hilA gene expression in SCFAs adapted and inorganic acid challenged *Salmonella enterica* serovar Typhimurium

Praveen Rishi[1] and Steven Ricke[2]

[1]Deptt. of Microbiology, Panjab University, Chandigarh, India-160014.
[2]Department of Poultry Science TEXAS A&M University, College Station, TAXAS, USA

Corresponding author: Dr. (Mrs.) Praveen Rishi, Associate Professor, Basic Medical Sciences Building, Department of Microbiology,Panjab University, Chandigarh (INDIA), e-mail: rishipraveen@yahoo.com

ABSTRACT

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Keywords: Gene expression, *Salmonella*, serovar typhimurium.

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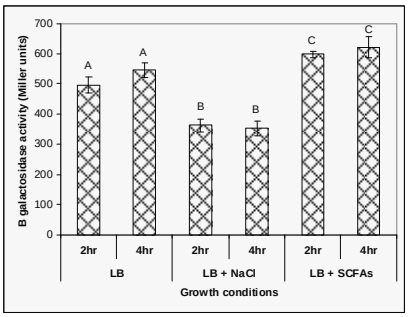

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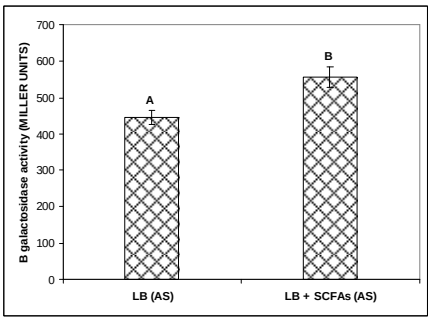

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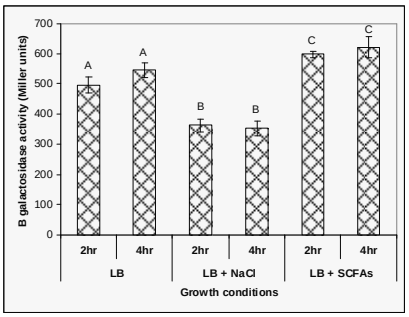

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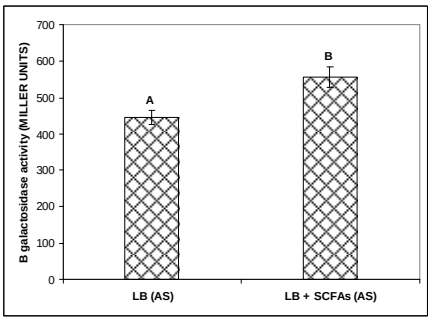

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An evaluation of training of teachers in medical education in four medical schools of Nepal

Nirmal Baral,[1] Bishnu Hari Paudel,[1] Binod Kumar Lal Das,[2] Madhukar Aryal,[2] Balbhadra Prasad Das,[1] Nilambar Jha1 and Madhab Lamsal[2]

[1]Department of Health Professions Education and [2]Department of Biochemistry, B. P. Koirala Institute of Health Sciences, Dharan, Nepal

Correspondence author: Dr. Nirmal Baral, Professor and Head , Department of Biochemistry, & Coordinator Health Professions Education, B. P. Koirala Institute of Health Sciences, Dharan, Nepal. e-mail: nirmalbaral@yahoo.com

ABSTRACT

Effective teaching is a concern of all teachers. Therefore, regular teachers' training is emphasized globally. B. P. Koirala Institute of Health Sciences (BPKIHS), a health science deemed university situated in eastern region of Nepal has an established Medical Education unit which attempts to improve teaching-learning skills by training faculty members through organizing regular medical education training programs. The aim of the present study was to assess the effectiveness of 3-day training workshop on "Teaching-learning methodology and Evaluation" held in four different medical colleges of Nepal. The workshop was targeted at middle and entry level of health profession teachers who had not been previously exposed to any teacher's training program. The various components, such as teaching-learning principles, writing educational objectives, organizing and sequencing education materials, teaching-learning methods, microteaching and assessment techniques, were incorporated in the workshop. A team of resource persons from BPKIHS were involved in all the four medical institutions. The collection data had two categories of responses: (1) a questionnaire survey of participants at the beginning and end of the workshop to determine their gain in knowledge and (2) a semi-structured questionnaire survey of participants at the end of workshop to evaluate their perception on usefulness of the workshop. The later category had items with three-point likert scale (very useful, useful and not useful) and responses to open-ended questions/ statements to document participants general views. The response was entered into a spreadsheet and analyzed using SPSS. The result showed that all participants (n = 92) improved their scores after attending the workshop ($p < 0.001$). Majority of respondents expressed that the teaching-learning methods, media, microteaching and evaluation techniques were useful in teaching-learning. The workshop was perceived as an acceptable way of acquiring teaching-learning skills but 39.4% participants expressed that the duration of the workshop was too short. The overall impression about trainers was very positive. Therefore, regular organization of such workshops with addition of new advances in medical education would be highly beneficial to improve teaching learning skill of medical teachers.

Keywords: Faculty development, BPKIHS, Teachers' training, Medical education workshop.

INTRODUCTION

There is an increasing demand upon medical school faculty members to be effective teachers and become productive clinicians. Therefore, teacher training in medical education is becoming increasingly necessary.[1] A variety of approaches to teaching improvement have emerged generally in association with advancing theories of learning. Evidences suggest that short term training workshop improves quality of instructions.[2] Teacher training remains the province of each institution which develops its own program.

During the first half of 20th century there was stress on the faculty members to acquire the knowledge of discipline. In the latter half of the last century, teaching has been recognized as a skill associated with, but separate from, content expertise. There is a general view that faculty members learn to teach not from learning their content but by observing it being taught and reported that they had experienced no formal preparation as teacher. Their primary source of knowledge about teaching had been observing teachers when they were learners. However, learning to teach from experience alone can be slow and painful process.[3,4]

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programs for improving teaching and evaluation practices through comprehensive faculty development programs.

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Therefore, the present study is an attempt to analyze effectiveness of three-day long training workshop of teachers conducted in the above mentioned medical colleges.

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This study was carried out at four medical colleges of Nepal viz. College of Medical Sciences, Bharatapur, Kathmandu university Medical College (KUMS), Nepalgunj Medical College and BPKIHS having middle and junior level of faculty members numbering 22, 26, 20 and 24 respectively were included as participant in the years of 2005-06. The duration of each training workshop lasted for three days having 12 hours of teaching/ interactive sessions supplemented by 7 hours active group work of participants and 5 hours of presentation of trainee in front of fellow participant, comment on them by another group, microteaching session in small groups with pre-designed check-list for peer evaluation, demonstration of good and bad viva-voce in a form of role play by resource persons. In addition, there was also liberty and an opportunity to institute's authority to appraise critically the on-going activity of the workshop. The duration of the workshop was also kept same in all the places.

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RESULTS

All the 92 participants from all the four medical colleges included in the study responded to the questionnaire distributed. The participants from KUMS were maximum (n = 26) followed by BPKIHS (n = 24), Bharatpur (n = 22) and Nepalgunj (n = 20) as shown in Table-1. It was a heterogeneous group of trainee i.e. medical, nursing and paramedical faculty. Majority of the participants were of assistant professor level (36.0%) followed by lecturer (29.0%), associate professor (24.0%) and professor (11.0%) as shown in Fig. 1. Table-2 shows the mean pre and post-test scores. There was a significant gain in knowledge following the workshop ($p<0.001$).

Great majority of respondents found teaching learning methods, media and microteaching session very useful and useful as shown in Table-3. The session on evaluation system on supply type of questions (short answer question, structured long assay type question) their response was: very useful (73.9%), useful (22.8%) and not useful (3.2%) and in multiple choice question: very useful (64.1%), useful (35.9%) in Table-4. Majority of respondent (64.1%) on conventional practical and oral examination was very useful. At the same time 76.1% participants had expressed that OSPE and OSCE to be very useful. There was negligible percent of respondents expressing not useful (Table-5).

Table 6 shows the participants views on workshop. On the basis of participant perception the objectives of the workshop was very clear (73.9%) and was an encouraging way of acquiring teaching-learning skills. 39.4% participants expressed the duration of the workshop was too short. Overall, the responses across the medical schools were comparable on majority of items asked. Majority of participants reflected more expressively in open-ended response that prior-training in teaching would have been helpful for them in teaching medical students. They all stressed for an additional training for reinforcement and update with new trends and tools in medical education on regular basis.

DISCUSSION

Medical education has seen major changes over the past decade. Integrated teaching, problem-based learning, community based learning, core curricula with electives or options and more systematic curriculum planning have been advocated. Institutions of medical science set predefined learning outcomes in behavioral objectives demonstrate advanced educational reform in teaching, learning and assessment. The application of new learning technologies has supported this move.[6,7] New directions can be identified in the area of assessment tool with increased emphasis on performance assessment techniques such as OSPE/ OSCE.[8,9] Teacher's training programs have emerged in recent years as a more in-depth and comprehensive mechanism for strengthening instructional skills and formulating assessment techniques of faculty members. This would also have the greatest potential to help individual faculty teachers significantly change their teaching. At the entry level, all faculty members should possess basic teaching skills and be oriented to academic values, norms and expectation of the institution.[10,11]

Through this article we are focusing on the faculty development in medical educations as a tool to improve teaching – learning techniques and evaluations by individual teachers to promote academic excellence.

This study was carried out with the aim of assessing effectiveness of teachers' training workshop on "Teaching-Learning Methodology and Evaluation". The workshop was organized in different parts of the country representing most of the regions of the country: B. P. Koirala Institute of Health Sciences in eastern part, KUMS and College of Medical Sciences, Bharatpur in mid-region, and Nepalgunj Medical College, Nepalgunj in western part. The study is first of its kind in the country. It attempts to investigate the achievement done by the participants during the training period and indirectly reflects the organizational aspect of the workshop.

The target teachers of the workshop were middle and entry level health profession teachers, majority of whom were medical teachers. Some of the participants (11.0%) were of professor rank who wished to refresh their understanding on the topic of the workshop. The purpose of targeting middle and emerging teachers was based on our assumption that after few years they are going to be leaders in their disciplines. They were also believed to be more receptive to new concepts. We, therefore, did not encourage senior teachers owing to their likely reservation.

Our result shows that the majority of the participants were assistant professors and lecturers, the most appropriate time of career to use the skills in their future career as a medical teacher.[12]

All the participants were fully engaged in the training; they enriched significantly their knowledgebase on health profession education as evidenced by their pre- and post-test score difference (Table-2) in all the medical schools.

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The workshop has been successful in refreshing knowledgebase by experienced teachers and sensitizing the emerging teachers. It generated a clear message of its effectiveness which is in itself an achievement (Table-2). The workshop also created sufficient background for organizing similar training programs in future so that the teachers perform better as educators. Therefore, they (8.7-39.4%) wanted a longer duration workshop (Table-6). Participants also suggested that every teacher who is new in the field should attend the training and more sessions should be added in the training module.

The teachers' training workshop on teaching-learning methodology and evaluation was effective in increasing knowledge of participants found to be useful to them and sensitized them to perform as better educators.

Authors also feel that feedback information obtained in this article may help in strengthening and planning of the teacher training workshop in the near future in rest of the medical institutions of Nepal, making a network of medical educationists who could provide leadership to educational programs for in-house training to more medical teachers.

ACKNOWLEDGEMENTS

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Table-1: Distribution of respondents according to their position:

Faculty position	Bharatpur	KUMS	Nepalgunj	BPKIHS	Total
Lecturer	6	11	5	4	27
Assistant Professor	7	9	8	9	33
Associate Professor	6	5	4	7	22
Professor	3	1	3	4	10
Total number	22	26	20	24	92

Table-2: Effect of training on participants' performance:

Sample	Number	Pre-test score (Mean ±SD)	Post-test score (Mean ±SD)	Significance (p value*)
Bharatpur	22	9.90 ± 1.63	14.63 ± 2.64	0.001
KUMS	26	11.95 ± 2.01	16.7 ±2.83	0.001
Nepalgunj	20	10.54 ± 2.06	16.41 ±2.41	0.001
BPKIHS	24	11.73 ± 1.97	18.07 ± 1.95	0.001
Total	92			

*Level of Significance at P value <0.05

Table-3: Participants views on usefulness of teaching learning media, method and micro-teaching

Topics	Bharatpur	KUMS	BPKIHS	Nepalgunj	Total
Teaching Learning Media					
-Very Useful	14 (15.2%)	13(14.1%)	14(15.2%)	7 (7.6%)	48(52.2%)
-Useful	8 (8.7%)	13(14.1%)	10(10.9%)	12 (13.0%)	43(46.7%)
-Not Useful	-	-	-	1 (1.1%)	1(1.1%)
Teaching learning Methods					
-Very Useful	12 (13.0%)	17(18.5%)	17(18.5%)	7 (7.6%)	53(57.6%)
-Useful	9 (9.8%)	9(9.8%)	6(6.5%)	12 (13.0%)	36(39.1%)
-Not Useful	1 (1.1%)	-	2(2.2%)	-	3(3.3%)
Microteaching					
-Very Useful	14 (15.2)	15(16.3)	22(23.9%)	9 (9.8%)	60(65.2%)
- Useful	6 (6.5%)	10(10.9%)	2(2.2%)	10 (10.9%)	28(30.4%)
-Not Useful	2 (2.2%)	1(1.1%)	-	1 (1.1%)	4(4.3%)

Table-4: Participant views on usefulness on evaluation system on the workshop:

Topic	Bharatpur	Nepalgunj	BPKIHS	KUMS	Total
Evaluation, Definition, Purpose and Methods					
- Very Useful n (%)	12 (13.04%)	9 (9.7%)	16	16	49 (53.3%)
- Useful n (%)	9 (9.7%)	9 (9.7%)	(17.4%)	(17.4%)	37 (40.2%)
- Not Useful n (%)	1 (1.08%)	2 (2.17%)	6 (6.52%)	9 (9.7%)	6 (6.5%)
			2 (2.17%)	1 (1.08%)	
Subjective evaluation: Essay type, short answer/ problem based question					
- Very Useful n (%)	15 (16.3%)	19 (20.6%)	15 16.3%)	19	68 (73.9%)
- Useful n (%)	7 (7.6%)	1 (1.08%)	6 (6.5%)	(20.6%)	21 (22.8%)
- Not Useful n (%)	-	-	3 (3.2%)	7 (7.6%)	3 (3.2%)
				-	
Multiple Choice Question					
- Very Useful n (%)	11 (11.9%)	14 (15.2%)	16	18	59 (64.1%)
- Useful n (%)	11 (11.9%)	6 (6.5%)	(13.4%)	(19.5%)	33 (35.9%)
- Not Useful n (%)	-	-	8 (8.7%)	8 (8.7%)	-
			-	-	

Table-5: Participant views on usefulness on evaluation method of practical examination of the workshop:

Topic	Bharatpur	Nepalgunj	BPKIHS	KUMS	Total
Conventional Practical and Oral Examination					
- Very Useful n (%)	13 (14.1%)	14 (15.2%)	16 (17.4%)	18 (19.5%)	59 (64.1%)
- Useful n (%)	8 (8.7%)	6 (6.5%)	8 (8.7%)	8 (8.7%)	33 (35.9%)
- Not Useful n (%)	1 (1.08%)	-	-	-	-
OSPE/OSCE					
- Very Useful n (%)	15 (16.3%)	14 (15.2%)	19 (20.6%)	22 (23.9%)	70 (76.08%)
- Useful n (%)	7 (7.6%)	6 (6.5%)	5 (5.4%)	4 (4.3%)	22 (23.9%)
- Not Useful 0n (%)	-	-	-	-	-

Table-6: Participants views on workshop's clarity, duration adequacy and their participation:

Topic	Bharatpur	Nepalgunj	BPKIHS	KUMS	Total
The workshop objectives were					
- Very clear n (%)	15 (16.3%)	15 (16.3%)	17 (18.5%)	21 (22.8%)	68 (73.9%)
- Clear n (%)	7 (7.6%)	5 (5.4%)	7 (7.6%)	5 (5.4%)	24 (26.08%)
- Not clear n (%)	-	-	-	-	-
The duration of the workshop was					
- Adequate	13 (14.1%)	10 (10.9%)	13 (14.1%)	15 (16.3%)	51 (55.4%)
- Too long	1 (1.08%)	-	1 (1.08%)	3 (3.3%)	5 (5.4%)
- Too short	8 (8.7%)	10 (10.9%)	10 (10.9%)	8 (8.7%)	36 (39.4%)
Did the methods adopted encourage active participation?					
- Yes, to a great extent	19 (20.6%)	14 (15.2%)	19 (20.6%)	19 (20.6%)	71 (77.1%)
- Yes, to some extent	3 (3.2%)	6 (6.5%)	5 (5.4%)	5 (5.4%)	19 (20.6%)
- Not at all	-	-	-	2 (2.1%)	2 (2.2%)

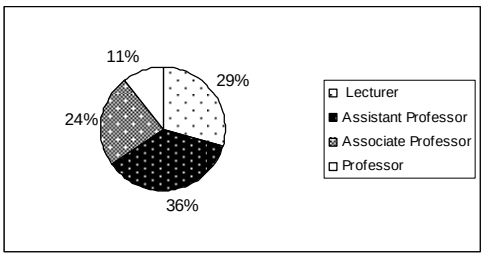

Fig. 1. Percentage distribution of participants

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All the participants were fully engaged in the training; they enriched significantly their knowledgebase on health profession education as evidenced by their pre- and post-test score difference (Table-2) in all the medical schools.

Among four medical colleges, pre-test scores of KUMS and BPKIHS participants were almost same but post-test scores achieved by BPKIHS participants were more. It may in part be due to the fact that majority of new faculty member of BPKIHS receiving training had the advantage of being taught by the same faculties who were involved in the workshop and thereby indirectly inculcating some aspects of medical education. Moreover, they had some preliminary training about medical education during their post-graduation. Some BPKIHS trainees were professors from India probably conversant with medical educations (Table-2).

The workshop has been successful in refreshing knowledgebase by experienced teachers and sensitizing the emerging teachers. It generated a clear message of its effectiveness which is in itself an achievement (Table-2). The workshop also created sufficient background for organizing similar training programs in future so that the teachers perform better as educators. Therefore, they (8.7-39.4%) wanted a longer duration workshop (Table-6). Participants also suggested that every teacher who is new in the field should attend the training and more sessions should be added in the training module.

The teachers' training workshop on teaching-learning methodology and evaluation was effective in increasing knowledge of participants found to be useful to them and sensitized them to perform as better educators.

Authors also feel that feedback information obtained in this article may help in strengthening and planning of the teacher training workshop in the near future in rest of the medical institutions of Nepal, making a network of medical educationists who could provide leadership to educational programs for in-house training to more medical teachers.

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Table-1: Distribution of respondents according to their position:

Faculty position	Bharatpur	KUMS	Nepalgunj	BPKIHS	Total
Lecturer	6	11	5	4	27
Assistant Professor	7	9	8	9	33
Associate Professor	6	5	4	7	22
Professor	3	1	3	4	10
Total number	22	26	20	24	92

Table-2: Effect of training on participants' performance:

Sample	Number	Pre-test score (Mean ±SD)	Post-test score (Mean ±SD)	Significance (p value*)
Bharatpur	22	9.90 ± 1.63	14.63 ± 2.64	0.001
KUMS	26	11.95 ± 2.01	16.7 ±2.83	0.001
Nepalgunj	20	10.54 ± 2.06	16.41 ±2.41	0.001
BPKIHS	24	11.73 ± 1.97	18.07 ± 1.95	0.001
Total	92			

*Level of Significance at P value <0.05

Table-3: Participants views on usefulness of teaching learning media, method and micro-teaching

Topics	Bharatpur	KUMS	BPKIHS	Nepalgunj	Total
Teaching Learning Media					
-Very Useful	14 (15.2%)	13(14.1%)	14(15.2%)	7 (7.6%)	48(52.2%)
-Useful	8 (8.7%)	13(14.1%)	10(10.9%)	12 (13.0%)	43(46.7%)
-Not Useful	-	-	-	1 (1.1%)	1(1.1%)
Teaching learning Methods					
-Very Useful	12 (13.0%)	17(18.5%)	17(18.5%)	7 (7.6%)	53(57.6%)
-Useful	9 (9.8%)	9(9.8%)	6(6.5%)	12 (13.0%)	36(39.1%)
-Not Useful	1 (1.1%)	-	2(2.2%)	-	3(3.3%)
Microteaching					
-Very Useful	14 (15.2)	15(16.3)	22(23.9%)	9 (9.8%)	60(65.2%)
- Useful	6 (6.5%)	10(10.9%)	2(2.2%)	10 (10.9%)	28(30.4%)
-Not Useful	2 (2.2%)	1(1.1%)	-	1 (1.1%)	4(4.3%)

Table-4: Participant views on usefulness on evaluation system on the workshop:

Topic	Bharatpur	Nepalgunj	BPKIHS	KUMS	Total
Evaluation, Definition, Purpose and Methods					
- Very Useful n (%)	12 (13.04%)	9 (9.7%)	16	16	49 (53.3%)
- Useful n (%)	9 (9.7%)	9 (9.7%)	(17.4%)	(17.4%)	37 (40.2%)
- Not Useful n (%)	1 (1.08%)	2 (2.17%)	6 (6.52%)	9 (9.7%)	6 (6.5%)
			2 (2.17%)	1 (1.08%)	
Subjective evaluation: Essay type, short answer/ problem based question					
- Very Useful n (%)	15 (16.3%)	19 (20.6%)	15 16.3%)	19	68 (73.9%)
- Useful n (%)	7 (7.6%)	1 (1.08%)	6 (6.5%)	(20.6%)	21 (22.8%)
- Not Useful n (%)	-	-	3 (3.2%)	7 (7.6%)	3 (3.2%)
				-	
Multiple Choice Question					
- Very Useful n (%)	11 (11.9%)	14 (15.2%)	16	18	59 (64.1%)
- Useful n (%)	11 (11.9%)	6 (6.5%)	(13.4%)	(19.5%)	33 (35.9%)
- Not Useful n (%)	-	-	8 (8.7%)	8 (8.7%)	-
			-	-	

Table-5: Participant views on usefulness on evaluation method of practical examination of the workshop:

Topic	Bharatpur	Nepalgunj	BPKIHS	KUMS	Total
Conventional Practical and Oral Examination					
- Very Useful n (%)	13 (14.1%)	14 (15.2%)	16 (17.4%)	18 (19.5%)	59 (64.1%)
- Useful n (%)	8 (8.7%)	6 (6.5%)	8 (8.7%)	8 (8.7%)	33 (35.9%)
- Not Useful n (%)	1 (1.08%)	-	-	-	-
OSPE/OSCE					
- Very Useful n (%)	15 (16.3%)	14 (15.2%)	19 (20.6%)	22 (23.9%)	70 (76.08%)
- Useful n (%)	7 (7.6%)	6 (6.5%)	5 (5.4%)	4 (4.3%)	22 (23.9%)
- Not Useful 0n (%)	-	-	-	-	-

Table-6: Participants views on workshop's clarity, duration adequacy and their participation:

Topic	Bharatpur	Nepalgunj	BPKIHS	KUMS	Total
The workshop objectives were					
- Very clear n (%)	15 (16.3%)	15 (16.3%)	17 (18.5%)	21 (22.8%)	68 (73.9%)
- Clear n (%)	7 (7.6%)	5 (5.4%)	7 (7.6%)	5 (5.4%)	24 (26.08%)
- Not clear n (%)	-	-	-	-	-
The duration of the workshop was					
- Adequate	13 (14.1%)	10 (10.9%)	13 (14.1%)	15 (16.3%)	51 (55.4%)
- Too long	1 (1.08%)	-	1 (1.08%)	3 (3.3%)	5 (5.4%)
- Too short	8 (8.7%)	10 (10.9%)	10 (10.9%)	8 (8.7%)	36 (39.4%)
Did the methods adopted encourage active participation?					
- Yes, to a great extent	19 (20.6%)	14 (15.2%)	19 (20.6%)	19 (20.6%)	71 (77.1%)
- Yes, to some extent	3 (3.2%)	6 (6.5%)	5 (5.4%)	5 (5.4%)	19 (20.6%)
- Not at all	-	-	-	2 (2.1%)	2 (2.2%)

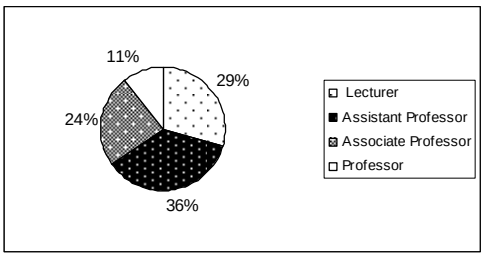

Fig. 1. Percentage distribution of participants