

Establishing and Sustaining a Pediatric Bone Marrow Transplant Program in Developing Countries

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Bone marrow transplantation (BMT) is an established treatment modality for various Pediatric malignant and nonmalignant hematological diseases such as leukemia, Thalassemia major, Sickle cell disease and bone marrow failure syndrome¹. For low-risk patients of sickle cell anemia and Thalassemia, BMT can cure 85% of the cases and improve the long term Health related quality of life,^{2,3} whereas for high risk malignancies and marrow failure syndromes, BMT is the only lifesaving option. Thalassemia major patients would die without transfusions or BMT. However, long term transfusion and optimized chelation therapy is highly challenging for many developing countries, where this disease is prevalent causing unsustainable health burden. Bone marrow transplantation should be considered the primary treatment of choice in the presence of suitable donor⁴ Patient's condition at the time of transplant is a major determinant of outcome, therefore close association between referral centers and BMT services is necessary.⁵

Offering free or subsidized HLA typing for identification of suitable transplant donor in communities with high consanguinity rate is also helpful for patients registered in thalassemia centers or other institutes providing supportive care to these patients⁶

There is a gross disparity between the requirement for transplant and existing facilities in Pakistan.⁷ For a self-sustainable BMT program financial constraints and professional expertise are two main challenges in developing countries like ours,⁸ support and commitment of governmental and nongovernmental organizations for the non-affording patients can help running such programs.⁹ The recognition of minimum to ideal requirement as well as clinical, technical, and financial consideration for the establishment of new Bone marrow Transplant (BMT) by WBMT will be helpful in limiting the initial program cost.¹⁰ Developing countries are deprived of essential human resources due to their migration in developed countries, therefore human resource capacity building through trained and dedicated health care professional is the next challenge in proper functioning of a BMT center. International cooperation and twining with other institutions in developed countries through information technology platform could be very helpful.¹¹ Traveling of expert BMT physicians and nurses to

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new BMT sites for supervision and on-site training of local BMT team when all basic requirements are in place is more cost effective than sending few physicians and nurses to established transplant centers. On-site training should be followed by interactions via web-based electronic medical record system and teleconferencing. Experienced nurses are a critical component of any BMT program, recommended optimum nurse to bed ratio per shift is 1:2.¹² Professional development plan and suitable salary prevents the nursing shortage and turnover. BMT unit for low-risk patients can be established within an existing hospital facility with relatively less cost, for them high-efficiency particulate air filtration and positive pressure is not mandatory according to international guidelines¹³ Moving on to the challenges during the various phases of transplant, they can be in the form of availability of chemotherapeutic drugs, access to certain mandatory laboratory services like drug levels, viral PCRs, Chimerism testing, Blood bank facilities for irradiated blood products and specialized radiological testing. Collaboration with institutes for outsourcing of tests like CMV PCR, Peripheral chimerism, irradiation of blood products and preparation of single donor Platelets can smooth line issues to quite an extent. Management of post transplant complications including GvHD, vasoocclusive disease, intracranial hemorrhage, septicemia low risk transplants studies have shown that major complication is septicemia and no extensive chronic GVHD is observed in such cases.¹⁴ A multidisciplinary approach in the management of complications and strengthening of existing facilities can be helpful in most of the cases. In summary, structured collaborative program, commitment, and team work can make a difference in offering this treatment modality and bringing about the difference in the lives of patients and families suffering from such diseases.

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