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Prosthetist/Orthotist Educational Experience & Professional Development in Pakistan

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ABSTRACT

Purpose: To explore areas in which the education at the Pakistan Institute of Prosthetic & Orthotic Science (PIPOS) could be improved or supplemented to facilitate clinical practice of graduates. To describe educational opportunities PIPOS graduates have had since their graduation and explore their further educational needs.

Method: 15 graduates from PIPOS participated in semi-structured interviews. A qualitative content analysis was applied to the transcripts. **Findings:** Respondents indicated a need to upgrade the education at PIPOS. This should include upgrading of resources such as literature and internet access as well as providing staff with the opportunity to further their own education. Females experienced inequality

throughout their education but were supported by management. Upon entering the workforce graduates reported that they were supported by senior staff but experienced difficulties in determining appropriate prescriptions. They further indicated that a multidisciplinary approach to patient care is lacking. Graduates knowledge of workshop management was identified as a problem when entering the workforce. Limited awareness of the prosthetics and orthotics profession by both the general community and the medical community was also identified as a problem. If offered the opportunity to continue their studies the respondents would like to specialise. “Brain drain” was noted as a risk associated with post graduate education. Interaction from international collaborators and networking within the country was desired.

Conclusion: The education at PIPOS meets a need in the country. Graduates indicated that P&O services for Pakistan can be better provided by modifying program content, upgrading teachers’ knowledge, improving access to information and addressing issues of gender equality . PIPOS graduates have had limited opportunities for professional development and have a desire for further education.

Keywords: Pakistan, prosthetist, orthotist, education, professional development

INTRODUCTION

The prosthetics and orthotics profession is involved in the manufacture and provision of orthopaedic appliances for amputees (potential prosthetic users) and persons with other physical disabilities (potential orthotic users). The majority of developing nations have no formal prosthetic and orthotic (P&O) education. This results in limited availability of prosthetic and orthotic services for persons with physical disabilities. In 2010 it is estimated that 30 million people in Africa, Latin America and

Asia, about 0.5% of the population in the developing world, will be in need of assistive devices [1]. The majority of these people could be re-established within society if they received an assistive device to facilitate mobilisation, recognised as a first step to accessing basic rights, food, education and income [1, 2].

The Pakistan Institute of Prosthetics and Orthotics Science (PIPOS) is the only educational institute for prosthetist/orthotists in Pakistan. The World Health Organisation (WHO) together with the International Society for Prosthetics and Orthotics (ISPO) has divided the education of personnel involved in the production and supply of prosthetic and orthotic devices into three categories. Category I, university level 3-4 years, category II Orthopaedic technologist and category III Technicians/ bench workers [1]. The PIPOS education programme is an ISPO/WHO category II recognised programme that includes three years of academic studies and one year of clinical internship. A category II inspection of PIPOS conducted in 2005 recommended that improvements need to be made in student assessment methods, access to resources, education in biomechanics and in the amount of exposure students have to a multidisciplinary working environment [3, 4]. This inspection was carried out over a period of five days. During this time the inspectors reviewed the curriculum, spoke with current students and staff and participated in student examinations. Inspectors did not interview graduates or employers. The aim of the inspection was to evaluate if the current program meets the requirements for ISPO category II recognition. As such the inspectors did not consider whether the education meets the specific needs of the Pakistani community.

The need for a high quality prosthetics and orthotic education program in Pakistan is intensified by the prevalence of disability in the country. In Pakistan the reported incidence of locomotor disabilities varies from 0.3%-0.83% [5-7]. Pakistan's frequent fighting with India over the ownership of Kashmir and fights with anti-Taliban forces, Iran and others have resulted in parts of the country being affected by landmines and a subsequent increase in the incidence of amputation [7]. In addition, Pakistan is one of four countries in the world that are still polio endemic [8]. The majority of patients infected with polio are in need of orthoses [9]. The earthquake in October 2005 produced 750 amputees at different levels and 650 paraplegic patients within North West Frontier Province and the Kashmir district [10]. International organisations, together with the Ministry of Health and PIPOS have been involved in implementing community based rehabilitation and providing prosthetic and orthotic services to support the disabled in this region [10]. PIPOS has played an important role in providing locally trained P&Os to the rehabilitation centres [11]. Assuming that 0.5% of the population is in need of P&O services, it is estimated that Pakistan requires about 1150 prosthetist/orthotists to meet the current need. To date 160 students in total have graduated from PIPOS.

Given that the category II inspection of PIPOS has recommended curricula changes to the program and given that there is such a need for prosthetic and orthotics services in Pakistan, it was considered important to explore, on a deeper level, how the program could be further improved to meet the immediate and future needs of the country.

The aim of this study was to examine areas in which the education at PIPOS could be improved or supplemented to facilitate the clinical practice of graduates. Further aims

were to describe the educational opportunities PIPOS graduates have had and to explore their future educational needs.

METHOD

Design and background

A qualitative cross sectional research approach using semi-structured individual interviews was selected to address the research aims.

102 students have graduated from PIPOS over the past six years, including 35 females and 67 males. All graduates are from Pakistan. Pakistan has a population of approximately 150 million people [12]. PIPOS is located in Peshawar, the lands of the Pashtons. Almost all inhabitants of this area are Sunni Muslims. Only half of the population has access to basic health care. The injustice of resources is enormous and it is estimated that one third of the population live under the official poverty line, 2\$ a day [13].

Participants

For the current study, fifteen graduates from PIPOS were interviewed, including five females and ten males. Persons interviewed had graduated from the school between 1999-2005. The average age was 25.9 years (range 23-30 years). The graduates had an average of 2.5 years experience (range 0.5-6 years) and were able to communicate with a reasonable level of English. The interviewees represented the cities of Peshawar, Karachi and the earthquake affected areas, including North-West Frontier

Province and Kashmir. Those respondents who had international experience had been in East Timor, Saudi Arabia and Cambodia. The respondents worked with patients from both rural and city areas and three of them were teaching at PIPOS. The gender distribution of participants reflected the distribution of the study population.

Procedures

In selecting graduates to interview, it was necessary to access a broad selection of persons who represented each of the different employment situations likely to be encountered after graduating from the school. Criterion sampling was subsequently used. Persons selected for interviews were chosen on the basis that they represented different genders and were involved in different sectors of health care including, 1/ private practice, 2/ governmental institutions, 3/ international and national NGOs, 4/ international workforce 5/ further studies abroad and 6/ unemployed. As no formal figures were available regarding the workforce distributions the number of interviews performed with graduates working within the different sectors was determined using estimations by PIPOS staff who are familiar with the situation in Pakistan.

PIPOS agreed on a review of their graduates' educational experience and professional development needs. Ethics approval was obtained from Jönköping University, Sweden and PIPOS. All the respondents were informed of the aims of the study and oral informed consent was obtained from all respondents.

Data collection took place in July 2006 in Pakistan. All interviews were carried out face to face in English by the author LM and followed a semi-structured interview guide. Background and demographic questions were followed by questions covering

the three content areas of interest; prosthetic and orthotic education, entering the workforce and professional development. The graduates were asked about how well they felt they had handled the situation as a new graduate, what knowledge they lacked and how the PIPOS education had influenced their performance. The interviews also covered questions about educational opportunities after graduating from PIPOS. Finally interviewees were asked about the type of further training/education they would like. Sessions lasted for about 30 min and were recorded with a digital voice recorder.

Data analysis

Interviews were transcribed and minor grammatical editing was applied by author LM. Content analysis was applied to the manuscripts using the principles described by Graneheim and Lundman [14]. The interview text was sorted into three content areas: prosthetic and orthotic education, entering the workforce and professional development. To obtain a sense of the whole, interviews were read through a number of times prior to coding. The text was then divided into meaning units, which consist of phrases or sentences describing or expressing different thoughts or feelings. The meaning units were further condensed and labeled with codes. The codes consisted of a short sentence rather than words only. This was considered necessary in order to preserve key content. The manifest content was analysed by creating codes (Table 1) and categories (Table 2). Categories were finally summarised into themes. The analysis process focused on the manifest content. Analysis of latent content was not considered appropriate given the aims of this study. To strengthen credibility during data processing, the second author (NR) was involved in the process of creating categories and themes.

Table 1: Example of the initial qualitative content analysis process

Meaning unit	Condensation	Code
<i>When concerning Patient groups /diagnoses? What did you find most difficult when you entered the workforce?</i> 'The cerebral palsy child. Mainly things can be improved by physiotherapy and I find it difficult to know if we should do any splinting or not. Often they are mainly referred to physiotherapy' (G).	The cerebral palsy child, things can be improved by physiotherapy. It is difficult to know if we should splint or not(G).	Lack of knowledge cerebral palsy patients (G).

Table 2: Example of how a number of codes are grouped into sub categories

Codes	Category	Theme
We are weak at biomechanics and do not have a good teacher (L). Teachers in PIPOS should update their knowledge (B). More than one teacher that knows arm prostheses (I).	Teachers knowledge	Need to upgrade the level of education

The authors' pre-understanding may have affected the analysis. Author, LM is a Swedish, female and prosthetist/orthotist with previous experience with research in developing countries including India and post war Sierra Leone but not in Pakistan. The second author is an Australian prosthetist/orthotist and researcher with experience in P&O education from Australia, North America and Europe.

FINDINGS

Findings are presented according to the categories that were developed under each of the content areas: prosthetic and orthotic education; entering the workforce and professional development. Quotes from transcripts of the interviews are used to summarise the message and /or to exemplify. Fictitious names have been given to the respondents to ensure confidentiality: A, B, C, etc. Figure 1 provides an overview of the content areas, and the categories that were developed. Figure 2 summarises the major themes that emerged from the data.

Figure 1: Content areas and categories that emerged from the data

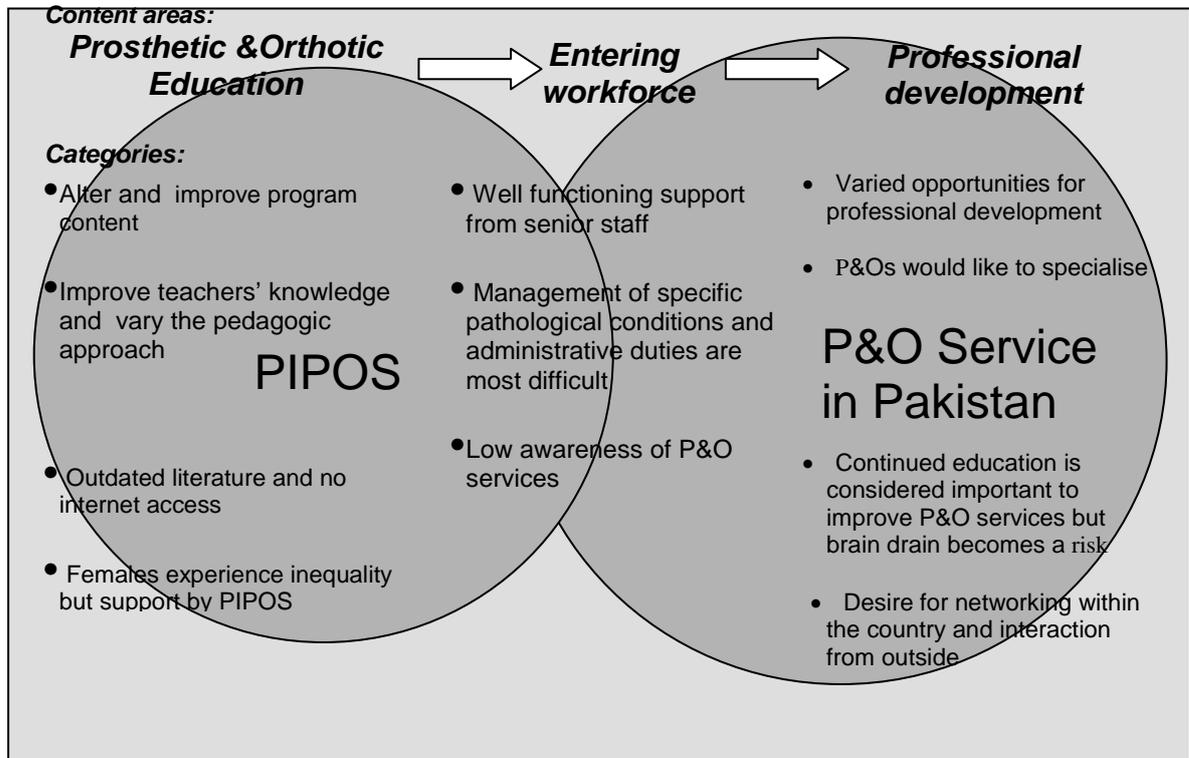


Figure 2: Major themes emerging from the data

Need to upgrade the level of education
 Graduates experience support from senior staff but lack knowledge
 Limited awareness of the profession
 Desire for professional development including international exposure

Prosthetic and orthotic education

Four categories specifically related to the education at PIPOS emerged from the data. These related specifically to program content, access to resources, gender inequality and the competency of teachers. These categories led to the development of a single theme being the ‘need to upgrade the level of education’. Each category is discussed in detail below.

Alter and improve program content

Almost all the respondents mentioned that they would like to see specific changes to the educational curricula. Of particular concern was the education offered in biomechanics which was perceived as substandard.

'Biomechanics is the backbone so it should be improved' (H).

The subjects of psychology, anatomy, physiology and pathology were also of concern to respondents who would like to see the content strengthened. It was further suggested that too much time was spent on metal work and mathematics.

'Technical drawing is waste of time' (G).

A desire for more knowledge regarding the prescription of specific devices for cerebral palsy patients and an ability to recognise when physiotherapy should be used instead of, or as complement to orthotic devices was indicated. This suggested that the link between theoretical and practical teaching needs to be improved in the curricula and that students would benefit from a multidisciplinary teaching environment. The emphasis on the clinical team approach was considered very important to the graduates. There was also a suggestion that part of the internship year (currently served on site in the PIPOS workshop) should be spent away from PIPOS.

Improve teachers' knowledge and vary the pedagogic approach

The competency of teachers at PIPOS was addressed by a number of respondents. The most urgent issues requiring attention were the staff's ability to teach biomechanics and their pedagogic aptitude.

'The cry of the day is upgrade the teachers, it is necessary, then training the teachers how to give this knowledge further' (O).

One of the respondents indicated that she was taking an upgrade course (category I) in Cambodia together with three other teachers from the school. This suggests that efforts are being made to increase the teachers' knowledge. A few respondents stressed the need for a different pedagogic approach with more assignments, discussions and varied examinations.

'The way they ask questions (at the upgrade course in Cambodia) we have to think, we cannot memorise. This I think we are missing in PIPOS. ...It is good to think rather than to memorise' (B).

'I think every student should have a chance to try the appliance they have fabricated to see what impact the appliance has on the patient and what is missing and what is wrong' (I).

Respondents said they would like to have more time to practice examination and consultation with patients during the internship. In addition, they would like to participate in the prescription generation process. At present it appears that interns are

only assigned patients after a senior clinician has performed the examination and already generated a prescription.

Outdated literature and no internet access

Almost all the respondents said that there was not enough literature available in the PIPOS library and at the workshops where they are employed. Available literature was outdated and respondents were frustrated that they were not exposed to modern technology throughout their education. They realised that it is important to be taught the 'older' conventional technology because of the economic situation in Pakistan but were interested in increasing their awareness of other alternatives.

'Sometimes I cannot find the information I am searching for and I think there are books missing' (K).

Neither teachers nor students had access to internet facilities or other online medical resources at PIPOS although a few respondents had internet access at home. No research articles were used in the education and the respondents stated that no scientific articles related to P&O are available in Pakistan.

Females experience inequality but support from PIPOS management

Both male and female respondents agreed that management at PIPOS treated both genders equally. A number of male respondents said that equal opportunities were provided by teachers at PIPOS but the female respondents did not agree.

'Females are always degraded. They say we can not do hard work bending and they say you can not work for so long. I do not think it is true, in our department we are two girls and they always tell us you can not do this you can not do that' (I). This is a male dominated society and you will face the same problem in any field in Pakistan. ...When I fight for myself I look at the strong females that are here' (K).

PIPOS has managed to educate female clinicians who are good examples for the female students even though they do not feel that they are treated equally by all the teachers. It was suggested that females could find employment in already established workshops but would not be able to establish a new workshop as they would have to travel to find material and machinery. A number of male respondents were of the opinion that the profession is for men only:

'I think this field is 100 % for males because the work is hard and heavy. The males should do the job' (J).

Some of the male respondents agree that both genders are needed within the profession and provided the argument that:

'Female patients in our society feel shame if a male P&O takes a cast of them. So I think it is important that females are treated equally in PIPOS...' (F).

One male respondent admitted that the females are theoretically stronger and better at teaching even though they are weaker when it comes to practical work. Most of the

female respondents indicated that they would like to work and that, even when the time for family comes, they would like to be able to manage both family and profession. These women understood that there is a risk that they would have to stay at home or move abroad, depending on who they marry.

Entering workforce

Under the content area related to entering the workforce respondents indicated that they are generally satisfied with their experience of transitioning into the working environment but were not prepared for all of the tasks demanded of them. Two themes emerged from this data. ‘Graduates experience support from senior staff but lack knowledge’ and ‘limited awareness of the profession’. Categories from which these themes emerge are as follows;

Well functioning support from senior staff

The newly qualified graduates felt that they received a lot of support and guidance from senior staff when entering the workforce, especially those who continued to work as PIPOS employees. Respondents who work within Pakistan but at an institute or clinical practice other than PIPOS often had the experience of feeling alone. Senior colleagues had been supportive over the phone and via email but respondents wished they had someone to work alongside. Students who began working abroad reported varied experiences, ranging from full support for their professional development to being the only educated P&O at the workshop. Most of the respondents said they were willing to train others if required.

Management of specific pathological conditions and administrative duties are most difficult for graduates

The respondents felt well prepared for providing appliances to polio patients and transtibial amputees. Major difficulties were however expressed in their ability to manage other pathological conditions including cerebral palsy, upper limb conditions, spinal injuries, diabetic patients and transfemoral amputees. Respondents also indicated that they were weak in evaluating patient outcomes after fitting appliances. For the respondents who began their working career outside PIPOS, administrative management was one of the most difficult issues.

'Management of the clinic was difficult' (A). 'I was all alone. Accounts and where to collect the material was difficult' (E).

Low awareness of P&O services

Low awareness of P&O services among the general population and other health professionals was identified as a problem. Respondents suggested that holding seminars or workshops which address different assistive devices could be provided by P&O's as a means of improving the situation. There was also low awareness regarding the services that P&O workshops could offer. Surprisingly, few P&O positions are available in government hospitals. It appears that these institutions mainly employ personnel with no formal education. Before the earthquake there were not enough employment opportunities for all the qualified P&Os. This was frustrating to the interviewees who felt that there should be at least one trained P&O at every hospital that was providing P&O services.

'How can technicians work without education...It must be a little bit dangerous for the patients, no one sees how they work. They can do production work but how can they prescribe and take casts? They do not know anatomy, pathology or material technology ... the government hospitals do not employ P&Os and this needs to change. If every hospital employed a P&O there would be a lot of jobs'
(C).

Professional development

The theme that emerged from data related to professional development was that there is a 'desire for professional development including international exposure'. Specific categories from which the theme emerged relate to opportunities available, specialization, the importance of professional development and networking.

Currently varied opportunities for professional development

Some respondents had participated in courses and workshops post graduation. These included courses on International Committee of the Red Cross polypropylene technology, spinal orthoses and computer training. Working alongside senior colleagues after graduation was considered valuable.

We have learnt so much from the physiotherapist and the Certified Prosthetist Orthotist from the ICRC. In the consultation and gait training...' (N).

Some respondents have had no opportunity for further education. One respondent had been given the opportunity to participate in an upgrade course to a category I prosthetist/ orthotist in Cambodia.

P&Os would like to specialize

There was a desire among respondents to specialize in a particular area of prosthetics and orthotics. Specific areas of specialty mentioned by respondents included gait biomechanics, new technologies, orthotics for cerebral palsy and polio patients, upper limb prosthetics, spinal orthotics, research and management.

'I would go for the management of the workshop if I have an opportunity to go to a course' (D).

Continued education is considered important to improve P&O services but brain drain becomes a risk

Almost all respondents said they would like to complete a Category 1 upgrade or a Master's degree. As the opportunity was not available in Pakistan they indicated that they would be willing to go abroad. The male respondents would like to have higher education to be able to work abroad. They indicated that this would provide them with the opportunity to earn more money, be famous and improve the P&O services in Pakistan. The female respondents indicated that they wanted to improve the P&O services within Pakistan or that they would like to come back to PIPOS to improve the school and contribute to the skills and knowledge that are lacking. One female respondent said:

'If I got a chance to go abroad I will never refuse the opportunity. Even alone I have to do it, even if it is almost impossible for a girl to go alone abroad in our

society. I will do it even if it is very difficult. I will then come back here to serve the people here' (K).

A desire for networking within the country and interaction from outside

Respondents felt they would benefit from discussion and exchange with professionals from other countries. They would like to see international collaborations for teachers to facilitate the exchange of ideas. There was some critic expressed towards the international society, ISPO.

'They (ISPO) should not just analyse PIPOS they need to do something to help us. Not just say you are not enough for a category I they should help if we do not have enough books, knowledge and teachers. Ok, but do something about it' (L).

Improved communication and a network between P&Os working in Pakistan were suggested as improvements that could be made without interaction from outside Pakistan.

DISCUSSION

Findings from this study suggest that Pakistani P&Os are isolated and that interaction, not just on management level, is needed to keep the P&O services and the education program updated. Internet access for all the students and staff at PIPOS would be a positive start in providing access to current literature. The medical information that is accessible free as part of the International Network for Availability of Scientific Publications (INASP) who provide journal articles through their Programme for the

Enhancement of Research Information (PERI) and other similar programmes are suggested by the authors as a potential means of addressing this issue.

Improvement of teaching within specific subject areas was considered a high priority by respondents in this study. Of particular importance was the subject of biomechanics. This confirms findings from the 2005 ISPO inspection [4] which mentioned that students had problems connecting device function to different outcomes and that the application of biomechanical concepts required revision. This issue could be addressed by increasing interaction and collaboration with the international community and upgrading of Pakistani teachers to a Category I level education. The findings of this study suggest continued, advanced education of teachers at PIPOS in pedagogics and in specific subject areas including; biomechanics and specific pathologies such as cerebral palsy is necessary. In addition, it is recommended that students' knowledge of upper limb prostheses, spinal orthoses, and management of a workshop be improved upon. An alternative to this would be to provide specialist post graduation education in these areas.

The findings of this study indicate that there is a greater desire for males to leave the country to work elsewhere and to increase their personal financial status. It appears that females are more likely to return to Pakistan to help improve PIPOS and the P&O services within the country. One must recognise however that, given the cultural context, there is a risk for newly married females to stop work. It should further be recognised that providing individuals with higher education increases their employability abroad. Sustainability of upgraded staff is consequently a challenge for PIPOS. At the present time the authors can only recommend careful selection of

persons who are offered further education opportunities and that female and male students be treated equally by the teachers at PIPOS during their education.

Students need to be prepared for independent decision making and clinical practice post graduation. This study indicated that the way the internship was currently designed was ideal for those who had the possibility to remain working at the PIPOS clinic post graduation as they can continue to learn and be supported by their teachers and senior staff. To facilitate graduates working outside the PIPOS environment it is recommended that students undertaking an internship should be part of every step of the process of providing appliances for the patients. For those students who are going to be on their own after graduation it is also recommended that they obtain knowledge on workshop maintenance and management. The findings of this study suggest a review of the PIPOS curricula is necessary. We would recommend removing technical drawing from the curricula and adding psychology and modern technologies. We further recommend increasing the emphasis on clinical decision making and outcome measures.

Respondents stated that an emphasis on the clinical team approach to care was lacking from the present education. Improvements in this area could be made by involving other allied health professionals in the education. An alternative solution would be to establish close collaboration with departments where such professionals are available. The suggestion from one respondent, that parts of the internship should be conducted outside PIPOS, is also considered beneficial, particularly for those students with special interests. It has previously been recognised that the contribution of both physiotherapists and orthotist/prosthetists is necessary to achieve the best

biomechanical solution for a patient [3]. This is also consistent with previous recommendations by the ISPO inspection team who pointed out an absence of a clinical team approach [4]. The findings of this study recommend that the multidisciplinary approach to healthcare be emphasized throughout the education and internship.

Appreciation of qualified P&O professionals in Pakistan by government employers is necessary in order to promote the clinical team approach and reach new geographical areas with P&O services. The findings of this study indicate that government hospitals employ untrained technicians to provide a service instead of qualified personnel. A change in this area will likely improve service delivery and create job opportunities for qualified clinicians. To improve quality of P&O services government hospitals need to start to employ educated P&Os for their workshops. Awareness raising activities are needed to improve other health professionals' knowledge about the profession. We would also recommend the establishment of a network between P&O professionals. This could be done through workshops held within the country or conferences abroad.

CONCLUSIONS

The education at PIPOS meets a real need in Pakistan. Findings from the present study suggest that a number of changes could be implemented to enhance the educational experience afforded by PIPOS and to provide a better service to patients. Graduates expressed a desire to upgrade the level of education offered by PIPOS. This included upgrading of the literature available to students and staff, internet

access and continuing education for teachers. The education program at PIPOS should reduce its focus on technical aspects of prosthetic and orthotic practice and dedicate more time to clinical management of patients and applied biomechanics. When entering the workforce graduates feel supported by senior staff but lack knowledge in dealing with specific clinical problems and workshop management. Graduates also expressed frustration due to low awareness of the P&O profession by their peers and the general community. PIPOS graduates consider opportunities for further education important but have had limited opportunities for professional development since their graduation. The respondents felt isolated and expressed a desire for increased interaction with international parties.

By addressing the issues raised in this investigation and implementing change to the education and professional development of prosthetist and orthotists in Pakistan it will be possible to provide more appropriate and efficient care and to produce clinicians with the skill and knowledge to facilitate and supervise training of those who follow.

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