Jurnal Sains Kesihatan Malaysia 24 (1) 2026: 18-28
DOI : http://dx.doi.org/10.17576/JSKM-2025-2401-03

Attitude and Motivation Influence the Research Performance among Academicians at Malaysian Research University

(Sikap dan Motivasi Mempengaruhi Prestasi Penyelidikan dalam Kalangan Ahli Akademik di Universiti Penyelidikan Malaysia)

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Abstract

Despite publishing and securing research grants being obligatory in research universities, the literature on the factors influencing academic productivity is relatively scarce. Thus, in this study, we aimed to determine the personal and behavioural-related factors that influence the culture of publishing and securing research grants among academicians with lower research-related performance. This cross-sectional study was conducted among 49 academic staff members of Universiti Kebangsaan Malaysia (UKM). A self-administered questionnaire consisting of personal, attitude and behavioural (barriers, perceived stress scale, work extrinsic and intrinsic motivation scale, psychological well-being scale, and basic needs satisfaction scale) questions were distributed during a workshop and online. Simple linear regression (SLR) analyses were performed for each variable, followed by multiple linear regression (MLR) to identify the associated factors of research output. After adjusting for covariates, having a doctoral degree (β=0.396, 95% CI=0.221-2.146, p<0.05) and integrated regulation (β=0.574, 95% CI=0.036-3.612, p<0.05) were found to be associated with research grant acquisition (R2=0.273). Moreover, increasing age (β=0.426, 95% CI=0.088-0.397, p<0.05), living alone (β=0.331, 95% CI=0.944-6.626, p<0.05), having a doctoral degree (β=0.248, 95% CI=0.174-6.747, p<0.05), environmental mastery (β=0.318, 95% CI=0.013-0.347, p<0.05), self-acceptance (β=0.284, 95% CI=0.010-0.242, p<0.05), satisfaction incompetence (β=0.273, 95% CI=0.001-0.200, p<0.05) and relatedness (β=0.280, 95% CI=0.001-0.116, p<0.05) were found to be the factors that influence the publications produced among participants (R^2=0.423). The findings of this study could be used by management to formulate effective strategies to increase the productivity of academics in their research-related performance.

Keywords: research; grant; publication; attitude; behavioral; factor; academic

Jurnal Sains Kesihatan Malaysia 24 (1) 2026: 18-28
DOI : http://dx.doi.org/10.17576/JSKM-2025-2401-03

Abstrak

Berbanding dengan kewajipan menerbitkan dan memperoleh geran penyelidikan di universiti penyelidikan, kajian mengenai faktor yang mempengaruhi produktiviti akademik masih terhad. Oleh itu, kajian ini bertujuan untuk menentukan faktor peribadi dan tingkah laku yang mempengaruhi budaya penerbitan dan pemerolehan geran penyelidikan dalam kalangan ahli akademik dengan prestasi penyelidikan yang lebih rendah. Kajian keratan rentas ini dijalankan dalam kalangan 49 staf akademik Universiti Kebangsaan Malaysia (UKM). Soal selidik yang diisi sendiri, merangkumi maklumat peribadi, sikap, serta faktor tingkah laku (halangan, skala tekanan yang dirasakan, skala motivasi intrinsik dan ekstrinsik kerja, kesejahteraan psikologi, dan skala kepuasan keperluan asas), diedarkan semasa bengkel dan secara dalam talian. Analisis regresi linear mudah (SLR) dilakukan untuk setiap pemboleh ubah, diikuti oleh regresi linear berganda (MLR) bagi mengenal pasti faktor yang berkaitan dengan hasil penyelidikan. Selepas pelarasan kovariat, memiliki ijazah kedoktoran (β=0.396, 95% CI=0.221-2.146, p<0.05) dan regulasi bersepadu (β=0.574, 95% CI=0.036-3.612, p<0.05) didapati berkaitan dengan pemerolehan geran penyelidikan (R^2=0.273). Selain itu, peningkatan umur (β=0.426, 95% CI=0.088-0.397, p<0.05), tinggal bersendirian (β=0.331, 95% CI=0.944-6.626, p<0.05), memiliki ijazah kedoktoran (β=0.248, 95% CI=0.174-6.747, p<0.05), penguasaan persekitaran (β=0.318, 95% CI=0.013-0.347, p<0.05), penerimaan kendiri (β=0.284, 95% CI=0.010-0.242, p<0.05), kepuasan dalam kecekapan (β=0.273, 95% CI=0.001-0.200, p<0.05) dan keterkaitan sosial (β=0.280, 95% CI=0.001-0.116, p<0.05) didapati mempengaruhi bilangan penerbitan (R^2=0.423). Hasil kajian ini boleh digunakan oleh pihak pengurusan untuk merangka strategi berkesan dalam meningkatkan produktiviti akademik dalam penyelidikan.

Kata kunci: penyelidikan; geran; penerbitan; sikap; tingkah laku; faktor; akademik

INTRODUCTION

The quality and recognition of research-related productivity are important and are obligatory among academicians, as these measures contribute to the performance and reputation of higher education institutions. In Malaysia, there has been a noticeable increase in research activities and publications since 2006 (Bakri, Azura, Nadzar, Ibrahim, & Tahira, 2017). The transformation of the nation to a highly intellectual society has become one of the Malaysian government's visions, whereby an increase in publication productivity is equated to increased quality in research and development (R&D) (Bakri et al., 2017; Chapman et al., 2017). Therefore, the basis of the establishment of research universities (RUs) within Malaysian public universities was to increase research-related activities, including teaching and learning (Ramli et al., 2013). The Malaysian government and funding bodies have also allocated a large amount of funds to support RUs in their continuous research-based initiatives that include innovations, publications and other related outcomes (Amran, Rahman, Salleh, Ahmad, & Haron, 2014).

Regarding research productivity, one of the most common evaluation methods is to assess the rate and quality of publications (Shabazi-Moghadam et al., 2015). Most of the universities and funding agencies consider traditional paper-based publications such as journal articles, conference papers, books or chapters as the output of university research (Bakri et al., 2017). Publication rates both are used as an indicator of individual and institutional performance and are important criteria in achieving external funding from governmental and other professional bodies and agencies (McGrail, Rickard, & Jones, 2006). In addition, the performance of an academician is evaluated based on the number and value of research grants secured (Bakri et al., 2017). Both publications and research grants are included as part of the key performance index (KPI) of academicians to account for their research performance. Notably, these are also some of the measurements for global university rankings and strategies to attract student enrollment (Shabazi-Moghadam et al., 2015). However, in reality, it is reported that only a small percentage of academics are productively publishing globally (McGrail et al., 2006).

Research grant attributes, such as the amount of funding obtained, can affect the possibility that a paper will be published in highly competitive journals (Jung, Seo, Kim, & Kim, 2017). Funding is a critical factor for science and engineering disciplines compared to social sciences, which require fewer facilities and lower costs. It has been reported that funding increases the quantity of research output (Amara, Landry, & Halilem, 2015) and the quality of studies (Reed et al., 2007). The positive relationship between research grants and productivity can be explained by the fact that the recipients of grants with higher funding are more likely to dedicate their time and energy to research activities (Svider et al., 2013). In contrast, research grant funding is not a guarantee for productive research output for the National Institutes of Health (NIH) (Jacob & Lefgren, 2011). Therefore, the association between the research grant acquired and its productivity is arguable and requires further

investigation.

Beyond grants and publications, which represent the tangible constructs of research productivity, other factors may determine whether the academicians are able to meet performance expectations. Personal factors, such as age, academic rank and level of qualification, are commonly used to measure research productivity. For instance, studies suggest that research output often peaks during mid-career years before declining at older ages, while higher academic rank and doctoral qualifications are consistently associated with greater research engagement and output due to accumulated experience, networks, and research training (Baldwin et al., 2005; Kyvik & Olsen, 2008; Nasser-Abu Alhija & Majdob, 2017). In addition, behavioural and environmental factors also play a central role. Time allocated to research activities is strongly correlated with publication output, yet time constraints remain one of the most common barriers faced by academics (Shin & Cummings, 2010; Sanmugam & Rajanthran, 2014). Collaboration, particularly at the international level, has been identified as a hallmark of prolific researchers, often leading to higher publication counts and greater visibility (Kwiek, 2016; Akbaritabar et al., 2018). Environmental support, such as institutional research culture, workload management, postgraduate student quality, and research assistance, together with motivational drivers like incentives, recognition, and promotion opportunities, further shape research engagement and productivity (Dhillon, Ibrahim, & Selamat, 2015; Mokhtar & Noordin, 2019).

Despite this growing body of evidence, little is known about how these personal and behavioural constructs interact in the Malaysian context, particularly among academicians who do not consistently achieve their research performance targets. Little is known about how personal and behaviour-related constructs interact with grant acquisition and publication outcomes. Thus, this study was conducted to determine the personal and behavioural-related factors that influence research grant and publication productivity among academicians at Universiti Kebangsaan Malaysia (UKM) who previously had lower research performance.

METHODOLOGY

Framework

This cross-sectional study was conducted among academicians at UKM, Malaysia. UKM is recognized as one of the RUs in Malaysia based on its achievements in the research field. It is located on three campuses, which are at Bangi, Cheras and Kuala Lumpur. A total of 49 academic staff members from all 13 faculties of UKM were chosen based on previous unsatisfactory research output, which is the total number of research grants secured and publications (data from 2019-2020). Inclusion criteria included permanent staff, age below 50 years old and lower research output (did not achieve the publication target of at least two research articles per year). A purposive sampling was conducted in which the deans of each of the 13 faculties at UKM were contacted to suggest two to four respondents meeting the inclusion criteria depending on the size of the faculty. Data of participants with lower performance on each rank were obtained from the deans of all 13 faculties at UKM. Prior to participation, written information was given, and written informed consent was acquired from all participants.

Data collection technique and study instrument

A survey was conducted to collect data from the participants through a workshop and online administration. A total of 60 survey invitations were distributed to participants, and only 49 questionnaires were returned, for an overall response rate was 81.7%. The questionnaire consisted of personal information, years of service, field of study being management, current position and workload, collaboration and networking, funding, publication, research profile and total number of those who are postgraduates and postdoctoral supervised. The following set of questionnaires on behavioral factors was used:

1. The **barriers scale** is a 16-item measure that is applied for assessing the general barriers to publication (Funk et al. 1991). The participants were instructed to rate the statements on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scores are obtained by summing across all the scale items. Higher scores indicate high barriers to publication faced by the participants. This scale had good internal consistency, as the Cronbach's alpha coefficient is .84.
2. The **perceived stress scale (PSS)** consists of 10 items and is a measure of the degree to which situations in one's life are appraised as stressful (Cohen, 1994). The Malay version of PSS-10 was applied in this study, as validated by previous studies (Al-Dubai, Barua, Ganasegeran, Jadoo, & Rampal, 2014; Al-Dubai, Alshagga, Rampal, & Sulaiman, 2012). Participants were instructed to rate statements on a scale ranging from 0 (never) to 4 (very often). PSS scores were obtained by reversing the responses to the four positively

stated items and then summing across all scale items. Higher scores are indicative of a higher level of perceived stress. The Cronbach's alpha coefficient of this scale was .80, indicating an acceptable level of internal consistency.

3. The **work extrinsic and intrinsic motivation scale (WEIMS)** consists of 18 items used for measuring the level of work motivation, where identification, integration and intrinsic motivation are the prototypes of self-determined motivations, whereas motivation, external regulation, and introjection are categorized as non-self-determined motivations (Tremblay, Blanchard, Taylor, Pelletier, & Villeneuve, 2009). Participants were asked to indicate, on a Likert-type scale ranging from 1 (does not correspond at all) to 5 (corresponds exactly), the extent to which the items represent the reasons they are presently involved in their work. In this study, the internal consistency (Cronbach's alpha coefficient) of this scale was .80.
4. The **psychological well-being scale (PWB)** has 18 items that were used to determine six aspects of well-being and happiness: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance (Ryff & Keyes, 1995). Participants were instructed to rate statements on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). One-half of the items were negatively worded and reverse-scored, with higher total scores indicating greater levels of well-being. In this study, the scale had adequate internal consistency, with a Cronbach's alpha of .74.
5. The **revised basic needs satisfaction** in general scale is a 16-item measure that is used for assessing the satisfaction of three psychological needs—autonomy, competence, and relatedness—through self-determination theory (Johnston & Finney, 2010). Participants were instructed to indicate how true they felt each statement was of their life and to respond on a scale ranging from 1 (not at all true) to 3 (very true). Higher scores indicate a higher level of satisfaction of needs. The Cronbach's alpha coefficient was .78, indicating that this scale has adequate internal consistency.

Table 1. Baseline characteristics of participants [presented as the mean ± standard deviation and number of participants (%)]

Parameter	Total (N=49)	Men (N = 11)	Women (N = 38)	p-value
Demographics				
Age	37.33 ± 7.49	34.91 ± 3.08	38.03 ± 8.24	0.228
Marital status				
Married	30 (61.2%)	8 (72.7)	23 (59.5)	0.499
Single/divorced	19 (38.8%)	3 (27.3)	15 (40.5)	
Number of households	4.09 ± 2.09	4.55 ± 1.70	3.94 ± 2.19	0.408
Living alone	8 (16.3%)	1 (9.1)	7 (18.9)	0.661
Education level				
PhD	44 (89.8%)	9 (81.8)	35 (92.1)	0.311
Years of service	7.82 ± 5.48	4.37 ± 4.07	8.82 ± 5.47	0.016*
Administrative position	32 (65.3%)	7 (63.6)	25 (65.8)	0.582
Research network	28 (59.6%)	7 (63.6)	21 (58.3)	0.520
Ministry	11 (22.4%)	3 (27.3)	8 (22.2)	0.703
International	10 (20.4%)	2 (18.2)	8 (22.2)	0.570
NGO	1 (2.0%)	0 (0.0)	1 (2.8)	0.766
Other	10 (20.4%)	3 (27.3)	7 (19.4)	0.679
Research funding	41 (83.7%)	9 (81.8)	32 (84.2)	0.584
Supervision of postgraduate students	40 (81.6%)	9 (81.8)	31 (81.6)	0.679
Research profile				
Google scholar	43 (87.8%)	10 (9.7)	33 (86.8)	0.592
UKMExpert	27 (55.1%)	5 (45.5)	22 (57.9)	0.510
Publons	12 (24.5%)	5 (45.5)	7 (18.4)	0.108
Academia	18 (36.7%)	3 (27.3)	15 (39.5)	0.724
ResearchGate	37 (75.5%)	8 (72.7)	29 (76.3)	0.545
Other	7 (14.3%)	4 (36.4)	3 (7.9)	0.036*

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Frequency of reading articles				
Everyday	4 (8.2%)	1 (9.1)	3 (8.1)	0.264
Once a week	20 (40.8%)	3 (27.3)	17 (45.9)	
Once a month	22 (44.9%)	5 (45.5)	16 (43.2)	
Rarely	3 (6.1%)	2 (18.2)	1 (2.7)	
Total Publication produced	4.96 ± 4.29	4.82 ± 4.62	5.00 ± 4.25	0.903
Total Research grant acquired	1.14 ± 0.91	1.09 ± 0.94	1.16 ± 0.92	0.833

***** $p<0.05$ significant at two-tailed using Independent t-test for continuous independent variable and Pearson Chi-square forcategorical variable. Notes: PhD = Doctor of Philosophy; NGO = nongovernmental organization.

Outcome variables

In this study, we used the number of research grants acquired and publications produced from 2019 to 2020 as the research outcomes of participants. The publication output included journal articles, proceedings and conference papers, books and chapters. Data on research grants were obtained from the UKM Centre for Research and Instrumentation (CRIM), whereas the total number of publications produced by the participants was acquired from the university librarian.

Statistical Analysis

The data were analyzed using IBM Statistical Package for Social Sciences (IBM, SPSS), version 25.0 (Licensed materials - SPSS Incorporation, Chicago, United States). The statistical significance level was fixed at $p < 0.05$ for all tests. Descriptive statistics and frequency analysis were used to analyze the overall characteristics of participants. The variables were normally distributed and presented as the means and standard deviations for continuous variables or as percentages for categorical variables. The association between each factor and the outcomes (research grant and publication) was determined using simple linear regression (SLR) analysis. All the significant factors ($p < 0.05$) from the SLR analysis were further analyzed using multiple linear regression (MLR) analysis individually and adjusted for confounding variables (age, living alone, doctoral qualification, funding, and supervision of postgraduates). Specifically, categorical variables were dummy-coded prior to inclusion in the regression models, with one category designated as the reference group. The significant variables ($p < 0.05$) in the MLR analysis were those factors associated with the research grant and publication among the academic staff at UKM.

RESULTS

As shown in Table 1, the mean age of the participants was 37.33 ± 7.49 years (age range 30 to 44 years), they were predominantly women, married, and living together with family, and their highest qualification was either a master's degree or PhD (doctorate). Men participants (4.37 ± 4.07 years) had lower years of service as compared to women participants (8.82 ± 5.47 years) ($p<0.05$). About 65.3% of the participants held an administrative position. Only 59.6% of participants had research networks, of which most of the collaborators were from ministries and others funding bodies. Approximately 83.7% of participants had acquired research grants, and 81.6% had supervised postgraduate students. The majority of participants had research profiles, particularly on Google Scholar (87.8%) and ResearchGate (75.5%). Furthermore, only 6.1% of the participants did not read journal articles regularly, while most of them read at least once a month (44.9%) and once a week (40.8%). Noted that, there is no association between gender and total of publication ($p>0.05$). Similarly, no association also was reported between gender and total research grants acquired by the participants. Since there were no gender differences in both research output, further analysis was based on overall participants. In addition, the findings demonstrated that 89.8% of participants were moderately stressed (Figure 1).

As shown in Table 2, the SLR analysis showed the direct influence of demographic and behavioral factors on the number of research grants and number of publications produced by participants. For research grants, this finding revealed that demographic factors such as age, education level, and number of postgraduate students supervised were significantly associated with the number of research grants acquired by participants ($p < 0.05$). In addition, self-determined motivation (integrated and identified regulation) in the WEIMS and environmental mastery in the PWB scales significantly predicted the research grants secured ($p < 0.05$ for all parameters). No significant association was found between research grants and the barriers scale, perceived stress scale and basic need satisfaction scale ($p > 0.05$).

In addition, demographic factors including age, living alone, PhD holder, research funding, and number of postgraduates supervised significantly influenced the total number of publications produced by participants ($p < 0.05$ for all parameters). Two

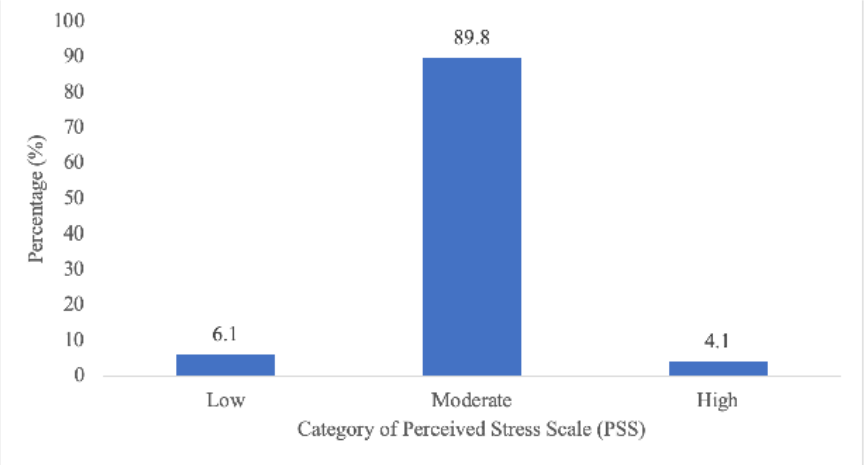

Figure 1. Percentage of participants according to stress level in the PSS

components in the PWB scales (i.e., environmental mastery and self-acceptance) were significantly associated with total publication ($p < 0.05$ for both parameters). Similarly, two components in the basic need satisfaction scale (i.e., competence and relatedness) appeared as predictors of publication ($p < 0.05$). There was no association found between publication and barriers, the perceived stress scale and the WEIMS ($p < 0.05$).

Table 2. The relationships among demographic, attitude and behavioral factors and research outcome (research grants and publication) in the SLR analysis

Parameter	Research grant		Publication	
	β (95% CI)	p-value	β (95% CI)	p-value
Age	0.289 (0.001 – 0.069)	0.044*	0.447 (0.106 – 0.406)	0.001*
Gender	0.031 (-0.568 – 0.702)	0.833	0.018 (-2.801 – 3.165)	0.903
Marital status	0.192 (-0.184 – 0.896)	0.192	-0.067 (-3.197 – 2.020)	0.652
Living alone	0.166 (-0.305 – 1.105)	0.259	0.352 (0.846 – 7.204)	0.014*
No. of households	-0.137 (-0.183 – 0.067)	0.358	-0.249 (-1.127 – 0.086)	0.091
Education level - PhD	0.352 (0.230 – 1.870)	0.013*	0.299 (0.261 – 8.111)	0.037*
Year of services	0.128 (-0.027 – 0.070)	0.380	0.084 (-0.163 – 0.295)	0.564
Administrative position	0.163 (-0.241 – 0.858)	0.264	0.094 (-1.766 – 3.442)	0.520
Research network	0.226 (-0.121 – 0.941)	0.127	0.053 (-2.166 – 3.087)	0.726
Research funding			0.360 (0.992 – 7.276)	0.011*
Supervision	0.308 (0.068 – 1.371)	0.031*	0.443 (1.967 – 7.733)	0.001*
Research profile	0.229 (-.214 – 1.939)	0.114	0.218 (-1.205 – 8.930)	0.132
Frequency of reading articles	-0.121 (-0.507 – 0.212)	0.413	0.176 (-0.673 – 2.714)	0.231
Barriers scale	-0.237 (-0.218 – 0.020)	0.101	-0.234 (-0.046 – 0.005)	0.106
Perceived stress scale	-0.234 (-0.477 = 0.047)	0.105	-0.071 (-0.071 – 0.043)	0.627
Work extrinsic and intrinsic motivation scale				
Self-determined motivation	0.476 (0.068 – 1.131)	0.029*	0.143 (-0.095 – 0.176)	0.538
Intrinsic motivation	0.272 (-0.672 – 2.596)	0.233	0.100 (-0.302 – 0.463)	0.666
Integrated regulation	0.455 (0.088 – 2.846)	0.038*	0.046 (-0.317 – 0.384)	0.844
Identified regulation	0.464 (0.114 – 2.579)	0.034*	0.205 (-0.174 – 0.443)	0.372
Non-self-determined motivation	0.110 (-0.547 – 0.873)	0.636	-0.105 (-0.196 – 0.125)	0.650
Introjected regulation	0.286 (-0.420 – 1.796)	0.210	-0.034 (-0.280 – 0.243)	0.883
External regulation	0.123 (-1.130 – 1.915)	0.596	-0.090 (-0.411 – 0.281)	0.697
Amotivation	-0.239 (-2.027 – 0.652)	0.296	-0.081 (-0.364 – 0.258)	0.726
Psychological well-being scales				
Autonomy	-0.054 (-0.770 – 0.530)	0.712	0.074 (-0.103 – 0.173)	0.612

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Environmental mastery	0.282 (0.002 – 1.499)	0.049*	0.350 (-2.881 – 0.680)	0.014*
Personal growth	0.059 (-0.524 – 0.787)	0.403	0.192 (-0.046 – 0.229)	0.186
Positive relationships	0.213 (-0.180 – 1.216)	0.142	0.280 (-0.001 – 0.291)	0.052
Purpose in life	0.187 (-0.210 – 0.983)	0.199	0.203 (-1.429 – 1.603)	0.162
Self-acceptance	0.060 (-0.484 – 0.735)	0.414	0.312 (0.015 – 0.262)	0.029*
Basic needs satisfaction				
Autonomy	0.127 (-0.733 – 1.867)	0.385	0.243 (-0.021 – 0.264)	0.093
Competence	0.143 (-0.347 – 1.017)	0.328	0.341 (0.024 – 0.228)	0.016*
Relatedness	0.203 (-0.147 – 0.849)	0.163	0.361 (0.018 – 0.133)	0.011*

*Significant at $p < 0.05$. Notes: PhD = Doctor of Philosophy; CI: confidence interval

Table 3 shows the predictors or associated factors of research grants after being analyzed further using MLR analysis and controlling for the covariates. After adjustment for the covariates, the results showed that education level (β=0.396, 95% CI=0.221-2.146, $p < 0.05$) and integrated regulation in the WEIMS (β=0.574, 95% CI=0.036-3.612, $p < 0.05$) remained predictors of the number of research grants acquired by participants (R2=0.273). Furthermore, as shown in Table 4, increasing age (β=0.426, 95% CI=0.088-0.397, $p < 0.05$), living alone (β=0.331, 95% CI=0.944-6.626, $p < 0.05$), PhD holder (β=0.248, 95% CI=0.174-6.747, $p < 0.05$), environmental mastery (β=0.318, 95% CI=0.013-0.347, $p < 0.05$) and self-acceptance (β=0.284, 95% CI=0.010-0.242, $p < 0.05$) in the PWB and competence (β=0.273, 95% CI=0.001-0.200, $p < 0.05$) and relatedness (β=0.280, 95% CI=0.001-0.116, $p < 0.05$) in the basic need satisfaction scale were found to be predictors or influencing factors of the total number of publications produced by the participants (R2=0.423).

Table 3. The influence of significant demographic, attitude and behavioral factors on research grants in the MLR analysis

Parameter	Adjusted β (95% CI)	p-value
Age	0.252 (-2.825 – 0.127)	0.088
Education level - PhD	0.396 (0.221 – 2.146)	0.017*
Research funding	0.348 (0.001 – 1.702)	0.050
Supervision	-0.226 (-1.512 – 0.457)	0.286
Work extrinsic and intrinsic motivation scale		
Self-determined motivation	0.354 (-0.291 – 1.170)	0.216
Integrated regulation	0.574 (0.036 – 3.612)	0.046*
Identified regulation	0.168 (-1.359 – 2.353)	0.573
Psychological well-being scales		
Environmental mastery	0.015 (-0.716 – 0.796)	0.915

*Significant at $p < 0.05$. Notes: PhD = Doctor of Philosophy; CI: confidence interval.

Table 4. The influence of significant demographic, attitude and behavioral factors on publication in the MLR analysis

Parameter	Adjusted β (95% CI)	p-value
Age	0.426 (0.088 – 0.397)	0.010*
Living alone	0.331 (0.944 – 6.626)	0.003*
Education level - PhD	0.248 (0.174 – 6.747)	0.039*
Research funding	0.070 (-2.858 – 4.453)	0.662
Supervision	0.064 (-3.538 – 4.932)	0.741
Psychological well-being scales		
Environmental mastery	0.318 (0.013 – 0.347)	0.035*
Self-acceptance	0.284 (0.010 – 0.242)	0.034*
Basic needs satisfaction		
Competence	0.273 (0.001 – 0.200)	0.047*
Relatedness	0.280 (0.001 – 0.116)	0.045*

*Significant at $p < 0.05$. Notes: PhD = Doctor of Philosophy; CI: confidence interval.

DISCUSSION

In this study, we successfully elucidated the factors associated with research productivity among academicians who did not achieve their recent publication target. Among the sociodemographic factors investigated, a higher degree level, i.e., having a PhD, is desirable to increase the research output of both research grants and publications. In addition, increasing age and living alone are associated with a higher number of publications.

The finding that holding a doctoral degree influences research output is in line with previous studies (Henry et al., 2020; Nurhudatiana & Anggraeni, 2015; Sulo et al., 2012). Doctorate graduates are often viewed as individuals with advanced knowledge and skills that are not as well developed in colleagues without doctorates (Bryan & Guccione, 2018; Diamond et al., 2014). An academician with a doctoral degree has been trained and equipped with research skills, strong self-assurance and a mindset related to the importance of research (Nurhudatiana & Anggraeni, 2015). They appeared to have stronger views of particular ideas of research than those without doctorate (Brew et al., 2015). Thus, academic staff members who do not have a doctoral degree should be encouraged to pursue doctoral study to enhance their research skills.

Nevertheless, the possession of a doctoral degree is not the only factor to consider in research productivity. Increasing age is a sociodemographic factor that was found to strongly influence the ability of having a higher number of publications in the present study. Age is generally associated with the level of experience throughout the academic career (Rørstad & Aksnes, 2015; Dhillon et al., 2015). As an academician becomes older, he or she has more experience in the research ecosystem and has the ability to publish more articles compared to his/her younger colleagues (Henry et al., 2020; Dhillon et al., 2015). Therefore, senior academics are encouraged to share knowledge with young academicians through mentoring programs, research teams and team teaching to increase research productivity, which eventually will boost university's ranking and reputation globally (Mat, Alias, & Muslim, 2016). Interestingly, our study results showed that living alone increased the publication rate by 30%, which may be due to the ability to work longer hours and not having as many demands outside of work compared to those living with families (Wilkinson, Tomlinson, & Gardiner, 2018). However, other studies have reported that living alone is often associated with loneliness, low positive mental health and poorer quality of life, which could affect work performance (Sok & Yun, 2011; McManus, Bebbington, Jenkins, & Brugha, 2014; Tamminen et al., 2019). There may be a need to further examine the relationship between living alone and research productivity among academic staff members.

Among the work extrinsic and intrinsic motivation scale (WEIMS) being investigated, integrated regulation was found to have the strongest influence on the number of research grants acquired by participants. Integrated regulation is self-determined motivation that occurs when the tasks are brought in line with one's personal values to the point that it becomes part of the individual's sense of self (Tremblay et al., 2009). Academicians with this kind of behavior pursue the accomplishment of tasks to attain additional external outcomes rather than solely for inherent enjoyment (Hawke 2019). Occasionally, they think that applying for research grants is part of their jobs and lives and is also important for their personal development. Therefore, with discipline and concerted efforts, those with self-determined motivation would potentially be more successful in securing research funding.

Pertaining to behavioral factors, environmental mastery, an indicator of PWB, has been shown to have a significant influence on the number of publications produced, reflecting the ability of a person to manage his or her life and having control over the environment (Ryff & Keyes, 1995). Developing environmental mastery has been previously reported as an important factor to enhance research productivity performance (Ghabban et al., 2019). Academicians who are unable to master environmental factors encounter constant stress derived from the research demands, workloads and deadlines in their hectic working environment (Kinman, 2001; Bavani & Mohan, 2015). Therefore, it is important for academic staff members to enhance their environmental mastery, as this will help them better manage their responsibilities and enhance their performance in regard to research publications (Bavani & Mohan, 2015). Moreover, self-acceptance could also affect publication predictability among academic staff members, which means having a positive attitude toward themselves, including good and bad qualities and feeling positive about their past life (Ryff & Keyes, 1995). These also include being confident about themselves and having the ability to control their lives, which improve their sense of responsibility toward work performance and productivity (Bavani & Mohan, 2015; Carson & Langer, 2006). It should be noted that academic staff members with higher self-confidence are more likely to be more productive in regard to publications than are those with lower self-confidence (Ayden et al., 2023).

Furthermore, 'competence' and 'relatedness' in the basic need satisfaction scale significantly influenced the total number of publications produced

among participants in this study. 'Competence' reflects the need to feel effective and capable of performing tasks at varying difficulty levels (Deci & Ryan, 2002). In line with environmental mastery, those with the need for competence have a natural tendency to manipulate and effectively deal with the environment, which allows them to easily adapt to stressful work demands and achieve their desired outcomes (Abun & Maggalanez, 2017; Deci & Ryan, 2002), particularly in relation to research publications.

As competence is necessary for intrinsic motivation, relatedness adds another value to the perspective of motivation among academic staff members (Joo, Lim, Han, Ham, & Kang, 2013). The need for relatedness represents the desire to experience closeness and connection with other people and to avoid isolation at work (Deci & Ryan, 2002). This sense of belonging has been found to facilitate the internalization of extrinsic motivation and positive work outcomes, leading to the enhancement of individual development and overall performance (Orazbayeva, van der Sijde, & Baaken, 2019). Hence, a good social work environment is expected to be supportive of academicians in their attempt to accomplish the desired outcomes, such as research output. Both relatedness and competency are important factors that determine the degree of research engagement and publication produced, which need to be enhanced among academic staff members.

Our study results did not demonstrate a significant association between the research grants secured and the publications produced by academicians. This finding suggests that the total number of research grants acquired was not associated with the number of publications produced, as supported by previous studies (Jung et al., 2017; Jacob & Lefgren, 2011). It has also been reported that productive academicians are able to publish equally as many papers of high quality, even without a large amount of research funding (Jung et al., 2017).

Interestingly, despite many studies revealing that academicians are experiencing increased stress levels due to workload demands (Kassim, Ismail, & Ismail, 2018; Kassim, Rosnah, & Mohd., 2017; Bowen, Rose, & Pilkington, 2016; Huda et al., 2004), the perceived stress scale did not appear to be one of the factors influencing research output in the present study. Most of the participants perceived moderate stress levels, which could have both positive and negative impacts on their performance, depending on how well they cope with those stressful situations (Syed et al., 2011). It should be noted that in this study, we were unable to identify the significant relationship between barriers and research output, which is contradictory to a previous study (Hagan, Armbruster, & Ballard, 2019). It is possible that these academic staff members have adapted to stressful research environments, which have become a common feature in their occupational life. Further research on the coping mechanisms and job satisfaction among academic staff members is recommended to obtain more information.

Our study strength is that its findings provide substantial insights into the personal and behavioral factors that affect research grant acquisition and publication among academicians in a research university in Malaysia. These findings would be beneficial for university administration to tailor their policies and strategies to maximize overall university performance. The limited number of participants recruited from a single university is one of the main limitations of this study. More attributes, such as different measures of barriers and stress scales, could be investigated in future studies to gain a more comprehensive picture. In addition, the scope of this study was limited to only the associated factors of quantitative output, such as the total number of research grants acquired and publications by academic staff members. Future investigations are needed to further assess the factors influencing the quality and impact of research performance and output, such as publication ratings, citations, h-index of the authors and its social impact.

CONCLUSIONS

In conclusion, there are associations among holding a doctoral degree, integrated regulation and greater research performance in regard to research grant acquisition among academicians in our present study. However, the publications produced by academicians were influenced by being older, having a doctoral degree, living alone, possessing environmental mastery and self-acceptance, as well as competence and relatedness within basic need satisfaction. This study provides empirical evidence of the importance of personal and positive attitudes and motivation in association with the quantity of research output among academicians with lower research performance. Future investigations pertaining to other factors associated with research outcomes and quality are desirable to aim for excellence in research-related performance in RUs.

ACKNOWLEDGMENTS

This study acknowledges the contribution, support and assistance of all coresearchers, staff and participants involved. This research was financially supported by grants from Universiti Kebangsaan Malaysia (KRA-2018-036).

DISCLOSURE

The authors declare no conflicts of interest.

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