



Self-Perceived Study on Spirituality and Productivity among Tissue Engineering and Regenerative Medicine Researchers in Malaysia

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Abstract

There is little to suggest that tissue engineering and regenerative medicine (henceforth TERM) research productivity in Malaysia has been studied from the aspect of spiritual well-being of a researcher. Therefore, this study aimed to assess the spirituality level and productivity among local TERM researchers and to examine the association between both aspects. A structured, cross-sectional questionnaire-based study was conducted online after substantiating a Spirituality Scale (henceforth SS), previously published in one reputable international journal, from the Malaysian context. The SS is a 23-item questionnaire involving self-discovery, relationships, and eco-awareness subscales. The SS underwent few validation procedures which include face validity and in-depth cognitive interview. The SS was then delivered online by using the Google Form application to targeted population. The results were analyzed by using Kruskal Wallis test, Mann-Whitney (U) test and Spearman rank correlation test to analyze (1) the spirituality level of TERM researchers and (2) the relationship between the number of articles related to TERM published by researchers and the spirituality level based on the demographic factors. Most local TERM researchers in Malaysia experienced moderate or high level of spirituality. The overall productivity pattern showed that the total number of articles published by most researchers were between 2 to 5. There was a significant difference between religiosity of an individual and the spirituality level. However, there was no correlation between spirituality and productivity. It can be noted that spirituality level varies according to multiple demographic factors. This present approach in trying to measure the immeasurable dimension of man may be far from its intended purpose. However, an effort to explore this aspect should be initiated.

Keyword: Science, spirituality, productivity, tissue engineering, regenerative medicine

Abstrak

Tidak banyak yang boleh dicadangkan bahawa produktiviti kajian kejuruteraan tisu dan perubatan jana semula (mulai sekarang, TERM) di Malaysia telah dikaji daripada segi kesejahteraan kerohanian seseorang penyelidik. Oleh itu, kajian ini dihalatujukan untuk menilai taraf kerohanian dan produktiviti dalam kalangan penyelidik tempatan dalam bidang TERM dan untuk mengkaji perkaitan kedua-dua aspek itu. Satu kajian keratan lintang berasaskan soal selidik yang distrukturkan telah dijalankan dalam talian selepas mengesahkan Skala Kerohanian (mulai sekarang SS) yang dahulu diterbitkan dalam satu jurnal antarabangsa bereputasi baik, daripada konteks rakyat Malaysia. SS ialah satu soal selidik yang mempunyai 23 perkara melibatkan subskala penemuan diri, hubungan dan kesedaran ekologi. SS menjalani beberapa prosedur pengesahsahihan

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termasuk kesahan lahir dan temubual kognitif yang mendalam. SS kemudiannya dihantarkan dalam talian menggunakan aplikasi Google Form kepada populasi sasaran. Hasil kajian telah dianalisis menggunakan ujian Kruskal Wallis, ujian Mann-Whitney (U) dan ujian korelasi pangkat Spearman untuk menganalisis (1) taraf kerohanian para penyelidik TERM dan (2) perkaitan antara jumlah artikel berkaitan dengan TERM yang diterbitkan peyelidik dengan taraf

kerohanian berdasarkan faktor-faktor demografi. Kebanyakan penyelidik TERM tempatan di Malaysia mengalami taraf kerohanian sederhana atau tinggi. Corak produktiviti keseluruhan telah menunjukkan bahawa jumlah artikel berkaitan dengan TERM yang diterbitkan oleh kebanyakan penyelidik adalah antara 2 hingga 5 artikel. Terdapat perbezaan bererti antara kesalihan seseorang individu dan taraf kerohaniannya. Namun begitu, tiada hubung kait antara kerohanian dan produktiviti. Ia dapat diperhatikan bahawa taraf kerohanian berbeza mengikut pelbagai faktor demografi. Pendekatan semasa ini yang cuba mengukur dimensi manusia yang tidak dapat diukur mungkin jauh dari tujuan yang sepatutnya. Walau bagaimanapun, usaha untuk meneroka aspek ini harus dimulakan.

Introduction

In Malaysia, tissue engineering and regenerative medicine (TERM) research is progressing well from bench to bedside. It is a multidisciplinary field which applies the principles and methods of engineering and the life sciences towards the grounding understanding of structural and functional correlation in normal and abnormal tissue. Its primary purpose is the development of biological substitutes to restore, maintain, or improve function to overcome the shortage of organs for transplantation (Saxena, 2005). Due to these reasons, TERM field development in the country is vital to ensure the sustainability and the future growth of medical care and services.

Human beings, being a dual creature consisting of the physical and spiritual aspects, constitute the most important part of any scientific endeavor. Without humans, science would not progress. Both aspects in humans need to be in balance to ensure the well-being of a person. Any mistreatment to the either two will result in dire consequences. According to Delaney (2008), spirituality is a crucial and powerful element that can bring about and explain outcomes. The increasing frequency of spirituality research in various settings and disciplines has marked a rising trend in the inclusion of spirituality in healthcare, management, sociology, psychology and many other disciplines. Spirituality has been used as interventions to improve patients' health and well-being of employees in various organizations (Moberg, 2010; Monod et al., 2011). There has been a growing interest in workplace spirituality in the past few years, namely the spiritual awakening in American workplace due to the realization to include the humanistic element in the work environment (Harrington, Preziosi & Gooden, 2001; Garcia-Zamor, 2003; Rani, Ghani & Ahmad, 2013).

Spirituality and religiosity are often used interchangeably although some scholars argue they hold different meanings. Covey (2011) mentioned that the word "spiritual" is rooted in the spirit in which the meanings provided by dictionaries are with most being non-religious in nature. Generally, spirituality is an element in life that gives meaning, comfort and peace in an individual that brings about the behavior

of a person depending on the spirituality state (Parsian & Dunning AM, 2009).

It is believed that spirituality affects the productivity of a person. According to Geigle (2012), spirituality was found to have positive impacts on employees' commitments. The connection between work and the spiritual life is more than just excellent ethical behaviors, as people go to work not only with their body and minds but also with their souls. It is therefore important to ensure the spiritual state of an individual is good to ensure the well-being and productivity in the workplace (Garcia-Zamor, 2003). Thus, this study attempted to look at the spirituality aspect of local TERM researchers in Malaysia alongside the productivity of the field, in the hope to embody spiritual element in TERM research which may in turns help the positive progress of the field for the betterment of medical and health care services. There is very little study looking at the spirituality and productivity of researchers in Malaysia and how those two correlates to each other, more over in the field of TERM. This study aims to assess the spirituality and productivity among local TERM researchers. The specific objectives include to compare the level of spirituality and productivity of local TERM researchers in Malaysia between different local institutions, age, gender, educational role, number of years of joining TERM and the existence of belief systems. This study aims to fill the gap of literatures in discussing the spirituality aspect of local TERM researchers in relation with productivity of the field in Malaysia.

2. Material and methods

2.1 Study Design

A structured, cross-sectional questionnaire-based study was conducted online from 24th of May 2017 until 16th of June 2017 among TERM researchers in Malaysia. This study adopted and adapted the psychometrical Spirituality Scale (SS) (Delaney, 2005). The SS was a holistic tool attempting to measure the beliefs, intuitions, lifestyle choices, practices, and rituals representative of the human spiritual dimension (Delaney, 2005).

2.2 Sampling

The population of the study was the Malaysian researchers in the field of TERM that had been participating in the International Conference on Biomaterials and Tissue Engineering (IC-BITE) 2004, National Tissue Engineering and Regenerative Medicine Scientific Meeting (NTERMS) 2006 and Malaysian Tissue Engineering and Regenerative Medicine Scientific Meeting (MTERMS) 2008-2016.

A non-random sampling procedure was used as the sampling method for this study. Purposive sampling was used to selectively choose the participants to achieve the objective of this study. The participants were chosen among TERM researchers in Malaysia that had been participating in the IC-BITE 2004, NTERMS 2006 and MTERMS 2008-2016.

The participants for this study were thoroughly selected and searched with the use of the conference proceedings. A total of six (6) proceedings and 556 abstracts were studied to filter authors that met with the inclusion criteria of potential participants which include first author, corresponding author, author presenting the abstract, local affiliation (international authors were included). The exclusion criteria include international affiliation and authors other than the first, corresponding and presenting author.

After the listed potential participants were recognized, the email addresses were identified through the proceedings. Only two out of six proceedings provided the email address of authors. Thus, a considerable amount of time was taken to search for the remaining email address in the net. The total number of email addresses succeeded to be found was 143 with 14 out of it did not delivered to. Out of 129 targeted respondents, only 34 that gave feedbacks and answered the questionnaire producing a response rate of 26.4%.

2.3 Data Collection

The questionnaire was made available online through the Google Form application in the English language. It was divided into two parts attempting to address personal and demographic characteristics and the spiritual aspects consisting of relationships, eco-awareness and self-discovery respectively.

The socio-demographic section contains the personal information of the targeted participants including age, gender, primary language used, level of education and others. The SS contains a 23-item divided into three subscales measuring on self-discovery, relationships and eco-awareness. Self-discovery assists in exploring the meaning and purpose in life, enhancing the existential part of one's spirituality. Relationships subscale measures the

interconnectedness and consciousness of an individual. Eco-awareness of spirituality tends to assess the understanding of transpersonal nature of spirituality (Delaney, 2005). The scoring of SS (Table 1) could be an indicator of to what extent or how crucial the phenomenon of spirituality is to, or manifested and portrayed, by the individual (Delaney, 2005).

2.4 Statistical Analysis

The data collected from the questionnaire was processed and analyzed by using the Statistical Package for Social Sciences (SPSS) software version 21 for Windows. Kruskal Wallis test, Mann-Whitney test and Spearman rank correlation test was computed to assess the relationship between the number or articles related to TERM published by researchers and the spirituality level.

2.5 Pilot Study

Before conducting the actual study, a pilot study was done aiming to substantiate the SS, previously published in one reputable international journal, from the Malaysian context. The SS underwent few validation procedures. Firstly, face validity method of the SS was conducted with an expert, Dr. Abdurzak Abdulahi Hashi whose interests are in the topics related to the scholarship of comparative religion, professional ethics, interfaith dialogue, philosophy and Bioethics, specifically on biotechnology, biomedical practices, health and the ethics of environmental protection. Next, in-depth cognitive interviews were undertaken using the modified-SS with six local researchers who took part in the previous TERM conferences to identify items that are not well understood. Demographic profile of respondents was also included in the modified-SS.

An item was added to the original 23-item scale after the face validity step. Certain terms in the SS were modified to fit in the settings and nature of Malaysian and TERM scientists. Based on the SS scoring guidelines, 50% respondent had a moderate spirituality while another 50% having high level of spirituality. Most respondents misunderstood or misinterpreted few words in the modified-SS such as "meaning of life", "religious", "the unseen" and "sacred". Few technical errors in how the modified-SS was presented were also notified. The modified-SS underwent a final validation process with an expert in spirituality to finalize the questions that would be distributed to participants.

3. Results

3.1 Prevalence of Spirituality among Local TERM Researchers

The total number of participants was 34. The demographic details collected for this study were affiliation (or local institution), age, gender, primary language preference, educational level, role in TERM field, number of years of joining TERM field, number of articles related to TERM published by researchers, ethnicity, belief system and a couple of open-ended questions on religiosity and spirituality. The findings can be described and appreciated as below. The results are summarized in Figure 1-12.

The distribution of respondents based on various local institutions was; 16 (47.06%) from Universiti Kebangsaan Malaysia (UKM), 3 (8.82%) from Universiti Sains Malaysia (USM), 9 (26.47%) from Universiti Islam Antarabangsa Malaysia (UIAM), 2 (5.88%) from Universiti Putra Malaysia (UPM) and 1 (2.94%) from Universiti Malaya (UM), Universiti Tenaga Nasional (UniTEN), Universiti Teknologi MARA (UiTM) and other university respectively (Figure 1).

Out of 34 respondents, 29 (85.29%) was in the age ranging from 26 to 40 years old while 4 (11.76%) ranging from 41-55 years old and 1 (2.94%) ranging from 25 years old or below (Figure 2). 15 (44.12%) respondents were male while 19 (55.88%) were female (Figure 3). 24 (70.59%) respondents chose Malay language as their primary language preference with 4 (11.76%) choosing the English language and 2 (5.88%) respondents chose Chinese, Tamil and other language respectively (Figure 4).

Twelve (12; 35.29%) out of total respondents hold Doctorate and Bachelor degree respectively while 10 (29.41%) hold Master degree (Figure 5). Sixteen (16; 47.06%) respondents were researchers in TERM field while 13 (38.24%) were students and 5 (14.71%) were lecturers (Figure 6). Seventeen (17; 50.00%) respondents have been joining the field for about 2 to 5 years while 8 (23.53%) for 6 to 10 years, 5 (14.71%) for 11-15 years and 4 (11.76%) for 2 years and below (Figure 7). For the number of articles related to TERM published, the number of respondents were; 11 (32.35%) publishing 2 articles or below, 12 (35.29%) publishing 2 to 5 articles, 6 (17.65%) publishing 6 to 10 articles, 4 (11.76%) publishing 16 articles or above and 1 (2.94%) publishing 11 to 15 articles (Figure 8). Out of 34, 26 (76.47%) respondents were Malay while 3 (8.82%) were Indian and other ethnicities respectively. 2 (5.88%) of the total respondents were Chinese (Figure 9). A total of 27 (79.41%) respondents classified themselves in the Islamic belief system, 3 (8.82%) in Hindu, 2 (5.88%) in Buddha, 1 (2.94%) in Christian

and 1 (2.94%) would rather not say his belief system (Figure 10). For religiosity, 27 (79.41%) respondents claimed they are religious persons, 2 (5.88%) claiming otherwise, 4 (11.76%) claiming maybe with 1 (2.94%) would rather not say (Figure 11). For spirituality, (70.59%) respondents claimed they are spiritual persons with 1 (2.94%) claiming otherwise and 9 (26.47%) claiming maybe (Figure 12). Figure 13 demonstrates the distribution of respondents according to their spiritual level. One (1; 2.94%) out of overall 34 respondents experienced low level of spirituality, 12 (35.29%) respondents experienced moderate level of spirituality and 21 (61.76%) experienced high level of spirituality.

3.2 Comparison of Spirituality Level among Local TERM Researchers in Malaysia by Demographic Data Factors

Descriptive analysis and interpretation was made on the spirituality level of participants according to local institutions, age, gender, educational level, educational role, years of joining TERM and religiosity. Table 2 to 8 show the overall prevalence of spirituality level in different local institutions, age, gender, educational level, educational role, years of joining TERM and religiosity. The overall spirituality level showed that most participants from all local institutions experienced a high level of spirituality. UKM recorded the highest number of participants (n=16) with 9 participants who experienced high spirituality level and 1 participant experiencing low spirituality level. Most of the participants were ranging from the age of 26 to 40 years old (n=29) with 17 of them experienced high spirituality level. Both male and female were equal in the moderate spirituality level having 6 participants respectively. 13 female and 8 male participants experienced high spirituality level. The number of participants who hold Bachelor and Doctorate degree were equal (n=12). 9 participants with Bachelor degree and 8 participants with Doctorate degree experienced high spirituality level. Most of the researchers and students experienced high spirituality level. Participants who have joined the TERM field between 2 to 5 years constituted the highest number of participants experiencing high spirituality level (n=11). Among the overall 34 participants, 33 claimed as being religious (having a belief system) while 1 participant claimed the otherwise. Out of 33 that were religious, 21 experienced high spirituality level. The one claiming not to be religious experienced a low spirituality level.

Descriptive analysis and interpretation was made on productivity of participants according to local

institutions, age, gender, educational level, educational role, years of joining TERM and religiosity. Table 9 to 15 show the overall prevalence of productivity level in different local institutions, age, gender, educational level, educational role, years of joining TERM and religiosity. The overall productivity pattern showed that most participants from all local institutions published the total number of 2 to 5 articles related to TERM. 11 participants ranging from the age of 26 to 40 years old published 2 or below and between 2 to 5 articles respectively. 2 participants of both respective male and female published 16 or above number of articles while 4 males and 7 female participants published 2 or below number of articles. 4 participants who hold Doctorate degree published 16 or above number of articles while most participants with Bachelor degree published 2 or below number of articles and the ones with Master degree mostly published between 2 to 5 number of articles. 2 researchers and lecturers respectively published 16 or above number of articles while students (n=7) published between 2 to 5 number of articles. Participants who have joined the TERM field between 6 to 10 years have mostly published a total number of 2 to 5 articles related to the field. 8 participants who have joined the field between 2 to 5 years have published 2 to 5 number of articles while those who had been joining the field for 2 years or below had mostly published 2 articles or below. 12 participants who were religious had published 2 to 5 articles related to TERM while the one and only non-religious participants had published a total number of 16 or above articles.

The analysis for local institutions, age, educational level, educational role and years of joining TERM was performed by using Kruskal Wallis test. Table 16 shows the test-statistics of Kruskal Wallis test and p-values for local institutions, age, educational level, educational role and years of joining TERM relating to spirituality level. For local institutions, there was no difference in terms of spirituality level between various local institutions in the population ($\chi^2(2)=4.766$, UKM, n=16, USM, n=3, UPM, n=2, UIAM, n=9, UM, n=1, UiTM, n=1, UniTEN, n=1, p=0.689) because the p-value > 0.05. Similarly, there was no difference in terms of spirituality level between different ages ($\chi^2(2)=1.03$, 25 or below, n=1, 26-40, n=29, 41-55, n=4, p=0.598, two-tailed), educational level ($\chi^2(2)=2.599$, Doctorate, n=12, Master, n=10, Bachelor, n=12, p=0.273, two-tailed), educational role ($\chi^2(2)=2.978$, Lecturer, n=5, Researcher, n=16, Student, n=13, p=0.226, two-tailed) and years of joining TERM ($\chi^2(2)=0.428$, 2 or below, n=4, 2-5, n=17, 6-10, n=8, 11-15, n=5, p=0.934, two-tailed).

The analysis for gender and religiosity was performed by using Mann-Whitney (U) test. Table 17 shows the test-statistics of Mann-Whitney (U) test and p-values for local relating to spirituality level. For gender, there was no difference in terms of spirituality level between male and female in the population (U=118.00, Male=15, Female=19, p=0.317, two-tailed) because the p-value > 0.05. Oppositely, there was significance difference in terms of spirituality level between those who are religious and non-religious (U=0.00, Religious=33, Non-religious=1, p=0.048, two-tailed) as the p-value < 0.05. It is suggested that the spirituality level between those who are religious and non-religious has significant difference.

3.3 Correlation between Spirituality Level and Productivity

Descriptive analysis and interpretation was made on the spirituality level of participants and productivity. Table 18 show the overall prevalence of spirituality level based on productivity. Most participants that experienced moderate level of spirituality (n=5) published a total number of 2 or below articles related to TERM. 8 participants that experienced high spirituality level published 2 to 5 number of articles while 1 participants experiencing low level of spirituality published 16 or above number of articles related to TERM. A Spearman rank correlation test was computed to assess the relationship between number of articles related to TERM published by researchers and the spirituality level. There was a positive correlation between the two variables, $r=0.060$, n=34, p=0.738. The association is however statistically insignificant. Overall, there was no correlation between the number of articles related to TERM published by researchers and the spirituality level. Increase in the number of articles related to TERM published by researchers may not be directly related to the spirituality level.

4. Discussion

4.1 Prevalence of Spirituality Level among Local TERM Researchers

The present study was conducted within this context, to assess the spirituality level among local TERM researchers in Malaysia. Demographic factors that may influence spirituality were examined which include affiliation (or local institution), age, gender, primary language preference, educational level, role in TERM field, number of years of joining TERM field, number of articles related to TERM published by researchers (the productivity indicator in this study), ethnicity, belief system and a couple of open-

ended questions on religiosity and spirituality. Comparisons of spirituality level between different demographic groups were made. The SS was used to examine spirituality in adult population in which spirituality in this scale is defined as personal, interpersonal and transpersonal relationships in spiritual dimension. It was selected as the instrument to assess spirituality in local TERM researchers in Malaysia due to its strong evidence of content validity, reliability and factorial structure after being tested in 240 patients with chronic illness (Delaney, 2008). The different level of spirituality could be seen in the participants. It is noted that no participant experienced very low level of spirituality. This somehow indicates a positive relation between local TERM researchers and spirituality. Spirituality is seen to be acknowledged and lived by those researchers particularly on the aspects that the SS was trying to measure; self-discovery, relationships and eco-awareness (Delaney, 2008). The presence of spirituality in researchers is important as Geigle (2012) stated that the presence of it in workplace increases productivity according to a few empirical studies.

4.2 Comparison of Spirituality Level among Local TERM Researchers in Malaysia by Demographic Data Factors

This study found that one male participant in the age between 26 to 40 years old experienced a low spirituality level despite being in a local institution with the highest number of participants with high spirituality level, holding a Doctorate degree, joining the TERM field for 11 to 15 years and having no belief system. Spirituality, as defined by many, is a complete different as compared to religion. Dhiman (as cited in Rani et al., 2013) denotes that religion is the outward emphasis particularly on rituals and rites while spirituality is an emphasis on the inward nature on things.

Ecklund and Long (2011) reported that a group of scientists perceived spirituality and religion as being qualitatively different forms of constructs, claiming religion to be described as “organized, communal, unified and collective” as opposed to spirituality which deemed as “individual, personal and personally constructed”. On the other hands, spirituality was ascribed to individuality and religion to organizations or collectivity. Because of the character if spirituality that is less organized than the traditional religion, it is more attractive to some in the general population of scientists. Religion is perceived as organized while spirituality is wider and provides a better compatibility with the scientific thinking nature

(Ecklund & Long, 2011). However, in Islam, spirituality and religiosity hold the same meaning. Those two words are used interchangeably and no distinction is provided between those two terms. Without religious thoughts and actions, there is no spirituality and the religion of Islam provides the spiritual journey to salvation and is a system of life (Nasr S.H, 1987). According to Carroll, Sermabeikian and Spero (as cited in Hodge, 2001), spirituality is defined as a relationship with God or anything considered to be ultimate that brings about a sense of meaning and purpose in life that creates fruitful effects on individual’s relationship with own self, nature, others and the ultimate power. It is suggested that because this one participant have got no belief system or is non-religious in nature, creating low connection to meaning and self-discovery, integral connection to others and to nature and environment as to what the SS was trying to measure (Delaney, 2005).

Other than the participant above, most participants experienced either moderate or high level of spirituality. These may be due to several factors which include the pursuit of meaning in scientific discovery in which scientists are often searching for a sense of truth that is in line with the work they do as scientists (Ecklund & Long, 2011). Science is also perceived as a meaning-making process itself. In addition, spiritual practices have shown to affect the learning process of students. In the Islamic traditions, spiritual practices are crucial elements that could be a factor motivating students to achieve success and excellence (Radzi et al., 2016).

It is noted that most participants in various local institutions have published a total number of 2 to 5 articles related to TERM. This is in line with the fact that the field is still in its infancy state in Malaysia. Two participants from UKM have published 16 or above number of articles related to TERM. Tissue Engineering (TE) Laboratory of the National University of Malaysia Hospital (HUKM) being the front liner of the field in Malaysia has already established itself as a national reference center for TE research. In 1999, one small laboratory was set up with two principal investigators and a research assistant. It has since then grown to become Tissue Engineering Centre (TEC) and was acknowledged by the Ministry of Education as a centre of excellence in research in 2008 (Idrus, 2006 & Our Story – Introduction – Tissue Engineering Centre -UKMMC, 2015). It is believed that UKM championed the number of publications because of the title as national reference for the field in the country. Four participants holding Doctorate degree published a total number of 16 articles or above. This is perhaps due to the highest

educational title and longer period of involvement in the field. In contrary, most participants with Bachelor degree published two articles or below particularly due to the shorter time of involvement and lack of experience in the field.

There was no difference in terms of spirituality level between various local institutions, age, educational level and role and years of joining TERM. This is perhaps in line with a statement by Koenig (as cited in Geigle, 2012) that mentioned instruments measuring spirituality are heavily contaminated. The evolution of definitions of spirituality laid out by scientists associates spirituality with positive character traits or mental health measurement, in which those associations are believed to be meaningless and redundant. However, demographics situations have shown to be affecting spirituality in the workplace. Age, education and experience affect a leader's spiritual behaviors. While public service employees portray more spiritual essence in terms of the attitude. In different occupational groups, the concept of spirituality is varied. Spirituality has a lesser impact on ethical behavior in the United States as compared with in Norway. In addition, across generations, the meaning of spirituality also differs (Geigle, 2012). According to Rani et al. (2013), the turning towards spirituality and religion for remedies in workplace among aging baby boomers may contributed by the thirst for meaning in their work.

For gender, there was no difference in terms of spirituality level between male and female in the population. This is contradictory to a study by Sharique et al. (as cited in Geigle, 2012) showing female athletes found to be more spiritual than males. The increasing number of female workers in the workforce produces a demand for nourishing and caring at the workplace (Rani et al., 2013).

In contrary, there was a significance difference in terms of spirituality level between those who are religious and non-religious. People work not only with their hands and body but also with their hearts and spirit. It is only then the meaning and purpose could be found particularly in the workplace (Petchsawang & Duchon, 2009). As mentioned by Lambert, Marler and Hadaway (as cited in Ecklund & Long, 2011), the decline of organized religion in the advancement of secularism was demonstrated by the increasing trends of Americans classifying themselves as "spiritual". Spirituality, which is related to the soul and spirit as opposed to the materialistic and physical traits is highly related to religion (Radzi et al., 2016). It is suggested that perhaps the absence of a belief system and connectivity to a higher power of God produces less meaningful life of a person.

4.3 Correlation between Spirituality Level and Productivity

Most participants experiencing moderate of high level of spirituality published two articles or below up to 16 articles or above. Spirituality has been found to have several impacts on productivity and work performance in various organizations. According to Fry et al. (as cited in Geigle 2012), a positive correlation was found in military units between spiritual leadership and productivity. Spirituality at work is about a connectivity felt by a person towards others, gaining inner consciousness and mindful of meaningful work and that provides transcendence (Petchsawang & Duchon, 2009).

The result shows that increase in the number of articles related to TERM published by researchers may not be directly related to the spirituality level. This is opposed to the spiritual awakening in workplace movement that took place as a reaction to corporate greed in 1980s. Excellent performance in organizations is closely related to high morale and personal fulfillment of individuals, which in turns increases productivity (Garcia-Zamor, 2003).

Conclusion

Most local TERM researchers in Malaysia experienced moderate or high level of spirituality. Participants from UKM, UPM and UIAM published the highest number of articles related to TERM. Most participants of all ranges of age experienced high spirituality level despite the educational role and level. Participants who had been joining the field for a longer period of time showed a higher productivity level or higher number of articles related to TERM published. Most participants who are religious have moderate or high spirituality level.

For future study, it is suggested that the proper selection of spirituality scale should be done as spirituality research in Malaysia is still new and there are not many articles relating to the titles provided in Malaysian context. The sample size should be increased and a randomized sampling should be used to generalize the result to a wider population.

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Appendices

A. Tables

Table 1: The theory of possible scoring of SS ranging from 23-138

Status	Level of Spirituality	Scores
Spiritual distress	Very Low	23-60
Potential for spiritual distress	Low	61-91
Possible potential for spiritual distress	Moderate	92-117
Spiritual wellness	High	118-138

*Excerpted from Delaney (2005)

Table 2: Level of spirituality in respective local institution (n=34)

Local Institutions	Very Low	Low	Moderate	High
UKM	0	1	6	9
USM	0	0	1	2
UPM	0	0	0	2
UIAM	0	0	4	5
UM	0	0	1	0
UiTM	0	0	0	1
UniTEN	0	0	0	1
Others	0	0	0	1

Table 3: Level of spirituality in different range of age (n=34)

Age	Very Low	Low	Moderate	High
25 or below	0	0	0	1
26-40	0	1	11	17
41-55	0	0	1	3

Table 4: Level of spirituality in different gender (n=34)

Gender	Very Low	Low	Moderate	High
Male	0	1	6	8
Female	0	0	6	13

Table 5: Level of spirituality in different educational level (n=34)

Educational Level	Very Low	Low	Moderate	High
Bachelor	0	0	3	9
Master	0	0	6	4
Doctorate	0	1	3	8

Table 6: Level of spirituality in different educational role (n=34)

Educational Role	Very Low	Low	Moderate	High
Lecturer	0	1	2	2
Researcher	0	0	7	9
Student	0	0	3	10

Table 7: Level of spirituality based on the number of years of joining TERM (n=34)

Years of Joining TERM	Very Low	Low	Moderate	High
2 or below	0	0	2	2
2-5	0	0	6	11
6-10	0	0	3	5
11-15	0	1	1	3

Table 8: Level of spirituality based on the religiosity (n=34)

Religiosity	Very Low	Low	Moderate	High
Religious	0	0	12	21
Non-religious	0	1	0	0

Table 9: Productivity in different local institutions (n=34)

Institutions	2 or Below	2-5	6-10	11-15	16 or Above
UKM	5	5	3	1	2
USM	0	1	2	0	0
UPM	0	1	0	0	1
UIAM	4	4	0	0	1
UM	1	0	0	0	0
UiTM	0	1	0	0	0
UniTEN	0	0	1	0	0
Others	1	0	0	0	0

Table 10: Productivity in different range of age (n=34)

Age	2 or Below	2-5	6-10	11-15	16 or Above
25 or below	0	1	0	0	0
26-40	11	11	4	1	2
41-55	0	0	2	0	2

Table 11: Productivity in different gender (n=34)

Gender	2 or Below	2-5	6-10	11-15	16 or Above
Male	4	5	3	1	2
Female	7	7	3	0	2

Table 12: Productivity in different educational level (n=34)

Educational Level	2 or Below	2-5	6-10	11-15	16 or Above
Bachelor	6	5	1	0	0
Master	4	5	1	0	0
Doctorate	1	2	4	1	4

Table 13: Productivity in different educational role (n=34)

Educational Role	2 or Below	2-5	6-10	11-15	16 or Above
Lecturer	1	0	2	0	2
Researcher	4	5	4	1	2
Student	6	7	0	0	0

Table 14: Productivity based on the number of years of joining TERM (n=34)

Years of Joining TERM	2 or Below	2-5	6-10	11-15	16 or Above
2 or below	4	0	0	0	0
2-5	7	8	2	0	0
6-10	0	4	3	1	0

11-15	0	0	1	0	4
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Table 15: Productivity based on the number of years of joining TERM (n=34)

Religiosity	2 or Below	2-5	6-10	11-15	16 or Above
Religious	11	12	6	1	3
Non-religious	0	0	0	0	1

Table 16: Test-statistics of Kruskal Wallis test for spirituality level between local institutions, age, educational level, educational role and number of years of joining TERM.

Demographic data	Mean Rank	Kruskal Wallis H Test	p-value
Local Institutions			
a. UKM (n=16)	16.38	4.766	0.689
b. USM (n=3)	18.50		
c. UPM (n=2)	24.00		
d. UIAM (n=9)	16.67		
e. UM (n=1)	7.50		
f. UiTM (n=1)	24.00		
g. UniTEN (n=1)	24.00		
h. Others (n=1)	24.00		
Age			
a. 25 or below (n=1)	24.00	1.030	0.598
b. 26-40 (n=29)	16.95		
c. 41-55 (n=4)	19.88		
Educational Level			
a. Doctorate (n=12)	17.96	2.599	0.273
b. Master (n=10)	14.10		
c. Bachelor (n=12)	19.88		
Educational Role			
a. Lecturer (n=5)	12.80	2.978	0.226
b. Researcher (n=16)	16.78		
c. Student (n=13)	20.19		
Years of Joining TERM			
a. 2 or below (n=4)	15.75	0.428	0.934
b. 2-5 (n=17)	18.18		
c. 6-10 (n=8)	17.81		
d. 11-15 (n=5)	16.10		

Table 17: Test-statistics of Mann-Whitney (U) test for spirituality level between gender and religiosity.

Demographic data	Mean Rank	Mann-Whitney U	p-value
Gender			
a. Male (n=15)	15.87	118.000	0.317
b. Female (n=19)	18.79		
Religiosity			
a. Religious (n=33)	18.00	0.000	0.048
b. Non-religious (n=1)	1.00		

Table 18: Number of articles related to TERM published and spirituality level.

Spirituality Status No. of Articles Related to TERM published	Very Low	Low	Moderate	High
	2 or below	0	0	5

2-5	0	0	4	8
6-10	0	0	3	3
11-15	0	0	0	1
16 or above	0	1	0	3

B. Figures

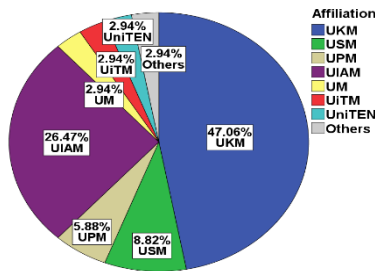


Fig. 1 Distribution of subjects according to affiliation.

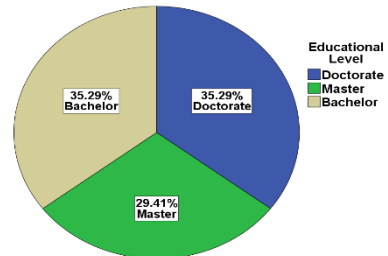


Fig. 5 Distribution of subjects according to educational level

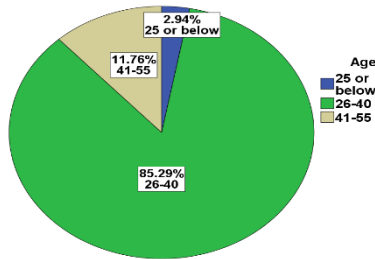


Fig. 2 Distribution of subjects according to age.

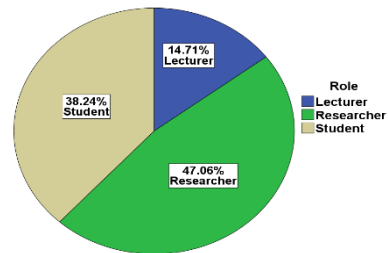


Fig. 6 Distribution of subjects according to their roles in TERM field.

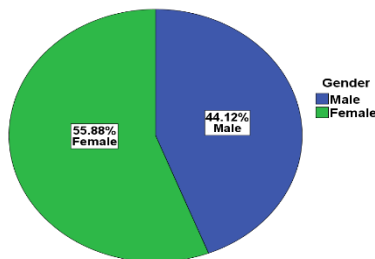


Fig. 3 Distribution of subjects according to gender.

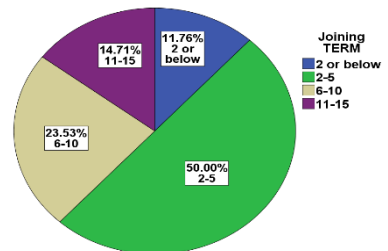


Fig. 7 Distribution of subjects according to number of years of joining TERM.

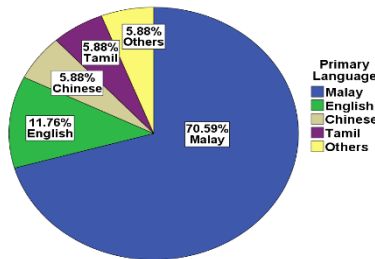


Fig. 4 Distribution of subjects according to primary language.

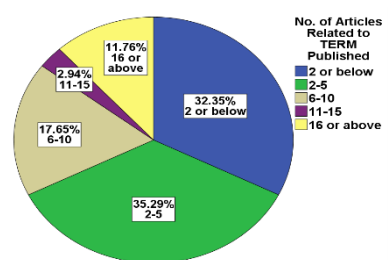


Fig. 8 Distribution of subjects according to the number of articles related to TERM published.

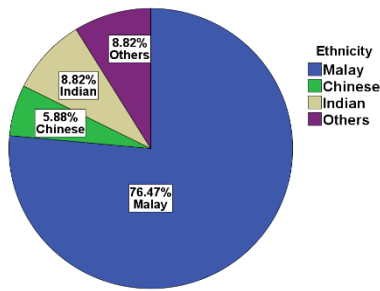


Fig. 9 Distribution of subjects according to the ethnicity

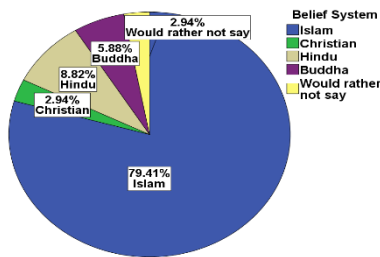


Fig. 10 Distribution of subjects according to the belief system.

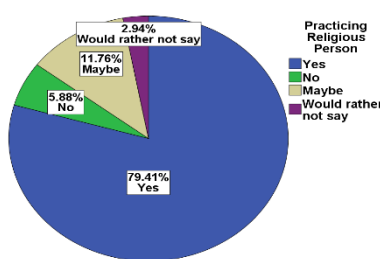


Fig. 11 Distribution of subjects according to the opinion on being practicing religious person.

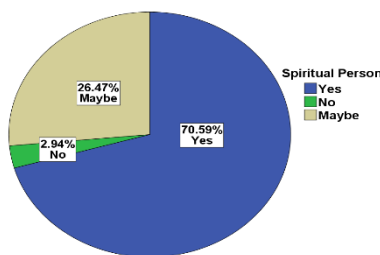


Fig. 12 Distribution of subjects according to the opinion on being spiritual person

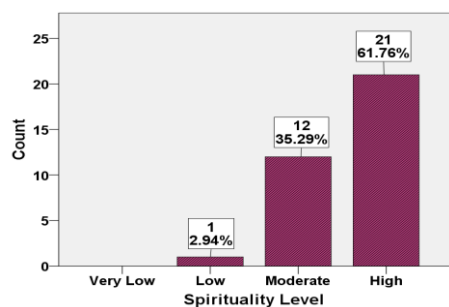


Fig. 13 Distribution of subjects according to the level of spirituality.

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