intervention Group (n=29) n(%)	Control Group (n=29) n(%)	X ²	p
Age				
50-69	7(24.1%)	22 (75.9%)	0.099	0.753
70 and above	6(20.7%)	23 (79.3%)		
Gender				
Male	15 (51.7%)	8 (27.6%)	0.2334	0.675
Female	14 (48.3%)	21 (72.4%)		
Ethnicity				
Malay	22 (75.9%)	8 (27.6%)	14.724	0.001*
Chinese	4(13.8%)	17 (58.6%)		
Indian and others	3(10.3%)	4 (13.8%)		
Educational status				
Illiterate	10 (34.5%)	7 (24.1%)	0.749	0.387
Going to school	19 (65.5%)	22 (75.9%)		
Marital status				
Married	11 (37.9%)	9 (31%)	0.305	0.581
Divorced/Widow	18 (62.1%)	20 (69.0%)		
Occupation				
Employed	2 (6.9%)	1 (3.4%)	0.352	0.553
Unemployed	27 (93.1%)	28 (96.6%)		
Family/own income				
Below RM1000	20 (69.0%)	24 (82.8%)	1.506	0.220
Above RM1000	9 (31.0%)	5 (17.2%)		
Stay with:				
Single	1 (3.4%)	0 (0%)	1.018	0.313
Family	28 (96.6%)	29 (100%)		

Note: X² = Chi-square; *Significant at 0.05.

Meanwhile, the subjects of the intervention group were more independent in performing daily activities (Median = 16; mean rank = 36.93) than the subjects of the control group (Median = 12; mean rank = 22.07). This difference was statistically significant (U = 205, p = 0.001). The effect size of this difference is 0.44, meaning that the size of the difference is moderate based on Cohen's (1988) table.

Table 5 shows the results of a descriptive analysis of the categorical data of daily living activities. The intervention group had more fully independent subjects (n = 7, 24.1%) and low dependence (n = 16, 55%) than the control group. Meanwhile, the control group had more subjects for moderate dependence (n = 13, 44.8%), complete (n = 4, 13.8%) and very high

(n = 1, 3.4%) than the intervention group. To see the differences in these daily living activities between the intervention and control groups, these five categories of daily living activities were reduced to two categories (fully independent='independent' while the other categories were consolidated into 'dependence') to meet the assumptions of the Chi-square [16]. The results of the analysis of Table 6 shows that there are significant differences between the two study groups and the category of daily living activities ($p = 0.05$). The p -value of 0.370 shows a moderate difference based on Cohen's (1988) table.

Table 3 : Clinical Data

Variables	Overall (n=58 n(%))	Intervention Group (n=29 n(%))	Control Group (n=29 n(%))	X ²	p
Chronic Disease					
High blood pressure/heart disease	45 (77.6%)	21 (72.4%)	24 (82.8%)	0.892	0.345
Other diseases	13 (22.4%)	8 (27.6%)	5 (17.2%)		
Type of fracture					
Outside capsule	20 (34.5%)	11 (37.9%)	9 (31%)	0.305	0.581
Inside capsule	38 (65.5%)	18 (62.1%)	20 (69%)		
Mechanism of injury					
High impact	5 (8.6%)	4 (13.8%)	1 (3.4%)	1.970	0.160
Low impact	53 (91.4%)	25 (86.2%)	28 (96.6%)		

Note: X²=Chi-square

Table 4: Differences in Ward Stay, Ward Re-admission Rates, Fall Rate and Daily Living Activities between the Intervention and Control Groups

Variable	Group	N	Mean Rank	Median	U	p
Ward Stay	Intervention	29	23.76	9.00	254	0.008*
	Control	29	35.24	10.00		
Ward Re-admission Rates	Intervention	29	28.50	0.00	391.5	0.154
	Control	29	30.50	0.00		
Fall Rate	Intervention	29	28.50	0.00	391.5	0.154
	Control	29	30.50	0.00		
Daily Living Activities	Intervention	29	36.93	16.00	205	0.001*
	Control	29	22.07	12.00		

Note: U = Mann-Whitney U Test *Significant at 0.05

Table 5 Daily Living Activities between the Intervention and Control Group

Daily Living Activities	Overall(n=58) n (%)	Intervention (n=29) n (%)	Control (n=29) n (%)
Very high dependency	1 (1.7%)	0 (0%)	1 (3.4%)
Complete dependency	7 (12.1%)	3 (10.3%)	4 (13.8%)
Moderate dependency	16 (27.6%)	3 (10.3%)	13(44.8%)
Low dependency	27 (46.6%)	16 (55.2%)	11 (37.9%)
Completely independent	7 (12.1%)	7 (24.1%)	0 (0%)

Table 6 Differences in Daily Living Activities (Dependence and Non-dependence) between the Intervention and Control Group

Variables	Daily Living Activities			<i>p</i>
	N	Dependency n(%)	Non- dependency n(%)	
Intervention	29	22(75.9%)	7(24.1%)	0.05*
Control	29	29(100%)	0(0%)	

Note: $X^2 = Chi-square$; *=Significant;
 (*Phi*)

4. DISCUSSION

The results of this study show that there is a significant difference in the length of stay in the ward between the intervention group and the control group in which the length of the intervention group stays in the ward is less than the control group and this difference is at a moderate size. However, the difference between the two groups did not occur for the rate of re-admission to the ward and the rate of falls. As for the activities of daily living, there is a significant difference between these two groups, in which the intervention group has a higher level of independence than the control group. The size of this difference is modest. When the level of independence was categorized into dependence and non-dependence, the results of the study found that all subjects of the control group could not be independent and required some dependence on others to perform daily activities of life, while the intervention group had 24.1% (n = 7) subjects who can be independent. These differences were significant and the size of the differences was moderate.

In this study, patients who had received a nursing discharge plan found that the length of stay in the ward was less than patients who received a routine discharge practice. These findings are in line with other studies [17], [18]. This study also supplied pamphlets on hip fractures, types of surgery and self-care after hip bone surgery to study subjects after they were admitted to the ward. According to Aasa et al., the provision of written information about surgery and expectations of what will happen after surgery along with self-care can encourage patient

involvement in postoperative self-care [19]. However, another study reported a positive effect of using music therapy after musculoskeletal surgery [20], [21]

Evidence has shown that discharge planning can reduce the rate of re-admission to the ward, where the length of stay in the ward for patients who receive a discharge plan is shorter than the group that does not receive a discharge plan [22]. In contrast to the study of Goldman et al., the discharge planning intervention in this study did not affect the rate of re-admission to the ward because the results of the study showed no significant difference between the intervention group and the control group [23]. In this study, the total ward re-admission rate for the control group was only twice while the total rate for the intervention group was zero (0). Although there were differences in terms of these rates, this study was unable to detect statistically significant differences. This may be due to such small differences and a small sample size. In this study, two subjects reported falling after discharge, which is once for each subject. Both were from the control group. For the intervention group, none of the subjects experienced a fall incident after discharge. However, statistically, this difference is not significant. A previous study showed that older people are at significant risk of falling post-discharge, with 50% of these incidents resulting in injury and 40% of them falling within six months of discharge [24].

Providing health education is an important component of discharge planning because it allows patients to continue self-care from the hospital and after discharge. The results of the nursing discharge plan in this study showed that the subjects of the intervention group had a higher level of independence than the control group. Other studies have also shown similar effects [27], [25]. The number of subjects who reported self-reliance was also high for the intervention group from the control group. These findings are also similar to previous studies [11]. Meanwhile, another study reported that the readiness of patients treated in hospitals before going home can be improved by applying a discharge planning model that used the METHOD (Medication, Environment, Treatment, Health teaching, Outpatient referral, Diet) approach [26]. Furthermore, a multidisciplinary approach using prescribed order entry and medication reconciliation is a low-cost, safe, and effective way to increase early morning discharges and improve patient flow for large hospitals with high volumes of scheduled patient admissions [27]. Moreover, a unit-based discharge coordinator can play an important part in enhancing the overall discharge experience for the patient and families by providing an effective and efficient approach to discharge and providing the patients and families with a feeling of preparedness [28].

This study was unable to detect small differences in ward re-admission findings and drop rates. This is likely due to the small sample size which causes the power to detect significant differences to be weak [29]. The components of discharge planning theory support health care continuity that can be described as a critical link between the treatment received by patients in the hospital with current post-discharge care in the community [30]. The strength of this study is also because the intervention of this study was conducted by only one intervener and thus it can reduce the bias that can occur due to different interveners during the intervention [31].

5. CONCLUSION

This study found that the use of an adapted nursing discharge plan at Hospital Melaka for patients with hip fractures has been shown to be effective by shortening the length of stay in the ward and increasing self-reliance among the intervention group. For patients with hip fractures, a nursing discharge plan with a comprehensive health education component should be considered from the time the patient is admitted to the ward until the time of discharge.

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