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Gender inclusion in research among academic members of staff: Lessons from Masinde Muliro University of Science and Technology, Kenya

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Abstract

All over the world, research has shown that women are underrepresented and generally face discrimination and marginalization on the basis of their gender. It is against this background that this study sought to establish the status of gender inclusion in research among academic members of staff with a focus on Masinde Muliro University of Science and Technology (MMUST), Kenya. The study employed a mixed methods research design. Purposive sampling technique was used in administering questionnaires to 104 academic staff from the 11 schools and interviews subjected to 14 members of the university management. Quantitative data was analyzed using both descriptive and inferential statistics while qualitative data was analyzed thematically and was used to triangulate quantitative data. The findings of the study revealed that research outputs for women were lower than their male counterparts. For example, males were more dominant in publications at 55% while females were at 45%. The study further revealed that workload, gender stereotypes, lack of mentorship and inadequate resources had an impact on the women's research output. These findings will be instrumental in supporting universities to strengthen structures and develop programmes that support research, particularly among women at all levels of their career.

Keywords: academic staff, gender inclusion, research output, Sub-Saharan Africa

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Public Interest Statement

Gender refers to the socially constructed relationships between men and women (AAU 2006). According to the AAU report these relationships change over time, space and circumstances based on different cultures, religions, environments, ethnicities and classes which men and women belong to. Hence, all over the world, research has shown that women are underrepresented and generally face discrimination and marginalization on the basis of their gender (Moodly, A. & Toni, N. 2015a). As a result, over the past decade African higher education institutions, universities in particular, have been keen on mainstreaming gender into their core functions of teaching, research, community outreach as well as administration. However, these efforts are far from being realized. It is against this background that this study sought to examine gender inclusion in research outputs among academic staff at MMUST and the factors affecting the inclusion in order to develop intervention strategies that are geared towards addressing structural and systemic gender inequalities within the institution for sustainable development.

1. Introduction

All over the world, research has shown that women are underrepresented and generally face discrimination and marginalization on the basis of their gender (Moodly, A. & Toni, N. 2015a). Gender mainstreaming was established as a major global strategy for the promotion of gender equality in the Beijing Platform for Action from the Fourth United Nations World Conference on Women in Beijing in 1995." Keino (2002) define gender mainstreaming as: "...the process of assessing the implication for women and men of any planned action, including legislation, policies or programs, in all areas and at all levels. This practice entails ensuring equal opportunity and benefits, bearing a gender perspective in institutional culture and practices as well as assessing and identifying gender gaps (quantitative and qualitative). The procedure involves women empowerment to increase their participation in decision-making processes and ensure their voices are heard and have the power to place relevant issues on the agenda including research.

Universities world over are expected to promote research and scholarly publishing among its academic members of staff for their career progression and contribution to knowledge for development. Research output is therefore imperative among academic staff at the university level. A part from educational qualifications and experience, members of academic staff have an obligation to get promotions on evidence of satisfying research publications in reputable journals, conference proceedings and seminar papers, number of post graduate students supervised to completion, number of grants applied and won among other research out puts (Keith et al, 2002). Some of the aforementioned parameters have been used in this study to measure gender inclusion in research namely; publications, supervision of postgraduate students, conference attendance, community outreach activities, innovations and patents. In Kenya for example, the Commission of University Education (CUE) was established to ensure that universities meet the highest standards in scientific research outputs so as to serve as feeder institutions in the overall development of nations (Uzoka, 2008).

In spite of the importance of research productivity among academic members of staff, research has shown that the level of research out puts among women academics is low compared to their men counter parts (Zulu 2021; Geber 2009; Prozesky 2006; Cole & Singer 1991; Cole & Zuckerman, 1984, 1991; Fox, 1983, 1991; Fox and Faver, 1985; Hargens et al., 1978; Long, 1990, 1992; Long et al., 1993; Long and Fox, 1995; Reskin, 1978). For example, in a study conducted by Mouton (2007) in South Africa, the findings revealed that research productivity among male academics ranged between 80 and 82 per cent, whereas females was 22 and 35 per cent. According to the findings from previous studies, women's research productivity is reported to be hampered in various ways such as absence of role models; lack of mentoring; and lack of access to national and international networks (Barrett & Barrett

2011; Creamer 1998; Chesterman et al. 2005; Dever et al, 2006; Hunter and Leahy 2010; Ramanathan 2003; Carvalho & Riordan 2011). Yet, it is acknowledged through research that networks, mentoring and role models are helpful in increasing research outputs among women. (Gardiner et al. 2007 cited by Barrett & Barrett 2011; Ramanathan 2003).

Notwithstanding this finding, not much research has been done to investigate to what extent women and men academic members of staff are involved in research in Sub Saharan (SSA). Most of the documented data has resulted from studies conducted in the United States (US), the United Kingdom (UK), Australia and (some in) Southern Africa (Barrett & Barrett 2011; Chesterman et al. 2005; Creamer 1998; Dever et al. 2006; Hunter & Leahy 2010; Leahy 2006; Ramanathan 2003; Sax et al. 2002; Tower et al. 2007; White et al. 2011). It is believed that findings from this study could be generalized among public Universities in Kenya.

In addition, gender imbalance in career progression among female academic staff in higher education in SSA is still a global issue since the progress towards equity has been very slow and uneven (Airini 2011; Davidson & Burke, 2004). Hence, international concerns about gender inequality have enhanced campaigns for more equitable distribution of the world's resources between men and women since women are underrepresented and generally face discrimination and marginalization on the basis of their gender (Karim, 1995). In addition, a strong commitment to the principles of equality and non-discrimination is evident in Article 27 of the Constitution of Kenya 2010 and the SDG 5. Article 4 of the World Declaration on Higher Education for the 21st Century (UNESCO, 1998) is also very explicit in its demand for the elimination of all gender stereotyping in higher education. It places particular emphasis on the need to eliminate political and social barriers to women's effective participation in policy and decision-making in higher education. Besides, their traditional roles of generating knowledge through research, and providing leadership in the development of high level human resources through education and training, universities are expected to assume responsibility for, and leadership in the transformation of society with regard to gender roles generally, and women's participation in particular (Kanake (1997). The Association of African Universities (AAU) has launched a gender equity programme, which all member universities are supposed to follow. Some of the initiatives include establishing gender centres/units, taking affirmative action and enhancing women's participation in science-related subjects. For instance, MMUST has established a gender unit in response to the AAU requirement. Therefore, it is important to investigate the level of gender representation of the academic members of staff in the participation of research outputs in the context of a University based in Sub Sahara Africa with a view to bridging the gender gap through policy and practice.

The study was informed by two theories namely, Systems of Career Influences Theory (Moodly & Toni 2015a) and the Social Relations theory (Kabeer 1993). The Systems of Career Influences Theory focuses on the interplay between sociocultural dynamics within the family and organizational factors in shaping gender related career/research advancement at different career stages. On the other hand, Kabeer's theory on the Social Relations provides key dimensions for an institutional gender analysis—within the family and workplace, expressed as formal and informal rules, resources, and activities which are all permeated by social power relations of gender in the context of the workplace to shape the everyday experiences of female and male members of academic staff in a SSA University context. The two theories were drawn together to form an integrated approach based on existing evidence from the research problem as a lens through which to understand the everyday experiences of individual researchers based on gender as they relate to institutional environment, policies, and practices, as well as access to the necessary research infrastructure or resources. This study sought to examine gender inclusion in research for academic staff at MMUST and the factors affecting their inclusion in order to develop intervention strategies that are geared towards addressing structural and systemic gender inequalities within the institution for sustainable development.

2. Methodology

The study employed a mixed methods research design, blending quantitative and qualitative paradigms for quality output. The instruments for data collection included a questionnaire for academic staff and an interview schedule for University management. The questionnaire was designed to collect data on the status of gender inclusion in research among members of the academic staff. Besides, respondents' input on policy interventions to enhance gender inclusion were sought. The Questionnaire was piloted on twenty academic staff from Moi and Kibabii universities. Cronbach's Alpha was used to test its reliability using data obtained from the pilot study. A Reliability Index of 0.91 was considered high compared to the set minimum threshold of 0.7, according to Kathuri & Pals, (1993). Content validity was used to validate the Questionnaire. This entailed assessing the instrument to ensure relevance, meaningfulness and appropriateness to respondents through critical examination of the items. (Cohen et al 2000). The online questionnaire was tagged to staff corporate mail for ease of dispatch and filling. The Interview Schedule was designed to complement the questionnaire. It sought to get management views on gender inclusion in research.

2.1 Study Population and Sampling

The study targeted three hundred and thirty (330) academic staff, eleven (11) deans of schools, ten (10) directors and seven (7) members of senior management. The list of 330 academic staff was obtained from the office of the Registrar Administration. Those who responded to questionnaires and interviews included one hundred and four (104) teaching staff, eight (8) Deans of Schools, five (4) Directors, and two (2) members of University Management. The distribution of the respondents is presented in Table 1 below.

Table 1: Sampling Frame and Respondents

S/No	Category	Target Population	Number of respondents	% response
	University Management	7	2	
	Directors	10	4	
	Deans of Schools	11	8	
	Academic staff	330	104	
	Total	358	118	32.96%

2.3 Data Analysis

Since the questionnaire was administered online, a data set in excel was generated automatically. The data was then retrieved, cleaned and variables coded appropriately to allow the use of Stata version 15. The status of gender inclusion was assessed using descriptive statistics (means, counts and percentages). Inferential statistics (t-test) was used to establish gendered differences in research output. Data generated from interviews were transcribed, cleaned and summarized thematically and used in the triangulation of the quantitative findings. The qualitative data was used to identify possible factors that influence gender inclusion in research and strategies on how the status quo can be improved.

3. Results and Discussion

This section presents findings on gender inclusion in research among academic staff of MMUST. The study was guided by two objectives namely; to examine the current status of gender inclusion in research among MMUST academic staff and to determine factors influencing gender inclusion in research among academic staff. The findings are presented both quantitatively and qualitatively in the context of the objectives.

3.1 Demographic Characteristics of Respondents

Distribution of respondents per school

All the 11 schools in MMUST were sampled for study as indicated in Table 2 below:

Table 2: Distribution of respondents per school

School	Frequency	% Frequency
SASS	26	25.00
SEBE	4	3.85
SEDU	20	19.23
SONAS	21	20.19
SONMAPS	3	2.88
SDMHA	0	0.00
SOM	1	0.96
SPHBST	26	25.00
SOBE	3	2.88
SCI	0	0
SAVET	0	0
TOTAL	104	100.00

Findings from Table 2 above show that one hundred and eighteen (108) members of academic staff participated in the study both who were interviewed and those who responded to the questionnaire. A response rate of 32.96% was achieved. The low response rate was occasioned by general apathy among members of academic staff in responding to online data collection tools. The apathy was more pronounced in the School of Computer and Informatics (SCI); School of Disaster and Humanitarian Assistance (SDMHA) and the School of Agriculture and Veterinary Technology (SAVET) which recorded zero responses as depicted in Table 2 above.

Distribution of Gender, Age, Academic qualifications and Academic Positions of Respondents

Both male and female members of the academic staff above 31 years with either a Masters or a PhD qualification working as tutorial fellow, assistant lecturer, lecturer, associate professor or full professor were targeted for the study. Their distribution is indicated in Table 3 below:

Table 3: Gender, Age Academic qualifications and Academic Positions of Respondents

Characteristic	Frequency	% Frequency	Cumulative %
Gender (N=102)			
Male	57	55.88	44.12
Female	45	44.12	100.00
Age (N=102)			
31-40	24	23.53	23.53
41-50	51	50.00	73.53
51-60	22	21.57	95.10
Above 60	4	4.90	100.00

Highest Academic Qualification (N=101)		Male	Female		
PhD	74	(35	39)	73.27	73.27
Masters	27	(19	6)	26.73	100.00
Current Academic Position (N=103)		Male	Female		
Tutorial Fellow	12	(2	10)		11.65
Assistant Lecturer	3	(2	1)		14.56
Lecturer	70	(33	35)	11.65	
Senior Lecturer	15	(8	7)		82.52
Ass. Professor	3	(0	3)	2.91	
				67.96	97.09
				14.57	100.00
				2.91	

In terms of gender, 55.88% of respondents were male while 44.12% were female and a majority (50%) were aged between 41-50 years. Further, a majority (74%) were PhD holders, while 67.96% were lecturers. Results in Table 3 further indicate that out of the 74 PhD holders who responded, 39 (52.7%) were females while 35 (47.3%) were males. This is an indication that women are competing favorably with men in their academic pursuits, despite the fact that only 27.88% of academic staff are females. The fact that there were more male respondents could be attributed to the fact that MMUST has more male (70%) academic members of staff than females (30%). In addition, more males are PhD holders holding senior lecturer, associate professor and professor positions compared to females. This again indicates that women are still lagging behind in terms of recruitment, placement and promotion to senior academic ranks in MMUST compared to their male counterparts.

3.2 Research Output

In order to establish the status of gender inclusion in research, research outputs relating to the number of refereed journal articles, books and book chapters published; academic conferences attended; postgraduate supervisions; workshops and seminars attended; research grants applied for; innovations and patents registered and outreach activities undertaken were compared between the two genders. Data was collected between 2016 to 2020. Results are presented in Tables 4 to 9 below:

3.2.1 Articles, Books and Book Chapters Published

Research has shown that the number of publications, particularly peer-reviewed journal articles, is the most widely used indicator of research productivity across academic disciplines (Toutkoushian & Bellas 2003; Horta, et al 2012) since it is the most important indicator of career progression among academic members of staff. Publications make scientific information publicly available, allow academic audience to evaluate the quality of research from an academic institution, provide a platform to share research findings, improve the university global ranking, hence visibility and may lead to attraction of grants. On the same note, publications are also a criterion for promotion of academic staff at the university (Shin et al. 2014). The study sought data on the number of articles, books and book chapters published by male and female members of staff. The results are presented Table 4.

Table 4: Published Articles, books and book chapters

Number of publications	Number of academic staff		Percentage of academic staff (%)	Cumulative Percent
	Male	Female		
0	2	0	2	2
1	3	1	4	6
2	1	6	7	13
3	10	3	13	26
4	0	4	4	30
5	3	4	7	37
6	3	7	10	47
7	7	2	9	56
8	2	8	10	66
9	2	0	2	68
10	10	6	16	84
12	2	0	2	86
14	3	0	3	89
15	2	0	2	91
17	0	2	2	93
18	0	2	2	95
20	3	0	3	98
21	1	0	1	99
25	1	0	1	100
Total	55	45	100.0	

Results in Table 4 show that only 2% of staff never published an article, book or book chapter between 2016 to 2020. This implies that 98% of staff published at least one paper, book or book chapter in the same period. Out of this, 45% were female while 55% were male, showing a slight difference, with males being dominant. One of the directors who was interviewed said that, publication was one of those platforms provided where both male and female academic members of staff can showcase their scholarly skills but according to him, females were not publishing as much as men because women were busy taking care of their families. Another dean further said: *“female-faculty members are more proactive in research design, execution and analysis. However, because a higher proportion of the faculty at the school are males, most of the publications are from males.”*

3.2.2 Research Conferences attended

Research conferences provide a platform for researchers to disseminate and share their research findings. They also afford researchers the opportunity to network with their peers, make contacts with donors and benchmark locally and internationally. Participation in such fora is an indication of active involvement in research and publication. It also enhances academic and intellectual growth among researchers. This study therefore, sought to document participation and contribution of MMUST academic staff to knowledge economy through research conferences attended in between 2016 to 2020. Table 5 presents a summary of the findings on conference attendance by staff.

Table 5: Attendance of Academic Conferences by staff

Number of conferences	Number of academic staff		Percentage of academic staff (%)	Cumulative Percent
	Male	Female		
0	3	2	5	5
1	1	1	2	7
2	5	7	12	19
3	14	4	18	37
4	8	5	13	50
5	11	11	22	72
6	0	5	5	77
7	4	4	8	85
8	2	4	6	91
10	2	2	4	95
11	1	0	1	96
14	2	0	2	98
15	2	0	2	100
Total	55	45	100.00	

It is evident from the findings in Table 5 that 95% of academic staff attended at least one conference (43% female and 52% male). Notably, only 5% attended more than 10 conferences, within the said period who were males. This is an indication of low participation in research oriented activities among academic staff, particularly by the female gender, yet conferences provide opportunities for researchers to share ideas and create meaningful research networks. The distribution of research conferences attended in terms of gender is further presented in Figure 1. below:

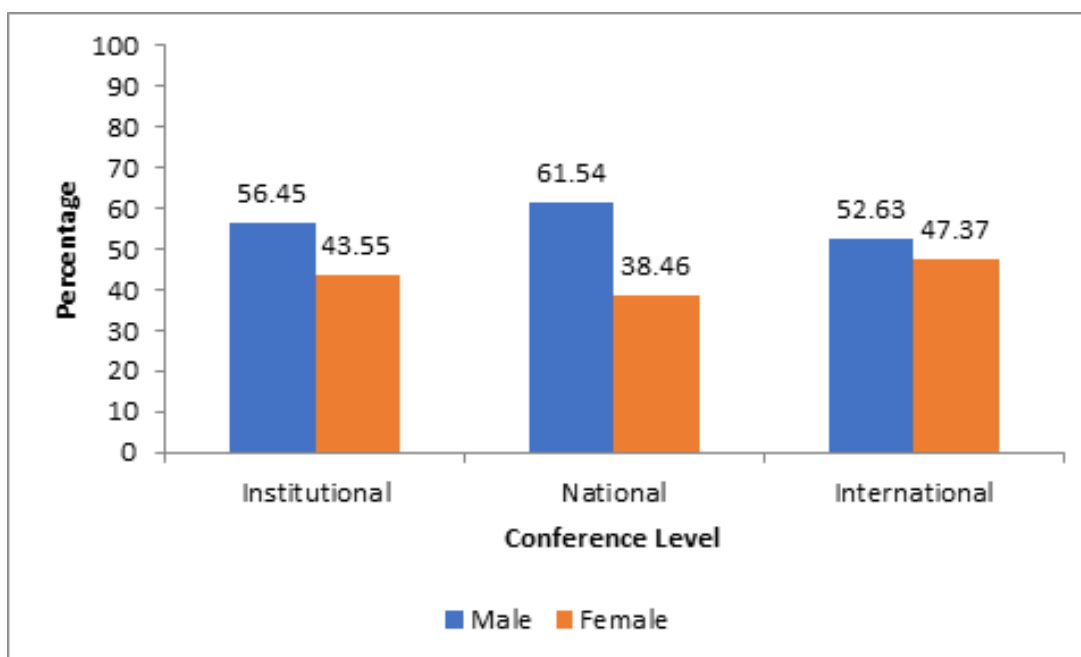


Figure 1: Distribution of Research Conferences attended by gender

Results in Figure 1 show that at institutional level females are at 43.55%; males 56.45%; national females 38.46%, males 61.54% and international females at 47.37% ; males 52.63% respectively. The results show that the female gender is underrepresented at conferences across all levels. Some of the interviewees attributed this scenario to gender-power relations in the African society whereby, some husbands (men) cannot allow women to travel out for conferences. This was further reported to have been increased by family caregiving obligations among female members of staff

3.2.3 Graduate Students’ Supervision

Supervision of graduate students at universities is one of the core responsibilities of academic staff and is considered a measure of research output. Supervision not only transfers research and related skills, but is also an intensive and interconnected form of educator-student engagement. The role of the supervisor is providing a supportive, constructive and engaged supervision process. This is important in the development of next generation practitioners who have the correct educational and skills mix to fulfill the future needs of the profession. Timely completion of postgraduate students attracts more students to enroll in the university. Table 6 gives a summary of students supervised by members of the academic staff to completion:

Table 6: Graduate Students Supervised to Completion

Number of students supervised	Number of academic staff		Percentage of academic staff (%)	Cumulative Percent (%)
	Male	Female		
0	28	16	43.14	43.14
1	2	3	4.90	48.04
2	1	8	8.82	56.86
3	9	9	17.65	74.51
4	3	1	3.92	78.43
5	10	4	13.73	92.16
6	2	0	1.96	94.12
7	0	2	1.96	96.08
8	1	0	0.98	97.06
10	1	2	2.94	100.00
	57	45	100	

Results in Table 6 indicate that about 43.14% of staff never supervised a student, with males accounting for 27.45% and females accounting for 15.69%. It is worth noting that only 2.94% supervised 10 students between 2016-2020. The results imply that very few staff especially women are engaged in supervision. According to one of the respondents, this could probably be attributed to engagement in non-research university activities such as teaching or lack of knowledge, skills and capacity to supervise. Another respondent said that female members of staff have more work both academic (teaching load) and domestic roles which make it difficult for them to supervise many students to completion.

3.2.4 Workshops and Seminars

Workshops and Seminars are key drivers for meaningful research as they provide a platform for researchers to be trained on key aspects of research, such as grant proposal writing, networking and collaborative research. They set the stage for researchers to engage in research that goes beyond borders and enhance academic and intellectual growth among researchers. This study therefore, sought to establish the participation of MMUST academic staff in workshops and seminars between 2016-2020.

Table 7 presents a summary of the findings on workshops/seminars by staff.

Table 7: Attendance of Workshops/Seminars by staff

Number of workshops/ seminars	Number of academic staff		Percentage of academic staff (%)	Cumulative Percent
	Male	Female		
0	2	0	2.04	2.04
1	2	2	4.08	6.12
2	7	8	15.31	21.43
3	10	5	15.31	36.74
4	7	5	12.24	48.98
5	4	5	9.18	58.16
6	6	3	9.18	67.34
7	4	4	8.16	75.5
8	2	3	5.10	80.6
10	8	8	16.33	96.93
20	0	2	2.04	98.97
25	1	0	1.03	100.00
Total	53	45	100.00	

It is evident from the findings in Table 7 that 45.92% female and 54.08% males attended workshop and/or seminars between 2016-2020. This implies that 97.96% attended at least one workshop/seminar and 17% of staff attended 10 workshops/seminars or more, within the said period. This is a good indication that staff are warming up to trainings geared towards improving research and creating meaningful research networks although women are lagging behind. The distribution of workshops/seminars attended is further presented in Figure 2 below.

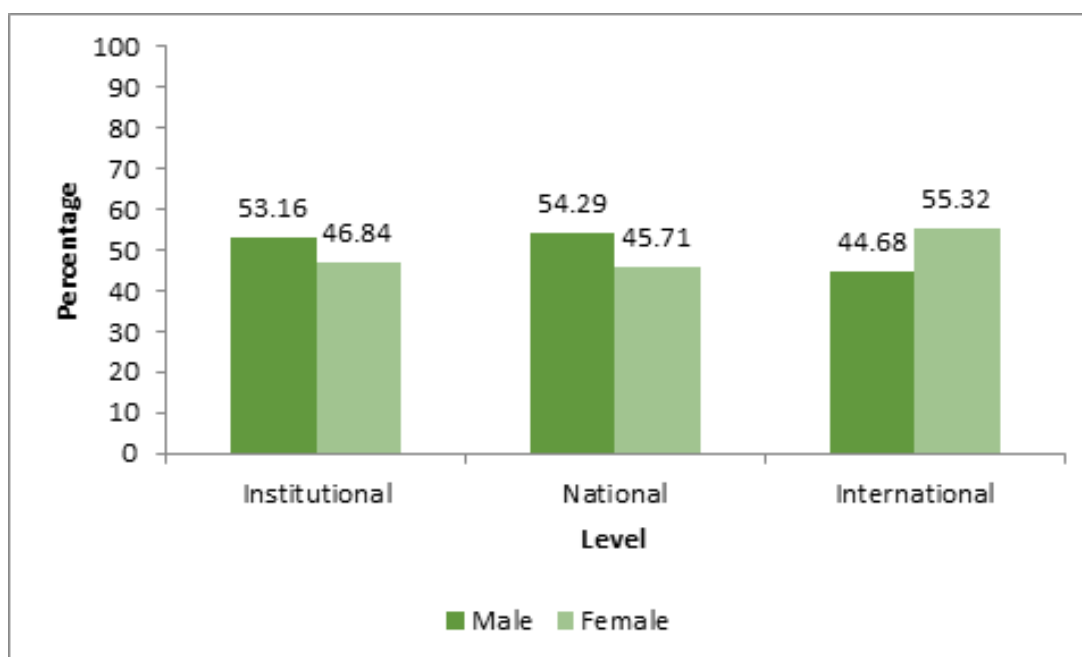


Figure 2: Distribution of Workshops/Seminars attended by gender

While it is evident that women are lowly represented at institutional (Male 53.16% vs females 46.84%) and national (females 45.71% vs males 54.29%) workshops/seminars, a majority are making a deliberate effort to make themselves visible at international workshops/seminars at 55.32% compared to males at 44.68%. This preference for international workshops/seminars could also be attributable to various reasons, which if interrogated could help improve the overall picture of research out puts among women.

3.2.5 Research Grants

Research is a major function of the University. The government of Kenya has allocated 0.1% of its GDP to Research and Development (R&D) to be accessed by University staff and other National research institutions. Similarly, MMUST in her annual budget allocates funds to support research on a competitive basis. Regionally and internationally, there exist organizations and foundations that support research grant programs on a competitive basis. These opportunities are available to academic staff to access funds for research. In this study, respondents were asked to indicate the research grants they had attracted between 2016-2020 and whether the source of those grants was by local (MMUST), National or International Organizations. These results are summarized in Figure 3.

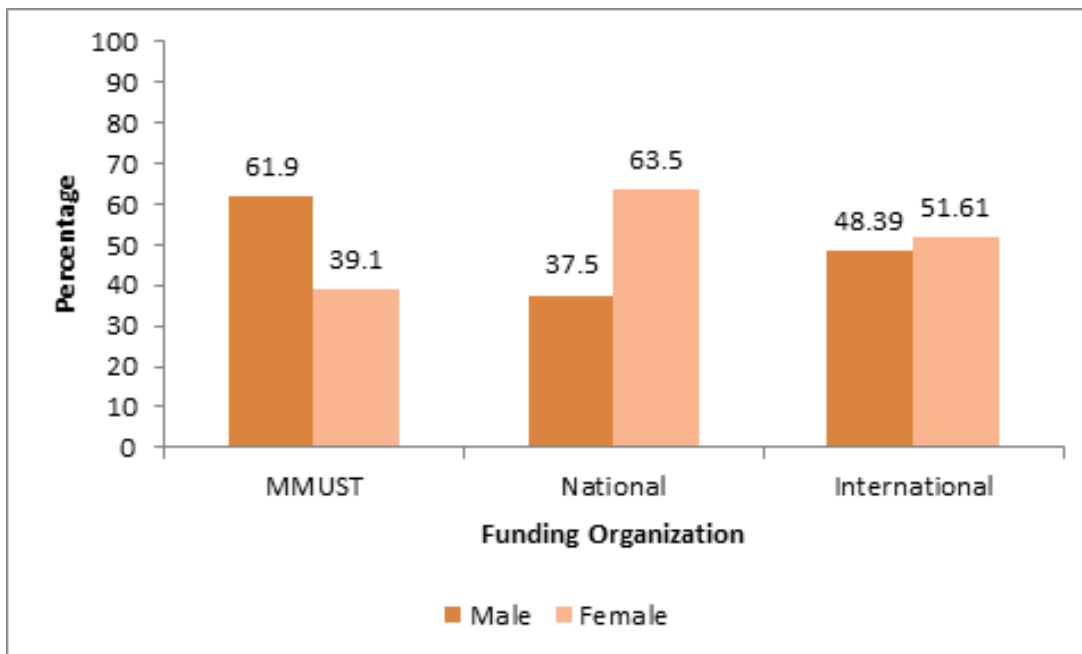


Figure 3 Distribution of research grants attracted by gender

Results in Figure 3 show that 61.9% of male academic staff have attracted MMUST research grants compared to 39.1% females; 37.5% of male academic staff attracted national research grants compared to 63.5% females and 48.39% of male academic staff attracted international research grants compared to 51.61% females between 2016-2020. It is worth noting that females are leading in terms of grants application at the national and international levels compared to males who are only leading at MMUST. Some respondents attributed this to the continuous training on grant proposal writing by the University. One of the respondents confirmed that some of the multidisciplinary research teams are led by women as Principal Investigators (PIs). Out of 102 research teams constituted in 2020, 45 were female-led and they successfully won both internal and external research grants. This is an indicator of multidisciplinary research teams that are inclusive, a deliberate demonstration of gender mainstreaming in terms of attracting research grants. However, deliberate efforts still need to be made to upscale the effort in attracting research funds as this will enable more and more women to lead research teams in conducting cutting edge research.

3.2.6 Innovations and Patents

Significant findings and innovations in research are recognized as such and patented accordingly to protect the intellectual property of researchers. Generally, patenting is rare and sporadic among African scholars yet, it is important to convert knowledge into realizable output, which can subsequently be patented. Patenting of innovations is not only a merit for an individual researcher but it also places the university on the map in terms of quality research output. Patenting also enhances linkages between university and industry which directly benefits from the university research output in improving the number and quality of its products.

This study investigated the extent to which MMUST academic staff carry out innovative research that leads to patenting in terms of gender. The results are contained in Table 8.

Table 8: Innovations and Patents

Number of Innovations & Patents	Number of academic staff		Percentage of academic staff (%)	Cumulative Percent
	Male	Female		
0	50	39	93.68	93.68
1	3	1	4.21	97.89
2	2	0	2.11	100.00
Total	55	40	100.00	

Results from Table 8 above indicate that 93.68% of academic staff have not registered a single patent or innovation between 2016-2020 while only 6 (6.32%) have registered at most two patents. Interestingly, out of the 6 patents registered, only 1 (16.67%) is registered by a female researcher. This indicates that in addition to low participation in research at the university, the quality of research output is very low and obviously women are not properly represented. This situation can probably be attributed to lack of research skills, inadequate funding and poor infrastructural support.

3.2.7 Outreach Activities

Higher education institutions play an important role in shaping communities’ development. It is necessary for universities to involve themselves in community outreach-based research to contribute to a strong knowledge-based economy in the country. For this reason, university outreach activities are necessary as they provide opportunities for academic staff to contribute to community development. The study obtained information on the participation of academic staff in outreach activities. Results are provided in Table 9.

Table 9: Participation in Outreach Activities

Number of outreach activities	Number of academic staff		Percentage of academic staff (%)	Cumulative Percent
	Male	Female		
0	4	4	8.42	8.42
1	5	4	9.47	17.89
2	15	11	27.37	45.26
3	8	8	16.84	62.10
4	2	4	6.32	68.42
5	8	5	13.67	82.09
6	3	3	6.32	88.41

7	3	3	6.32	94.73	
8	0	2	2.11	96.84	
10	1	1	2.11	98.95	
17	1	0	1.05	100.00	
Total	50	45	100.00		

Research findings in Table 9 show that 43.16% of women have participated in at least one outreach activity compared to their male counterparts whose participation stands at 56.84%. These statistics indicate a relatively low rate of participation in outreach activities by female members of staff. This is a clear indication of low engagement between the university and the community among women. One responded this to the limited time among female members of staff due to the heavy workloads, reproductive roles coupled with the stereotype of fear of the unknown among the female gender. Yet, MMUST in her Mission and Vision emphasizes the importance of outreach activities and the need for effective engagement of the University with communities. One of the respondents said that:

“Women are not supervising, publishing and getting involved in outreach activities because of the heavy teaching load at the university coupled with their reproductive roles such as child bearing and rearing as well as domestic work at home.”

3.2.8 Constitution of research teams and leadership

About whether or not a member of academic staff belongs to a research team, the results are presented in Table 10 below.

Table 10: Whether or not a member belongs to a Research Team

Characteristic	Frequency		% Frequency	Cumulative %
	Male	Female		
Belonging to a Research Team Management(N=99)				
Yes	37	38	75.76	75.76
No	17	7	24.24	100.00

Clearly, more than three quarters of academic staff belong to a research team. On composition of these research teams in terms of gender, 78.13% of the groups had between one and five men while 87.50% of them had between one and five women. This implies that the constitution of the research teams is gender responsive. One of the directors shared that academic staff had formed multidisciplinary research teams which had both men and women as Principal Investigators (PIs).

Concerning leadership in those research groups, 60% reported to have male Principal Investigators while 40% reported to have female PIs. This was evident from the data which showed that out of 102 respondents who reported to belong to a research teams, 45 reported being led by a female PI while 57 reported being led by a male PI. From the interviews conducted, it was said that due to gender stereotyping against women such as women not being able to lead, some women were shy from leading research teams. One female responded said that in some cases, efforts female PIs to lead the team are deliberately curtailed by male-team members through sabotage, absenteeism and delayed feedback on tasks assigned.

3.3 Effect of gender on research output

A bivariate analysis was done in order to determine whether there was any significant difference between the two genders constructs in terms of research output. Using a sample of forty five (45) females and fifty seven (57) males, this section presents results on the effect of gender on research output. The parameters considered for research output were: Publications, Conferences attended, Postgraduate supervision, Workshops/seminars, Research grants attracted, Outreach activities and innovations and patents. An analysis was done using an independent t-test at 5% level of significance, ($\alpha=0.05$). Results are presented in Table 11.

Table 11: Gender and Research Output

Category	Gender	Sample	Mean	P-value	Comments
Publications	Male	55	8.2363	0.1794	Insignificant
	Female	45	6.8444		
Conferences	Male	55	4.9636	0.6851	Insignificant
	Female	45	4.7111		
Postgraduate supervision	Male	57	2.1578	0.7629	Insignificant
	Female	45	2.3111		
Workshops/seminars	Male	53	5.2641	0.4073	Insignificant
	Female	45	5.9555		
Research grants	Male	57	1.1578	0.0049	Significant
	Female	45	2.0222		
Outreach activities	Male	50	3.4600	0.9903	Significant
	Female	45	3.4667		
Innovations & Patents	Male	51	0.1590	0.0251	Significant
	Female	44	0.0196		

Results in Table 11 show that the mean numbers of publications, conferences attended, postgraduate supervision, workshops/seminars, research grants attracted, outreach activities and innovations and patents for males and females are different with a varied mean differences. The independent t-test results show that these differences are however, statistically insignificant except for research grants, innovations and patents, ($t(100,102) = 2.8796, p=0.0049, t(93, 95) = 1.9832, p=0.0251$) at $\alpha=0.05$. This implies that females are almost twice more likely to win research grants but males are eight times more likely to register a patent than their female counterparts. From the qualitative data generated, family is seen as a significant influence on the women’s research out put, which has created constraints and demands as they struggle and sacrifice more than men with to parent, conduct housework and navigate around the myth of the discourse of a successful academic and a successful mother and wife.

3.4 Gender inclusion Structures

The following constructs were responded to, on a scale of 1 to 5, with 1 representing absolute disagreement and 5 representing absolute agreement. The mean for each construct was computed and the results are presented in Table 12. A mean close to 1 implied absence of gender inclusion while a mean close to 5 implied strong presence of gender inclusion.

Table 12: Gender Inclusion Structures

Statement	N	Mean	Mean of Means
The University has gender responsive structures for appointment to management positions	66	3.061	
The University has a clear policy on appointment to management with regard to gender	66	2.818	
The current management appointments are equitably distributed in terms of gender	66	3.167	2.558
My school/Department has networks and partnerships for collaborative research	66	2.939	
The networks/partnerships are accessible to all staff regardless of gender	67	2.313	
My school/Department organizes research workshops/seminars for staff at least once a month	66	2.258	
My school/Department has well established research teams that are gender responsive	66	2.318	
My school/Department has a well-established system for community outreach activities	66	2.287	
The University fully supports staff to do presentations at research conferences	67	2.492	2.558
The University organizes workshops to sensitize members on gender issues in academia	66	2.409	
The University has gender mainstreamed routines for outreach activities	66	2.214	

Results in Table 12 show that on average respondents disagreed with nine (9) out of eleven (11) constructs, translating to 81.81% disagreement (Means<3). Members were undecided on two (2) of the constructs (Means>3). Surprisingly, on average, no respondent agreed with any of the constructs on gender inclusion structures. The construct averages gave an overall mean (for all constructs) as 2.558, indicating that on average, respondents disagreed with all the statements. On the overall, this means that the level of gender inclusion is minimal within the University structures.

3.5 Factors Influencing Gender Inclusion in Research

The study further sought to find out the factors which influenced research output especially among female academic members of staff. From the study findings, there are underlying factors that respondents

believe that they inhibit research output among female academic members of staff. In as much as both men and women academic members of staff have families; teach; engage in further studies; attend conferences, seminars and workshops; write grant proposals; hold doctoral degrees and are associate professors and professors; and so on, the outputs for the mentioned variables seem to be constructed differently for men and women in academia.

The results indicated that, family challenges such as care giving and reproductive role as well as gender stereotypes against women were the main hindrances to their limited research output. Gender stereotypes are silent cancers instigated by society that negatively affect women not just in research but other spheres of career progression. In most cases when teams are blended gender wise, men would quietly take off and work alone without the women, in the pretext that women are busy with other socio-cultural roles. In so doing, women are left behind when it comes to conducting research, publication and dissemination. One of the respondents said that:

“Women are not supervising, publishing and getting involved in outreach activities because of the heavy teaching load at the university coupled with their reproductive roles such as child bearing and rearing as well as domestic work at home.”

The results of this study are in agreement with a study conducted by Hunter & Leahey (2010) which revealed that children and child-rearing during the early years of a woman’s academic career have a negative impact on their research productivity.

Other factors mentioned included financial constraints where by most female respondents acknowledged that they lacked fees and/or research funds to conduct field studies as well as inadequate research facilities. In addition, heavy teaching load coupled with the already heavy family responsibilities among women affected their research output. One female said:

“since I was appointed as director in this office, I have never published or presented a paper in a conference since I am expected to teach four courses in a semester, mark, perform office work as well as take care of my family. It is overwhelming...”

In addition, lack of mentorship from women as role models to early career women researchers, unsupportive organizational culture, patriarchy where men force their way to spearhead research teams, lack of support from family and gender imbalances in some schools were reported to inhibit women’s research productivity. For example, one dean reported that the School of Computing and Informatics had only one female academic member of staff which critically affected the research output of the female gender in that school. In terms of role model mentorship, a female scholars admitted that:

“...despite the fact that MMUST has a handful women as professors, they are not mentoring us and guiding us on how we should get there...”

On research team leadership, one respondent complained that:

...if you are a female PI, men in the team will give you a hard time. They wont cooperate even when you give them a task to accomplish. It really discourages women from leading research teams comprising of men...

The lack of inadequate research infrastructure was also reported to be affecting both female and male researchers although women are affected more because they are already facing other challenges. A dean said:

“ we can do better in terms of research as a university only if our labs are well equipped and we are adequately funded...”

According to Sawyerr (2004), research capacity includes the quality of the research environment, funding, adequate infrastructure, research incentives, and time available to the researcher. Therefore, if such provisions are compromised especially to an already marginalized group, then the research output will automatically be compromised.

4.0 Discussion of Research Findings

Results from this study indicate that both men and women academic members of staff at MMUST are aware of the importance of research outputs and scholarly publishing towards their career progression and are working towards its promotion. This view is in tandem with studies by Migosi, Muola & Maithya (2012); Nyaigotti, (2004) and Kinyanjui (2007), who pointed out that research should be made an integral part of every academic post at the university.

However, the same study further reveals that the level of research output among female academic members of staff at MMUST is generally low compared to their male counterpart. These results are consistent with the submissions of Zulu (2021) who attributes the low research output among women to the heavy teaching loads; lack of time; family responsibilities; and difficulty in entering supportive networks.

Other studies which are in tandem with the findings of this article on women's research productivity include, Barrett and Barrett (2011); Creamer (1998); Chesterman et al. (2005); Dever, et al (2006); Hunter & Leahy (2010); Ramanathan (2003) and Carvalho & Riordan (2011). Just like the present study, these studies argue that women's research productivity may be hampered by the absence of role models; lack of mentoring; and lack of access to national and international networks. According to these authors, male academics' productivity is largely not affected by child-rearing and related responsibilities mainly because of traditional and cultural expectations of the woman as homemaker, and more importantly because men are not subject to the biological constraints of child-bearing. Traditional gender roles ensure that the woman remains largely accountable for family responsibilities such as doing household chores and child rearing. This similar sentiments have been brought out in this study which has equally established within the African context of this data that there is a gender gap with respect to research output. It was also revealed that scarcity of fees, infrastructure and other resources hamper women's research output at MMUST.

Stack (2004) also posits that the time, energy, and money devoted to child-rearing among women can reduce their research productivity. Yusuf (2012) and Bassey et al (2007) also made similar observation regarding the low research productivity among female academic staff in Nigeria. According to them, the research output of female academic members of staff is compromised by many challenges, including: inadequate research funds; gender stereotypes, lack of mentorship and training and poor working environment. Similar sentiments have been raised by Migosi, Muola and Maithya (2012) and Ngome (2003) who also observed that one of the key factors that stunted the growth of research out puts in the Kenyan university system was inadequate research funds. Since women are already marginalized due to socio-cultural factors, the problem of inadequate research funds affects them more than men.

5.0 Conclusion

Research and scholarly publishing is indeed a pillar of any university system and, as such, academic members of staff are expected to undertake research and disseminate their findings. Thus, it is through research that any University connects with the outside world and provides solutions to societal problems. It is therefore, imperative that research structures in Universities are strengthened and made gender

inclusive for any meaningful impact to be felt. This paper investigated the inclusion of gender in research output among academic members of staff at MMUST with a view to supporting universities in SSA and Kenya in particular to strengthen structures and develop programmes that support research, particularly among women at all levels of their career. This is based on the assumption that the results generated from this study could be generalized among other Kenyan public universities which operate in an almost similar context.

6.0 Recommendations

Based on the findings of this study, the following recommendations are made to strengthen gender inclusion with the view to improving research outputs in Kenyan universities.

- a. **Policies:** The University management needs to make deliberate efforts to ensure her research policies have a strong component on gender inclusion in research and the same is effectively implemented. Affirmative action needs to be part and parcel of these policies such as deliberate University Research Funding for women-led research teams; creation of family-friendly environment such as establishment of nursing/daycare centers within the university to ensure that female members of staff with young children are catered for to give them some time to conduct research ; purposive and frequent training on various aspects of research including but not limited to grant proposal writing and article writing workshops among others as well as provision of research/study scholarships targeting female members of academic staff.
- b. **Research visibility:** Women's contributions to research can be made more visible through the university's website and all other social media platforms. Periodical drumbeats for any achievement by women researchers need to be initiated to encourage more women to actively participate in research activities.
- c. **Gender stereotyping:** There is need for public awareness and creation of sensitization forums against gender stereotyping against women academic members of staff. There is need to always strike a compromise in terms of time to allow both genders to contribute equally to research tasks, as this will help both to develop their research skills.
- d. **Targeted mentorship:** There is need to provide a platform where senior female academic members mentor junior staff (female early career researchers) through the establishment of mentorship families. Junior staff can be tagged to senior staff who walk them through the research journey.

Declarations

Ethics approval and consent to participate

The study was approved by the MMUST Institutional Research & Ethics Committee (IERIC). Additional authorization to conduct the study was obtained from individual participants through an informed consent. During data collection data was recorded using a digital recorder and files downloaded and stored on a password protected computer whose files were accessible only to the study team. To maintain confidentiality of the information and the privacy of the participants, only selected participants attended the sessions. Personal identifiers and locator information were not recorded, and any identifying information accidentally mentioned was removed from the text before the analysis.

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Authorship and Level of Contribution

Authors are drawn from different schools at Masinde Muliro University of Science and Technology namely; School of Arts and Social Sciences (2), School of Education (3), School of Natural Sciences (1) and School of Health Sciences (1).The authors equally contributed in the research, writing and preparation of the work for publishing

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