



# Journal of Biological Sciences

ISSN 1727-3048

**science**  
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## Missed Injuries in Multi Trauma Patients

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**Abstract:** The multi-trauma patient has usually sustained multiple traumatic injuries to the body, affecting different organs and body systems. The aim of this study was to assess the reasons for injury concealment in multitrauma patients and provide resolutions to reduce them. In this cross sectional study, 487 patients were evaluated. After collection of needed data, a questionnaire included demographic data, primary diagnosis in emergency ward, graphics conducted in emergency ward, missed injuries, trauma severity was filled for every multitrauma patient who had a missed injury. The relative frequency of multitrauma was 18.51% among all studied trauma patients (487 cases), but 7.6% of included patients had missed injury. Thirty two missed injuries were found in 28 patients. Most injuries were musculoskeletal, involving the distal part of the limbs. Fracture was the most common type of musculoskeletal injury (19 out of 32 missed injuries). Causes that led to concealment of injuries were founded to be inadequate physical and/or, radiographic examinations, commonly after severe penetrating injuries which are mostly due to motorcycle accident. Most of the missed injuries have been ultimately diagnosed upon the patient's complaints in hospital wards, within 1 to 30 days after trauma. Repeating examinations during hospitalization and follow-up periods especially in patients suffering from severe trauma and conscious disorder and those hospitalized at ICU, plays an essential role in discovering the missed injuries.

**Key words:** Multitrauma, missed injury, complication

### INTRODUCTION

Patients with several injuries are called multitrauma patients. The third leading cause of death for all ages, multitrauma is the leading cause of death for all under the age of 44 years (Fardiazar *et al.*, 2012; Goldust *et al.*, 2011; Nikanfar *et al.*, 2012; Pearl and Bar-Or, 2012; Sadeghpour *et al.*, 2011). Mortality rate is a weak index considering the subject importance because most injured patients are survived (Ganjpour Sales *et al.*, 2012; Golfurushan *et al.*, 2011; Milan *et al.*, 2011; Parks and Croce, 2012; Sadeghpour *et al.*, 2012; Sadighi *et al.*, 2011). The missed injuries will be minimized through exactly observing. Most studies conducted in this regard have introduced factors such as alteration of consciousness level, several traumas, sever and life-threatening injuries, homodynamic instability, delayed manifestation of missed injuries, scientific and experimental level of trauma team and methods of applying radiography as effective factors in missing of the injuries (Bergh *et al.*, 2012; Czirjak *et al.*, 2012; Goldust *et al.*, 2012; Sadeghpour *et al.*, 2011; Sadighi *et al.*, 2011; Shakeri *et al.*, 2013; Vahedi *et al.*, 2012). Most studies have already conducted about missed

injuries of multitrauma patients are not comprehensive and most of them have considered special missed injuries such as musculoskeletal injuries (Farhoudi *et al.*, 2012; Goldust *et al.*, 2013d; Karzar *et al.*, 2012; Newgard *et al.*, 2012; Nourizadeh *et al.*, 2013; Seyyednejad *et al.*, 2012; Vafae *et al.*, 2012). But, the present study considered other missed injuries including internal parts injuries (Goldust *et al.*, 2013a-c; Mohebbipour *et al.*, 2012; Salehi *et al.*, 2013a, c). According to different studies, accident with vehicles especially motorcycle is the most common mechanism of multitrauma incidence (Goldust and Rezaee, 2013; Lotti *et al.*, 2013; McCrum *et al.*, 2012; Mosquera *et al.*, 2012). Considering high rate of accident in our country, conducting the present research was of high importance in order to discover factors effective in diagnosing missed injuries other than the above mentioned cases.

### MATERIALS AND METHODS

This cross sectional study was conducted on 487 patients out of all trauma cases referring to emergency ward of Shohada Hospital, for one year Aug., 2011 to

Aug., 2012. This study was approved by ethic committee of Tabriz University of Medical Sciences. Written consent was obtained from all the patients. All primary examinations and evaluations were conducted by one orthopedic surgeon in the emergency ward. According to the study objectives, a questionnaire was drawn up and filled for every multitrauma patient. The questionnaire was included demographic data, primary diagnosis in emergency ward, graphies conducted in emergency ward, missed injuries, trauma severity, etc. Our patients often suffered from moderate trauma. After taking all necessary actions of primary and secondary evaluations, the patients were transferred to operation room, ward or Intensive Care Unit (ICU) and were followed up for one month. The patients hospitalized at the ward or ICU were followed up through evaluating their files. The operated patients transferred to the ward or ICU after surgery, were followed up in a way similar to the previous group. Those released patients who were hospitalized for duration less than one month were followed up through their referring to the clinic. Those patients not referred to the clinic were followed up by phone call. All patients passed away in the emergency ward, operation room or during one-month period of follow-up or even those who were referred to another center were excluded from the study if they had not any missed injuries until when they died or referred to another center. There were 120 cases of such patients. The results of the study were statistically analyzed using SPSS, version 16. Mean $\pm$ SD was used, as appropriate. A p-value of  $p < 0.05$  was considered significant.

## RESULTS

The present study evaluated 487 multi trauma patients constituting 18.5% of total trauma patients referring to the emergency ward of Shohada hospital. Out of the mentioned patients, only 367 cases completed the study and 120 ones were excluded due to dying or referring to other centers. The highest rate of referring to the hospital was seen in summer especially July in 74 patients (20.19%). However, the difference was not statistically meaningful ( $p > 0.05$ ). In this study, 283 (77%) of multi trauma patients were male and 184 (23%) were female and missed injury was observed in 23 (8.1%) of males and 11 (5.96%) of females. Mean age of patients with missed injuries was  $30.25 \pm 8.24$  years. It was  $29.9 \pm 7.86$  years in the rest patients ( $p > 0.05$ ). Out of 367 patients, 28 ones (7.6%) suffered from missed injuries and 32 missed injuries were diagnosed in these 28 patients (averagely 1.14 injuries per each patient). Considering mechanism, the highest rate of trauma was related to vehicle accidents especially motor cycles and falling from

height occupied the next position. Considering type of trauma, it should be mentioned that non-penetrating trauma was seen in 19 cases (67.9%), penetrating trauma in 4 patients (14.3%). Also, 5 patients (17.8%) experienced both types of trauma. There was statistically meaningful difference between kind of trauma and missed injuries rate ( $p = 0.001$ ). Mean GCS (Glasgow Coma Score) was  $14.7 \pm 0.5$  and  $14.9 \pm 0.7$  in patients with missed injuries and the rest multi trauma cases, respectively. The difference was not statistically meaningful ( $p = 0.313$ ). Considering trauma severity, patients with missed injuries suffered from more severe trauma in comparison with the rest multi trauma ones ( $p = 0.001$ ). The most injured limbs included foot and ankle, hand and wrist (5 patients for each of them) and then, shoulder and chest (4 cases for each of them). Most of the injuries (25 cases) were diagnosed in the ward resulting from the patient's complaints (13 cases). Out of them, 3 patients were hospitalized in ICU. Considering quality of the requested graphies, it should be stated that no injury was seen in graphy of 6 patients. The injury was unclear in graphy of 7 patients and it was seen in 6 patients but was not reported. There was not conducted any graphy from the injured area in 9 patients.

## DISCUSSION

Most studies have already been conducted about missed injuries in multi trauma patients are not comprehensive and often considered some special injuries including musculoskeletal ones (Babaud *et al.*, 2012; Fardiazar *et al.*, 2013; Ganjpour Sales *et al.*, 2013). There are relatively few studies considering all missed injuries. Prevalence rate of musculoskeletal was 18.51% in our study. Incidence rate of the missed injuries was determined as 7.6%. The result is not comparable to those outcomes resulted from previous studies (Salehi *et al.*, 2013d; Snoek *et al.*, 2012; Soleimanpour *et al.*, 2013). The difference comes back to varied methods used in different studies. However, incidence rate of missed injuries varied from 6 to 12.4% in other studies. The missed injuries may be associated with mortality risk if they are really significant such as liver laceration (Brito *et al.*, 2012; Daghigh *et al.*, 2013; Holly *et al.*, 2012; Nemati *et al.*, 2013). Most missed injuries diagnosed in this study were of musculoskeletal type (25 injuries out of 32 ones). Musculoskeletal injuries constitute the highest rate of injuries in most previous studies (Goldberg *et al.*, 2011; Qadim *et al.*, 2013; Salehi *et al.*, 2013b). The highest rate of missed injuries was seen in foot, hands, ankles and wrists. The injuries are left missed in the primary evaluations mainly because of incomplete physical

examination (Razi *et al.*, 2013; Yousefi *et al.*, 2013). According to the previous studies, extremities were reported as the most common areas for missed injuries (Barzana *et al.*, 2011; Goforoushan *et al.*, 2013). In clinical examination, therefore, it seems that physicians pay less attention to extremities injuries in comparison with internal part and cerebral injuries. Missed injuries in males were more than females in almost all previous studies (Gupta *et al.*, 2011). This study did not referred to any meaningful relationship between patients' GCS level and incidence rate of missed trauma while other studies indicated that GCS of traumatic patients with missed injuries was less than other traumatic ones. Previous studies have introduced decreasing the patients' conscious level as one of the factors involved in hiding of the injuries (Keijzers *et al.*, 2011). In our study, trauma severity and number of hospitalization cases at ICU in patients with missed injuries was more than other traumatic patients. In Buduhan and McRitchie (2000) study, severity of injuries and number of hospitalization in ICU was high in patients with missed injuries (Buduhan and McRitchie, 2000). Therefore, sever traumatic patients hospitalized at ICU ward require intensive cares and more examinations during hospitalization and exact follow-up after being released from hospital. Radiography was always associated with clinical examinations in evaluating the traumatic patients. It is regarded as one of the important diagnostic methods. Incorrect interpretation of radiography negatives and insufficiency of radiographies in multi trauma patients are of reasons resulting in hiding of the injuries (Eurin *et al.*, 2012). In this study, lack of graphy from the injured area, i.e., insufficiency of graphies mentioned in other studies, was introduced as the most common radiographic reason responsible for missing the injuries. Therefore, it seems that required and sufficient radiographies can be prepared from traumatic patients using a standard radiographic protocol in these patients. The study conducted indicated to importance of such protocol (Duane *et al.*, 2011). Most missed injuries were mainly diagnosed relying on the patients' compliant and most cases were diagnosed during hospitalization in the ward. It indicates to inadequacy of secondary and tertiary evaluations emphasizing contribution of repeated physical examinations during hospitalization (Kaiser *et al.*, 2011). High number of patients referring to the emergency wards and hospitalized patients can be suggested as one of leading factors in justifying insufficiency of clinical examinations and diagnostic actions. Delayed diagnosis varied from hospitalization day to 30 days later. However, the result cannot be compared with results of other studies because follow-up period of the patients varies in different studies (Chen *et al.*, 2011).

## CONCLUSION

Considering the results, it seems that there are dysfunction at all three stages of primary, secondary and tertiary evaluations resulting from lack of experienced physicians and personnel regarding trauma. Evaluation of multi trauma patients require a collaborative and team work such that all group members should be sufficiently educated regarding diagnosis, treating and following up the injuries in the patients. Repeating examinations during hospitalization and follow-up periods especially in patients suffering from severe trauma and conscious disorder and those hospitalized at ICU, plays an essential role in discovering the missed injuries.

## REFERENCES

- Babaud, J., C. Ridereau-Zins, G. Bouhours, J. Lebigot and R. Le Gall *et al.*, 2012. Benefit of the vittel criteria to determine the need for whole body scanning in a severe trauma patient. *Diagn. Interv. Imaging*, 93: 371-379.
- Barzana, D.C., C.A. Kotwall, T.V. Clancy and W.W. Hope, 2011. Use of laparoscopy in trauma at a level II trauma center. *JSLs*, 15: 179-181.
- Bergh, T.H., T. Lindau, S.V. Bernardshaw, M. Behzadi, L.A. Soldal, K. Steen and C. Brudvik, 2012. A new definition of wrist sprain necessary after findings in a prospective MRI study. *Injury*, 43: 1732-1742.
- Brito, J., R.M. Malina, A. Seabra, J.L. Massada, J.M. Soares, P. Krustup and A. Rebelo, 2012. Injuries in portuguese youth soccer players during training and match play. *J. Athl. Train.*, 47: 191-197.
- Buduhan, G. and D.I. McRitchie, 2000. Missed injuries in patients with multiple trauma. *J. Trauma*, 49: 600-605.
- Chen, C.W., C.M. Chu, W.Y. Yu, Y.T. Lou and M.R. Lin, 2011. Incidence rate and risk factors of missed injuries in major trauma patients. *Accid. Anal. Prev.*, 43: 823-828.
- Czirjak, S., K. Racz and M. Goth, 2012. Neuroendocrine dysfunctions and their consequences following traumatic brain injury. *Orv. Hetil.*, 153: 927-933.
- Daghigh, M.H., S.H. Safavi and M. Goldust, 2013. Evaluation of magnetic resonance imaging signal changes in vertebral depressed fractures to determine the fracture time. *Pak. J. Biol. Sci.*, 16: 299-300.
- Duane, T.M., J. Mayglothling, S.P. Wilson, L.G. Wolfe and M.B. Aboutanos *et al.*, 2011. National emergency x-radiography utilization study criteria is inadequate to rule out fracture after significant blunt trauma compared with computed tomography. *J. Trauma*, 70: 829-831.

- Eurin, M., N. Haddad, M. Zappa, T. Lenoir and C. Dauzac *et al.*, 2012. Incidence and predictors of missed injuries in trauma patients in the initial hot report of whole-body CT scan. *Injury*, 43: 73-77.
- Fardiazar, Z., F. Ronaci, R. Torab and M. Goldust, 2012. Vulvovaginitis candidiasis recurrence during pregnancy. *Pak. J. Biol. Sci.*, 15: 399-402.
- Fardiazar, Z., M. Ramin, E.O.S. Madarek, S. Atashkhouei, R. Torab and M. Goldust, 2013. Complications in premature labor between severe preeclampsia and normal pregnancies. *Pak. J. Biol. Sci.*, 16: 446-450.
- Farhoudi, M., A. Taheraghdam, G. Abbasi Farid, M. Talebi, A. Pashapou, J. Majidi and M. Goldust, 2012. Serum iron and ferritin level in idiopathic Parkinson. *Pak. J. Biol. Sci.*, 15: 1094-1097.
- Ganjipour Sales, J., J. Soleymanpour, A. Sadeghpour, S. Sharifi, S. Rouhani and M. Goldust, 2012. Efficacy of reverse triangle screw fixation in patients suffering from femoral neck fractures. *Pak. J. Biol. Sci.*, 15: 395-398.
- Ganjipour Sales, J., J. Soleymanpour, M. Ansari, F. Afaghi and M. Goldust, 2013. Treatment results of bicondylar tibial fractures using hybrid external fixator. *Pak. J. Biol. Sci.*, 16: 491-495.
- Goldberg, J., R.J. McClaine, B. Cook, V.F. Garcia, R.L. Brown, K. Crone and R.A. Jr. Falcone, 2011. Use of a mild traumatic brain injury guideline to reduce inpatient hospital imaging and charges. *J. Pediatr. Surg.*, 46: 1777-1783.
- Goldust, M., F. Goforoushan and E. Rezaee, 2011. Treatment of solar lentigines with trichloroacetic acid 40% vs. cryotherapy. *Eur. J. Dermatol.*, 21: 426-427.
- Goldust, M., E. Rezaee and S. Hemayat, 2012. Treatment of scabies: Comparison of permethrin 5% versus ivermectin. *J. Dermatol.*, 39: 545-547.
- Goldust, M. and E. Rezaee, 2013. The efficacy of topical ivermectin vs. malation 0.5% lotion for the treatment of scabies. *J. Dermatol. Treat.*, (In Press).
- Goldust, M., E. Rezaee and R. Raghifar, 2013a. Comparison of oral ivermectin versus crotamiton 10% cream in the treatment of scabies. *Cutaneousv Ocul. Toxicol.*
- Goldust, M., M. Talebi, J. Majidi, M.A.R. Saatlou and E. Rezaee, 2013b. Evaluation of antiphospholipid antibodies in youths suffering from cerebral ischemia. *Int. J. Neurosci.*, 123: 209-212.
- Goldust, M., M.R. Ranjkesh, M. Amirinia, F. Goforoushan, E. Rezaee and M.A.R. Saatlou, 2013c. Sertaconazole 2% cream versus hydrocortisone 1% cream in the treatment of seborrheic dermatitis. *J. Dermatol. Treat.*, (In Press).
- Goldust, M., S.B. Nejad, E. Rezaee and R. Raghifar, 2013d. Comparative trial of permethrin 5% versus lindane 1% for the treatment of scabies. *J. Dermatol. Treatment*, 10.3109/09546634.2012.723122
- Golfurushan, F., M. Sadeghi, M. Goldust and N. Yosefi, 2011. Leprosy in Iran: An analysis of 195 cases from 1994-2009. *J. Pak. Med. Assoc.*, 61: 558-561.
- Goforoushan, F., H. Azimi and M. Goldust, 2013. Efficacy of vitamin E to prevent dermal complications of isotretinoin. *Pak. J. Biol. Sci.*, 16: 548-550.
- Gupta, M., D.L. Schriger, J.R. Hiatt, H.G. Cryer, A. Tillou, J.R. Hoffman and L.J. Baraff, 2011. Selective use of computed tomography compared with routine whole body imaging in patients with blunt trauma. *Ann. Emerg. Med.*, 58: 407-416.
- Holly, J., J. Bledsoe, K. Black, R. Robbins and V. Davis *et al.*, 2012. Prospective evaluation of an ED observation unit protocol for trauma activation patients. *Am. J. Emergency Med.*, 30: 1402-1406.
- Kaiser, M.L., M.D. Whealon, C. Jr. Barrios, S.C. Dobson and D.J. Malinoski *et al.*, 2011. Risk factors for traumatic injury findings on thoracic computed tomography among patients with blunt trauma having a normal chest radiograph. *Arch. Surg.*, 146: 459-463.
- Karzar, S.H., K. Hasanzadeh, M. Goldust and N.H. Karzar, 2012. Intravesical residual urine of patients with benign prostate hyperplasia, Sonography accuracy. *Pak. J. Biol. Sci.*, 15: 1090-1093.
- Keijzers, G.B., D. Campbell, J. Hooper, N. Bost and J. Crilly *et al.*, 2011. Tertiary survey performance in a regional trauma hospital without a dedicated trauma service. *World J. Surg.*, 35: 2341-2347.
- Lotti, T., M. Goldust and E. Rezaee, 2013. Treatment of seborrheic dermatitis, Comparison of sertaconazole 2% cream vs. ketoconazole 2% cream. *J. Dermatol. Treat*, 10.3109/09546634.2013.777154
- McCrum, M.L., J. McKee, M. Lai, J. Staples, N. Switzer and S.L. Widder, 2012. ATLS adherence in the transfer of rural trauma patients to a level I facility. *Injury*, 10.1016/j.injury.2012.05.009
- Milan, P.B., D.M. Nejad, A.A. Ghanbari, J.S. Rad and H.T. Nasrabadi *et al.*, 2011. Effects of *Polygonum aviculare* herbal extract on sperm parameters after EMF exposure in mouse. *Pak. J. Biol. Sci.*, 14: 720-724.
- Mohebbipour, A., P. Saleh, M. Goldust, M. Amirnia, Y.J. Zadeh, R.M. Mohamadi and E. Rezaee, 2012. Treatment of scabies: Comparison of ivermectin vs. lindane lotion 1%. *Acta Dermatovenerol. Croat*, 20: 251-255.

- Mosquera, V.X., M. Marini, J. Muniz, V. Asorey-Veiga and B. Adrio-Nazar *et al.*, 2012. Traumatic aortic injury score (TRAINS): An easy and simple score for early detection of traumatic aortic injuries in major trauma patients with associated blunt chest trauma. *Intensive Care Med.*, 38: 1487-1496.
- Nemati, M., H. Nosratinia, M. Goldust and R. Raghifar, 2013. Arterial injuries in extremities trauma, Angiographic findings. *Pak. J. Biol. Sci.*, 16: 145-147.
- Newgard, C.D., M. Kampp, M. Nelson, J.F. Holmes and D. Zive *et al.*, 2012. Deciphering the use and predictive value of emergency medical services provider judgment in out-of-hospital trauma triage: A multisite, mixed methods assessment. *J. Trauma. Acute. Care Surg.*, 72: 1239-1248.
- Nikanfar, M., S. Shaafi, M. Hashemilar, D.S. Oskouii and M. Goldust, 2012. Evaluating role of leukocytosis and high sedimentation rate as prognostic factors in acute ischemic cerebral strokes. *Pak. J. Biol. Sci.*, 15: 386-390.
- Nourizadeh, D., A. Houshangi and M. Goldust, 2013. Lich-Gregoir procedure in treatment of the vesicoureteral reflux. *Pak. J. Biol. Sci.*, 16: 426-430.
- Parks, N.A. and M.A. Croce, 2012. Use of computed tomography in the emergency room to evaluate blunt cerebrovascular injury. *Adv. Surg.*, 46: 205-217.
- Pearl, A. and D. Bar-Or, 2012. Decision support in trauma management: Predicting potential cases of ventilator associated pneumonia. *Stud. Health Technol. Inform.*, 180: 305-309.
- Qadim, H.H., F. Golphoroushan, S.B. Nejad and M. Goldust, 2013. Studying the calcium serum level in patients suffering from psoriasis. *Pak. J. Biol. Sci.*, 16: 291-294.
- Razi, A., F. Golphoroushan, A. Bahrami, S. Babae Nejad and M. Goldust, 2013. Evaluating of dermal symptoms in hypothyroidism and hyperthyroidism. *Pak. J. Biol. Sci.*, 16: 541-544.
- Sadeghpour, A., R. Mansour, H.A. Aghdam and M. Goldust, 2011. Comparison of trans patellar approach and medial parapatellar tendon approach in tibial intramedullary nailing for treatment of tibial fractures. *J. Pak. Med. Assoc.*, 61: 530-533.
- Sadeghpour, A., A. Rouhani, M.A. Mohseni, O.A. Aghdam and M. Goldust, 2012. Evaluation of surgical treatment of developmental dysplasia of hip for avascular necrosis of femoral head in children. *Pak. J. Biol. Sci.*, 15: 391-394.
- Sadighi, A., A. Elmi, M.A. Jafari, V. Sadeghifard and M. Goldust, 2011. Comparison study of therapeutic results of closed tibial shaft fracture with intramedullary nails inserted with and without reaming. *Pak. J. Biol. Sci.*, 14: 950-953.
- Salehi, R., N. Aslanabadi, S. Taghavi, L. Pourafkari, S. Imami and M. Goldust, 2013a. Percutaneous balloon mitral valvotomy during pregnancy. *Pak. J. Biol. Sci.*, 16: 198-200.
- Salehi, R., M. Enamzadeh and M. Goldust, 2013b. Study of cognitive disorders in stroke-free patients with a history of atrial fibrillation. *Pak. J. Biol. Sci.*, 16: 44-47.
- Salehi, R., M. Motemavele and M. Goldust, 2013c. Risk factors of coronary artery disease in women. *Pak. J. Biol. Sci.*, 16: 195-197.
- Salehi, R., S. Taghavi, S. Imani and M. Goldust, 2013d. Pregnancy in mothers with prosthetic heart valves. *Pak. J. Biol. Sci.*, 16: 421-495.
- Seyyednejad, F., A. Rezaee, S. Haghi and M. Goldust, 2012. Survey of pre-inflammation cytokines levels in radiotherapy-induced-mucositis. *Pak. J. Biol. Sci.*, 15: 1098-1101.
- Shakeri, A., M. Pourisa, A. Deldar and M. Goldust, 2013. Anatomic variations of Aortic Arch branches and relationship with diameter of Aortic Arch by 64-ROW CT Angiography. *Pak. J. Biol. Sci.*, 16: 496-500.
- Snoek, A., M. Dekker, T. Lagrand, A. Epema, T. van der Ploeg and J.G. van den Brand, 2012. A clinical decision model identifies patients at risk for delayed diagnosed injuries after high-energy trauma. *Eur. J. Emerg. Med.*
- Soleimanpour, J., J. Ganjpour, S. Rouhani and M. Goldust, 2013. Comparison of titanium elastic nails with traction and spica cast in treatment of children's femoral shaft fractures. *Pak. J. Biol. Sci.*, 16: 391-395.
- Vafaei, I., M.B. Rahbani Nobar and M. Goldust, 2012. Etiology of ocular trauma: A two years cross-sectional study in Tabriz, Iran. *J. Coll. Physicians Surg. Pak.*, 22: 344-344.
- Vahedi, A., R. Estakhri, M.H. Somi, E. Abdollah, M. Goldust and S. Samankan, 2012. Diagnostic value of serum P53 in comparison with tissue P53 in gastric adenocarcinoma and their relationship with microscopic prognostic factors. *Pak. J. Biol. Sci.*, 15: 685-688.
- Yousefi, P., A. Siroos, F. Darreh, M.M. Ahmadi, F.H. Qoran and M. Goldust, 2013. Sacrum index in children suffering from different grades of vesicoureteral reflux. *Pak. J. Biol. Sci.*, 16: 545-547.