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## **Evaluation of soft skills among Italian Healthcare Rehabilitators: A cross sectional study**

Grazia Isabella Continisio,<sup>1</sup> Nicola Serra,<sup>2</sup> Assunta Guillari,<sup>2</sup> Silvio Simeone,<sup>3</sup> Rosita Lucchese,<sup>1</sup> Gianpaolo Gargiulo,<sup>2</sup> Silvia Toscano,<sup>1</sup> Marianna Capo,<sup>4</sup> Angela Capuano,<sup>5</sup> Franca Sarracino,<sup>6</sup> Maria Rosaria Esposito,<sup>7</sup> Teresa Rea<sup>2</sup>

<sup>1</sup>Continuing Medical Education Unit, University Hospital Federico II of Naples

<sup>2</sup>Department of Public Health, University Federico II of Naples

<sup>3</sup>Department of Biomedicine and Prevention, University of Rome Tor Vergata, Rome

<sup>4</sup>Department of Humanities, University Federico II of Naples

<sup>5</sup>Department of Emergency, AORN Santobono-Pausilipon, Naples

<sup>6</sup>Department of Pediatrics, Betania Evangelical Hospital, Naples

<sup>7</sup>Istituto Nazionale Tumori, Fondazione “G. Pascale” of Naples, Italy

**Corresponding author:** Nicola Serra Ph.D., Department of Public Health, University Federico II of Naples, Italy. E-mail: nicola.serra@unina.it

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### **Significance for public health**

This study investigates on the perception about soft skills competence by healthcare rehabilitators working in Southern Italy. In fact, soft skills are an essential component to improvement performance in many professions and especially in healthcare professions such as healthcare rehabilitators, but unfortunately, in university courses, they are not taught sufficiently or equally as hard skills.

### **Abstract**

**Background:** Healthcare rehabilitator skills can be grouped into *hard* and *soft skills*. Hard skills are specific and teachable, which can be defined and measured, while soft skills are less tangible and more difficult to quantify. The aim of this study is to investigate the level of knowledge of soft skills among Italian healthcare rehabilitators, and how they were acquired.

*Design and Methods:* Two hundred healthcare rehabilitators, who worked in Southern Italy were enrolled from September 1<sup>st</sup> to October 31<sup>st</sup> 2017, and interviewed with Computer-Assisted-Web-Interview (CAWI) software, to assess their level of soft skills.

*Results:* Healthcare rehabilitators showed significant satisfaction with university education (59.5%), particularly for theoretical training (64%), while significant dissatisfaction was found for technical-practical training (63.5%), training in patients' family management (66.5%) and stages participation to improve soft skills (59%). Dissatisfied rehabilitators were found for university education of soft skills (59%), particularly for interpersonal relationships with patients' family (66.5%) and technical-practical training (63.5%). Women considered the training courses about soft skills acquisition more useful than men (43.8%).

*Conclusions:* Healthcare rehabilitator training is lacking in the teaching of both technical-practical and soft skills. It is striking that in a healthcare profession like that of the rehabilitator, where practical and empathic skills are fundamental in the relationship with the patients, such skills are not treated in analogously with theoretical training.

**Key words:** Soft skills; healthcare rehabilitators; CAWI software; theoretical training; technical-practical skills; rehabilitator education.

## Introduction

Healthcare rehabilitators include all health professionals involved in the recovery of functions of patients with disabilities as a consequence of chronic diseases or accidents. As these professionals have continuous and repeated interactions with both patients and parents, their soft skills are very important. Particularly, in Italian context there were no studies on Healthcare rehabilitators and soft skills.

Generally, skills can be grouped into *hard* and *soft skills*. *Hard skills* are specific, teachable abilities which can be defined and measured, such as typing, writing, math, reading and the ability to use software programs, while *soft skills* are less tangible and harder to quantify, such as etiquette, personal habits, getting along with others, listening and facility with language. Both hard and soft skills are unavoidable in the training of highly qualified workers because soft skills complement hard skills, which are the technical requirements of a job. In this context, higher education institutions and universities have a crucial role in planning and implementing, according to national institutions, how to train people for the jobs of today and tomorrow and how to shape teaching and learning so that people can acquire skills for the types of work needed in the foreseeable future.<sup>1-4</sup>

Hard skills are quantifiable, such as proficiency in a foreign language, earning a degree or certificate, operating a machine, ability to use technical diagnostics, or programming a computer; i.e., they represent the qualifications of a subject. In particular, hard skills may be learned in school and from books. In contrast, soft skills are more personality-oriented interpersonal skills, such as teamwork, flexibility, patience, persuasion and time management. Soft skills involve rules that change, depending on the type of work and colleagues' expectations. In fact, healthcare professionals, must be able to manage their emotions in difficult situations involving both patients and parents.<sup>5,6</sup> Soft skills are fundamentally based on the following:<sup>7,8</sup>

- *Interpersonal skills:* active listening, good relationships, being useful, conflict resolution and mediation, negotiation, persuasion and influencing skills, team-working, problem solving and decision-making.
- *Organizational skills:* time management, the ability to complete activities multitask, the ability to achieve goals and follow guidelines.

- *Leadership skills*: making optimal decisions, taking initiative, motivating others, problem solving, managing a team and being able to evaluate, manage, organize, supervise and delegate.
- *Communicative skills*: being able to advise, explain and convince, public speaking, translating, giving instructions, training, writing and publishing papers.

Soft skills are linked to personality<sup>9</sup> and to the way of being and acting, and they can be strengthened with adequate training.<sup>2,10,11</sup> In this paper, we considered the following rehabilitation healthcare professions: occupational therapists, orthoptics and ophthalmologist assistants, psychiatric rehabilitation therapists, neuro-and psychomotility therapists, physiotherapists and speech therapists. In these categories, soft skills are very important because health rehabilitators are led to take care of patients and to follow them continuously and for a long time.<sup>12</sup>

In Italy, rehabilitation procedures are provided by the National Health System to patients at no cost, and therefore the choice of a specific healthcare rehabilitator is not an option offered to patients. Conversely, in the case of freelance rehabilitators, who are chosen based on a good empathic relationship with the patient and family, soft skills are essential to provide mutual understanding and greater adherence to treatments. This relationship in a specific geographical area such as Southern Italy is even greater than in other areas, because both patients and family need more communication and interaction with the rehabilitators. This need is probably due to social, historical and cultural background linked to specific geographical areas of patients.

Learning of *soft skills* is not taught well in schools and does not have a set path.<sup>13-15</sup> Instead, they are learned by trial and error, that is, in a spontaneous and not coded way. For example, a physiotherapist will learn from experience which interventions enhance patient adherence to medication prescriptions. Unfortunately, in university courses, they are not taught sufficiently or equally as hard skills<sup>4,9,13,14</sup> as also reported for other healthcare professions such as medical and nurse students.<sup>15-17</sup> Therefore, we provided a picture of the perception about soft skills competence by healthcare rehabilitators working in Southern Italy. The perceived limits in soft skills competence reflect the structure of university programs for health care professionals that are mostly based on theoretical rather than practical approach.

## Objective

The objective of this study was to investigate the level of knowledge of soft skills among Italian healthcare rehabilitators, and how they were acquired.

## Design and Methods

### *Sampling and eligibility*

A cross-sectional study was conducted from September 1<sup>st</sup> to October 31<sup>st</sup> 2017 using a sample of 200 healthcare professionals who worked as rehabilitators in Southern Italy.

Informed consent signed was obtained from all participants, and no economic incentives were offered or provided for participation in this study.

The ethics approval of the study was obtained from the Institutional Review Board (IRB) of the Department of Public Health, University Federico II of Naples.

The questionnaire, based on the software Computer-Assisted-Web-Interview (CAWI) was administered to subjects after a brief description, with the following inclusion criteria: 1) healthcare rehabilitators, 2) graduate, 3) informed consent obtained, 4) Southern Italy geographic area. The questionnaire was published online and compiled independently by all respondents.

### *Instrument*

CAWI is an Internet surveying technique in which the interviewee follows a script provided on a website. This software allows one to make web interviews using on-line questionnaires that can contain pictures, audio and video clips, links to different web pages, etc.

The questionnaire used in this study was created ad hoc for rehabilitators, considering previous studies.<sup>13,16-20</sup>

The questionnaire was composed by a short introduction informing the subjects why the questionnaire is being conducted and that all information were collected according to the Article 12, paragraph 1, point *d*); Article 9 of Legislative Decree No. 322 of 6 September 1989); and Article. 1 and c.2 point *i*) of the law 675/1996 and the subsequent Legislative Decree 196/2003; with a brief description of them.

The questionnaire was characterized both in multiple-choice questions (generally from two to four), and easy-to-understand, open-ended questions to allow respondents to justify some answers in more detail. It was structured in four sections. The first section was designed to collect information about variables including personal information such as age and gender. The second section, composed of 14 items, concerned university education and investigated whether the educational process provided rehabilitators with adequate learning of soft skills. The third section, composed of 16 items, concerned the work activity of the interviewees and focused on any problems identified by them during the course of their profession connected to inadequate soft skills. Finally, the last section, composed of 8 items, investigated the opportunities for professional development, considering both the skills acquired by Continuing Medical Education (CME) courses and skills they would like to deepen.

To facilitate the interview, the survey was performed on a sample equipped with computers, smartphones, or any other devices with an Internet connection. Furthermore, to avoid the abandonment of the survey, the questionnaire administered provided a time of about 15 minutes. There were 206 participants in this study, but only 200 met the inclusion criteria.

### *Preliminary testing*

In order to verify that the questionnaire was clear and understandable, a pilot study was carried out on a random sample of 10 subjects (5 females and 5 males) to make sure the respondents were interpreting the questions as intended, prior to carrying out the study on a larger sample.

### *Sample size*

To individualize a sample size statistically significant in this study, we considered a Bernoulli sampling (Strand, 1979).<sup>21</sup> The minimum sample size for this study was estimated equal to 166 subjects. It was obtained considering a statistical z-score at 99%, an error  $\varepsilon = 10\%$  and hypothesizing a prevalence  $\pi$  equal to 50% on the knowledge of soft skills among Italian healthcare rehabilitators. The  $\pi$  value is considered equal to 50%, because this study is the first explorative research on the knowledge of soft skills among Italian healthcare rehabilitators, therefore we do not have sufficient information in regards. Finally, the possibility of subjects withdrawn and/or incomplete questionnaires, and consequently the possibility of data loss, to minimize possible statistical biases, the sample size was enlarged to 200 subjects.

### *Statistical analysis*

The statistical analysis was performed using the Matrix Laboratory (MATLAB) analytical toolbox version 2008 (MathWorks, Natick, MA, USA). Data are presented as number and percentage for categorical variables, and continuous data are expressed as the mean  $\pm$  standard deviation

(SD) unless otherwise specified. The  $\chi^2$ -test and Fisher's exact test were performed to evaluate significant differences of proportions or percentages between two groups. In particular, Fisher's exact test was used where the  $\chi^2$ -test was not appropriate. In addition, the binomial test was performed to compare two mutually exclusive proportions. The multiple comparison chi-square test was used to define significant differences among three or more independent groups or modalities. In this case, if the chi-square test was significant ( $p < 0.05$ ), the *post-hoc* Z-test was performed to individualize the significant most or less frequent modality. In the case of paired data, the multiple comparison Cochran's Q test was used to compare the differences among three or more percentages under the consideration of the null hypothesis that there are no differences between the variables. When the Cochran's Q test was positive ( $p < 0.05$ ), then a minimum required difference for a significant difference between two proportions was calculated using the Minimum Required Differences method with Bonferroni p-value corrected for multiple comparisons according to Sheskin.<sup>22</sup> All tests with  $p < 0.05$  were considered significant.

## Results

Table 1 shows the characteristics of the sample defined in our study, and statistical tests were performed among modalities for every variable.

By statistical analysis, we observed a significant presence of healthcare rehabilitators with age  $< 35$  y.o. (61.5%,  $p < 0.0001$ ) and female gender (84.5%,  $p < 0.0001$ ). In addition, the speech therapist category was most frequent in our sample (37%,  $p < 0.0001$ ); instead, the occupational therapists (1.5%,  $p < 0.0001$ ) and orthoptists (3%,  $p < 0.0001$ ), were the less frequent categories. The most frequent job location was the rehabilitation center (75.5%  $p < 0.0025$ ), and the most frequent healthcare rehabilitators were those with  $< 5$  years post-graduation (51.5%,  $p < 0.0001$ ), and with a working period of 0-3 years (39.5%,  $p < 0.0001$ ) and 3-10 years (27%,  $p < 0.0001$ ).

Table 2 shows the acquired skills by healthcare rehabilitators in University.

From Table 2, we observed in healthcare rehabilitators a significant presence of subjects satisfied with university education in comparison to dissatisfied subjects (59.5% vs. 40.5%,  $p = 0.0087$ ), such as satisfaction with university theoretical training (64%  $> 36\%$ ,  $p < 0.0001$ ). Conversely, a significant dissatisfaction was observed for university education of technical-practical skills, (36.5%  $< 63.5\%$ ,  $p = 0.0002$ ), university education in interpersonal relationships with patients' families (34.5%  $< 66.5\%$ ,  $p < 0.0001$ ) and university education with stages to improve soft skills (41%  $< 59\%$ ,  $p < 0.0131$ ). Healthcare professionals were particularly satisfied by stage courses: 91.5% ( $p < 0.0001$ ) considered these stages useful to acquire soft skills. Finally, for university education in patient management, no significant difference between satisfied and dissatisfied subjects was observed (50% vs. 50%,  $p < 0.0001$ ).

Table 3 shows the analysis of soft skills considering the gender. From Table 3, only two significant differences can be observed between male and female group. In particular, the females considered training courses more useful than men in learning of soft skills (43.8%  $< 22.6\%$ ,  $p = 0.027$ ), while among topics less discussed, problem-solving is perceived as useful by men much more than in women (48.4%  $> 18.3\%$ ,  $p = 0.0003$ ). Finally in Table 4, we report the statistical analyses of soft skills acquired by our sample of healthcare rehabilitators as described in Table 3.

Table 4 shows that the more frequent shortcomings in educational gaps were interpersonal skills (40%,  $p < 0.0001$ ) and technical and practical skills (45.5%,  $p < 0.0001$ ). Analogously to soft skills acquisition by Continuing Medical Education courses, it was shown that the most discussed topics were interpersonal skills (89.5%,  $p < 0.05$ ) and technical and practical skills (89.5%,  $p < 0.05$ ). With regard to soft skills acquisition, healthcare rehabilitator responses were working experience

(90.5%,  $p<0.05$ ) and training courses (40.5%,  $p<0.05$ ). Finally, among minor topics the most mentioned topics were emotion management (40.5%,  $p<0.05$ ) and team working (45%,  $p<0.05$ ), in contrast, communication and problem-solving were the topics less mentioned (22.5%,  $p<0.05$ ; 23%,  $p<0.05$ ; respectively).

## Discussion

This paper is the first study performed in Southern Italy that discusses the levels of knowledge of soft skills in healthcare rehabilitators. This category includes more sub-categories, such as occupational therapists, orthoptics and ophthalmologist assistants, neuro- and psychomotility therapists and speech therapists. In the literature, there are no data demonstrating the importance of soft skills in the training of healthcare rehabilitators in general, but there are studies that highlight the importance of these skills in specific sub-categories. For example, Ullrich *et al.*<sup>23</sup> show that a group of speech therapists exposed to training in empathic skills significantly improves communication skills with patients; Sanders *et al.*<sup>24</sup> also show that physiotherapists, benefiting from further training centered on the patient's biopsychosocial needs, improve their communication skills necessary to deal with patients' beliefs and fears; and Yu *et al.*,<sup>25</sup> with a study conducted on occupational therapy students, showed that students' exposure to professional interpersonal skills should be incorporated into the curriculum of academic education programs with the aim of better preparing them for practice education. Therefore, we conducted an investigation in our geographic area to evaluate the degree of knowledge of soft skills of the healthcare rehabilitators.

Our results show that degree courses for healthcare rehabilitators in Southern Italy, furnish a good quality of hard skills except for the technical-practical skills, while healthcare rehabilitators perceive formative shortcomings about soft skills, i.e., they did not feel sufficiently prepared to assist patients. To confirm our results about the soft skills gap in university courses, there is the reduced presence of stages, which represent a very important training aspect. In particular, the results of our investigation show that all healthcare rehabilitators who took part in stages believe that they improved their soft skills.<sup>26</sup>

Soft skills include cognitive, personal, interpersonal and organizational skills; therefore, to acquire them, a specific training methodology is required, such as workshops, practical activities, stages and lessons with different approaches to the traditional ones.<sup>27</sup> Through data analysis about university training satisfaction, based on the period of graduation, we found no significant differences among different university courses. The universities in Southern Italy, particularly in the Campania Region, seem to only partially meet the training needs of future healthcare rehabilitators, as they are not provided with sufficient training in practical and soft skills.<sup>28</sup> These results were confirmed considering that the healthcare rehabilitators perceived shortcomings in connection with both soft and technical-practical skills as being very high, and it is probably not a coincidence that in the CME courses, the most preferred themes concerned the technical-practical and soft skills, i.e., the healthcare rehabilitators' needs for field training. This is the only way it is possible to improve both hard skills and soft skills, particularly the technical-practical skills. With regard to gender, we observed that women consider the acquisition of soft skills more useful than men. We could interpret the result as indicative of a greater predisposition to acquire interpersonal skills in women than in men. Instead, men perceive a much greater need than women to learn problem-solving skills. Another factor that clearly emerges from this study is the operators' belief in acquiring skills with working experience. This result highlights the serious lack of practical and experiential skills in university courses, which, according to healthcare rehabilitators, should be more oriented to the real care of the patient.<sup>29</sup> We did not specifically explore the reasons for limited

soft skills in the healthcare rehabilitators; therefore, we assume that this could be linked with the more theoretical rather than practical structure of the universities' teaching programs.

## **Conclusions**

The initial hypothesis concerning the possible lack of soft skills of healthcare rehabilitator training is confirmed in this paper. Particularly, it is pointed out that traditional teaching methods, such as the frontal lesson, leave no room for those skills, which need different teaching approaches.<sup>30-32</sup> In most degree courses, there is a considerable discrepancy between theoretical training and practical exercises,<sup>17</sup> and it is striking that in healthcare professions, where the practical and empathic skills are fundamental in the relationship with the patient, they are not treated in equal measure with theoretical training.

## **Limitations**

Due to the lack of previous research on the topic of the study, there is a need for further development in this research area. The first limitation is related to the generalization of our results to a larger population: data were collected from a sample of healthcare rehabilitators working in a single region of the Southern Italy; therefore, findings must be interpreted with caution and further studies should be conducted on a larger sample of healthcare rehabilitators from several Italian regions.

The second limitation is that in our study all sub-categories of healthcare rehabilitators were not equally represented. In fact some sub-categories such as occupational therapists or orthoptists were less present in comparison to others.

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**Table 1.** Characteristics of 200 participants in our study.

| Parameters                                 | % (Nr.)     | Statistical analysis                       |
|--|-------------|--|
| <i>Age</i>                                 |             | p<0.0001 * (Cm)                            |
| <35  | 61.5% (123) | <35 **, p<0.0001 (Z)                       |
| 35-50                                      | 28% (56)    | >50 ***, p<0.0001 (Z)                      |
| >50  | 10.5% (21)  |  |
| <i>Gender</i>                              |             |  |
| Male                                       | 15.5% (31)  | 15.5% < 84.5% , p< 0.0001 * (B)            |
| Female                                     | 84.5% (169) |  |
| <i>Rehabilitators type</i>                 |             | p<0.0001 * (Cm)                            |
| Occupationaltherapists                     | 1.5% (3)    | Speech therapists, p<0.0001 ** (Z)         |
| Orthoptics and ophthalmologists assistants | 3% (6)      | Occupational therapists, p<0.0001 *** (Z)  |
| Psychiatric Rehabilitation Therapists      | 9.5% (19)   | Orthoptics assistant, p< 0.0001 *** (Z)    |
| Neuro and psychomotilityTherapists         | 24% (48)    |  |
| Physiotherapists                           | 25% (50)    |  |
| Speech therapists                          | 37% (74)    |  |
| <i>Education level</i>                     |             |  |
| Bachelor'sdegree                           | 85.5% (171) | 85.5% > 14.5%, p<0.0001 * (B)              |
| Master'sdegree                             | 14.5%(29)   |  |
| <i>Place of employment+</i>                |             | p< 0.0001 * (Q)                            |
| 1) Unemployed                              | 1% (2)      | Unemployed, p<0.0025 *** (MRD-B)           |
| 2) Freelancer                              | 2.5% (5)    | Freelancer, p<0.0025 *** (MRD-B)           |
| 3) Other                                   | 3% (6)      | Other, p<0.0025 *** (MRD-B)                |
| 4) Public Institute                        | 10% (20)    | Rehabilitation center, p<0.0025 ** (MRD-B) |
| 5) Private activity                        | 19.5% (39)  |  |
| 6) Rehabilitation center                   | 75.5% (151) |  |
| <i>Years post-graduation</i>               |             | p< 0.0001 * (Cm)                           |
| <5   | 51.5% (103) | <5 y.o., p<0.0001 ** (Z)                   |
| [5-10[                                     | 17% (34/    | ≥20, p<0.0001 *** (Z)                      |
| [10-20[                                    | 21.5% (43)  |  |
| ≥20  | 10% (20)    |  |
| <i>Working period</i>                      |             | p< 0.0001 * (Cm)                           |
| 0-3 y                                      | 39.5% (79)  | 0-3 y.o., p<0.0001 ** (Z)                  |
| 3-10 y                                     | 27% (54)    | 3-10 y.o., p<0.0001 ** (Z)                 |
| 10-20 y                                    | 19% (38)    |  |
| 20-30 y                                    | 12% (24)    | >30 y.o., p<0.0001 *** (Z)                 |
| >30 y                                      | 2.5% (5)    |  |

+ the healthcare rehabilitators furnished more answers, \* = significant test, \*\* = most frequent, \*\*\* = less frequent, Cm= Multiple comparison chi-square ( $\chi^2$ ) test, Z = post hoc Z-test, B=Binomial test, Q = Cochran's Q test, MRD-B=Minimum Required Differences method with Bonferroni p-value corrected

**Table 2.** University skills acquired assessment by 200 healthcare rehabilitators.

| Parameters   | % (Nr.)       | Satisfied vs. Dissatisfied     |
|--|---------------|--------------------------------|
| <i>University Education</i>  |               |                                |
| Satisfied  | 59.50% (119)  | 59.50% > 40.50%, p=0.0087* (B) |
| Dissatisfied   | 40.50% (81)   |                                |
| <i>University Theoretical training</i>   |               |                                |
| Satisfied  | 64% (128)     | 64% > 36%, p<0.0001* (B)       |
| Dissatisfied   | 36% (72)      |                                |
| <i>University Technical and Practical training</i>                                       |               |                                |
| Satisfied  | 36.5% (73)    | 36.5% < 63.5%, p=0.0002* (B)   |
| Dissatisfied   | 63.5% (127)   |                                |
| <i>Adequate University education in patient management</i>                               |               |                                |
| Satisfied  | 50% (100)     | 50% = 50%, p<0.0001* (B)       |
| Dissatisfied   | 50% (100)     |                                |
| <i>Adequate University education in interpersonal Relationship with patient's family</i> |               |                                |
| Satisfied  | 34.5% (69)    | 34.5% < 66.5%, p<0.0001* (B)   |
| Dissatisfied   | 66.5% (131)   |                                |
| <i>Adequate University education with stage to improve soft skills</i>                   |               |                                |
| Satisfied  | 41% (82)      | Satisfied vs. Dissatisfied     |
| Helpful  | 91.5% (75/82) | 41% < 59%, p=0.0131* (B)       |
| Unnecessary  | 8.5% (7/82)   |                                |
| Dissatisfied   | 59% (118)     | Helpful vs. Unnecessary        |
|  |               | 91.5% > 8.5%, p<0.0001* (B)    |
| * = significant test, B=binomial test.   |               |                                |

\* = significant test, B=binomial test.

**Table 3.** Information on healthcare rehabilitators about their soft skills.

| <b>Skill type</b>   | <b>Total(200)<br/>%(Nr.)</b> | <b>Males (31)<br/>%(Nr.)</b> | <b>Females (169)<br/>%(Nr.)</b> | <b>Male vs. Female<br/>p-value (Test)</b> |
|---|------------------------------|------------------------------|---------------------------------|---|
| <i>Perception educational gaps</i>                                      |                              |                              |                                 |   |
| None  | 0.5% (1)                     | 0% (0)                       | 0.6 % (1)                       | p = 1.0 (F)                               |
| Theoretical knowledge   | 14% (28)                     | 12.9% (4)                    | 14.2% (24)                      | p = 1.0 (F)                               |
| Interpersonal skills  | 40% (80)                     | 41.9% (13)                   | 39.6% (67)                      | p = 0.81 (C)                              |
| Technical and Practical skills  | 45.5% (91)                   | 48.4% (15)                   | 45% (76)                        | p = 0.73 (C)                              |
| <i>Skills acquisition by Continuing Medical<br/>Education courses +</i> |                              |                              |                                 |   |
| Theoretical knowledge   | 19.5% (39)                   | 19.4% (6)                    | 19.5% (33)                      | p = 0.98 (C)                              |
| Technical and Practical skills  | 89.5% (179)                  | 87.1% (27)                   | 89.9% (152)                     | p = 0.75 (F)                              |
| Interpersonal skills  | 89.5% (179)                  | 87.1% (27)                   | 84.9% (152)                     | p = 0.75 (F)                              |
| <i>Soft skills acquisition+</i>   |                              |                              |                                 |   |
| Personal experience   | 3.5% (7)                     | 6.5% (2)                     | 3% (5)                          | p = 0.30 (F)                              |
| Working experience  | 90.5% (181)                  | 87.1% (27)                   | 91.2% (154)                     | p = 0.50 (F)                              |
| Colleagues'sAdvice  | 19.5% (39)                   | 32.3% (10)                   | 17.2% (29)                      | p = 0.051 (C)                             |
| University education  | 19.5% (39)                   | 29% (9)                      | 17.8% (30)                      | p = 0.15 (C)                              |
| Training corse  | 40.5% (81)                   | 22.6% (7)                    | 43.8% (74)                      | p = 0.027* (C)                            |
| <i>Minor topics in soft skills acquisition +</i>                        |                              |                              |                                 |   |
| Communication   | 22.5% (45)                   | 25.8% (8)                    | 21.9% (37)                      | p = 0.63 (C)                              |
| Problem solving   | 23% (46)                     | 48.4% (15)                   | 18.3% (31)                      | p=0.0003* (C)                             |
| Patient management  | 32% (64)                     | 45.2% (14)                   | 29.6% (50)                      | p = 0.09 (C)                              |
| Decision making   | 35.5% (71)                   | 35.5% (11)                   | 35.5% (60)                      | p = 1.0 (C)                               |
| Emotion management  | 40.5% (81)                   | 35.5% (11)                   | 41.4% (70)                      | p = 0.54 (C)                              |
| Team work   | 45% (90)                     | 45.2% (14)                   | 45% (76)                        | p = 0.98 (C)                              |

+ = every healthcare rehabilitators can indicate more answers . \* = significant test, C =  $\chi^2$  test, F= Fisher's exact test, p=p-value

**Table 4.** Statistical analysis of soft skills acquisitions described in Table 3 on total group.

| <b>Parameters</b>   | <b>Statistical test</b>  |
|---|--|
| <i>Perception educational gaps</i>  | p< 0.0001 * (Cm)<br>None (0.5%), p<0.0001 *** (Z)<br>Theoretical knowledge (14%), p=0.0015*** (Z)<br>Interpersonal skills (40%), p<0.0001 ** (Z)<br>Technical and practical skills(45.5%), p<0.0001 ** (Z) |
| <i>Soft skills acquisition by Continuing Medical Education courses</i>  | p< 0.001 * (Q)<br>Theoretical skills (19.5%), p<0.05 *** (MRD-B)<br>Technical and practical skills (89.5%), p<0.05 ** (MRD-B)<br>Interpersonal skills (89.5%), p<0.05 ** (MRD-B)                           |
| <i>Soft skills acquisition</i>  | p< 0.001 * (Q)<br>Personal experience (3.5%), p<0.05 *** (MRD-B)<br>Working experience (90.5%), p<0.05 ** (MRD-B)<br>Training courses (40.5%), p<0.05 ** (MRD-B)   |
| <i>Minor topics in skills acquisition</i>   | p< 0.001 * (Q)<br>Communication (22.5%), p<0.05 *** (MRD-B)<br>Problem-solving (23%), p<0.05 *** (MRD-B)<br>Emotion management (40.5%), p<0.05 ** (MRD-B)<br>Team work (45%), p<0.05 ** (MRD-B)            |
| * = significant test, ** = most frequent, *** = less frequent, Q = Cochran's Q test, MRD-B =Minimum Required Differences method with Bonferroni-p-value corrected; Cm = Multiple comparison $\chi^2$ test, Z = Z-test |  |