

Diagnosis and Management of Benign Paroxysmal Positional Vertigo in a West African Country

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ABSTRACT

Objectives: Management of benign paroxysmal positional vertigo is inadequate in many developing countries. Also, there is a paucity of literature on benign paroxysmal positional vertigo in developing countries including West African countries.

This study aimed at determining the pathological distribution, clinical presentation, comorbid illnesses, patients limitations, prehospital and Specialist treatment of benign paroxysmal positional vertigo in our center. It will also form the basis for further study on benign paroxysmal positional vertigo.

Methods: This was a prospective hospital-based study of all patients with the diagnosis of benign paroxysmal positional vertigo. Pretested interviewer assisted questionnaire was administered to obtain data. Otoscopic examination, otoneurologic review, followed by mandatory Dix Hallpike manoeuvre and supine roll test was performed on all patients. All the patients were treated appropriately by Epley manoeuvre and Semont liberation manoeuvre. All the data obtained were collated and analysed by using SPSS version 18.0.

Results: The mean age of the patients studied was 48.7. Males accounted for 46.1% with male to female ratio of 1:1.2. There was unilateral benign paroxysmal positional vertigo in 99.4% and right benign paroxysmal positional vertigo in 64.3%. 66.2% was posterior semicircular canal followed by 24.7% lateral semicircular canal. Majority 83.8% had more than 4 episodes before the presentation. Commonest clinical experience among our patients was vertigo, nystagmus, and loss of balance in 85.1%, 81.8%, and 80.5% respectively. Chronic cases (greater than 3 months) of benign paroxysmal positional vertigo occurred in 92.9%. 97.2% of the patients were reviewed ear, nose, and throat outpatient clinic.

Associated comorbid illnesses were a visual disorder, hypertension, arthritis and diabetes mellitus in 27.9%, 23.4%, 22.1%, and 2.6% respectively.

Patients major sources of referral was a general practitioner in 57.8%. The Commonest affected quality of life among patients was anxiety in 31.8%. It limits the daily activities of patients in 31.8% movement restrictions, 29.9% avoid turning on the bed, 24.7% indoor and 1.9% avoid driving a car.

Majority 72.7% of the patients had one or more form of prehospital treatment. These were 46.1% pharmacy consultation, 30.5% over the counter drugs, 44.2% spiritual intervention, 23.4% herbal medication and 5.2% dietary approach. Majority 65.6% of the patients were on one or more form of medication(s) of which labyrinthine sedative was 63.0%.

Conservative treatment was offered in 79.2%. Only 59.1% had canalith repositioning manoeuvres at presentation with two or more sessions in 50.6%. Comorbid illnesses were responsible for referral in 9.1% for experts review and management.

Conclusion: Benign paroxysmal positional vertigo is a common otologic disorder with significant comorbid illnesses which limits patients daily activities and affect their quality of life. The illness was associated with late

presentation and poorly treated by an unskilled hand, thus there is a need for public enlargement on vertigo and treatment.

Keywords: Benign paroxysmal positional vertigo, Comorbid illnesses, Quality of life, Management.

Introduction

Benign paroxysmal positional vertigo is the commonest causes of both vertigo and peripheral vestibular disorder. Commonly encountered in primary care, general practitioners, neurologist and otorhinolaryngologist, head and neck surgeon¹. Benign paroxysmal positional vertigo is characterized by a sudden, transient gyrotory sensation accompanied by nystagmus. This is provoked by positional changes of the head with respect to gravity and the symptoms range from mild dizziness to debilitating state. The severe state may induce nausea and vomiting which may significantly hinder the daily quality of life, depression, anxiety and act mutually reinforcing. In severe cases, the word benign is a misnomer in the label of benign paroxysmal positional vertigo. This is due to the association of substantial inconveniences and disabilities during symptomatic periods in the patients.

Benign paroxysmal positional vertigo is also the most common vestibular disorder which affected both adults and children with higher prevalence at advanced ages. Benign paroxysmal positioning vertigo accounted for about 17–40% of diagnoses in specialized dizziness clinics². Lifetime prevalence is estimated to be 2.4% in the general population. In emergency medical departments it was 8–9% while in otology clinic it was 43% of the patient population^{3,4}.

The fundamental pathophysiology of benign paroxysmal positional vertigo is from dislodged calcium carbonate crystals in the utricle of the inner ear entering the semicircular canals. This occurs spontaneously and identification of the underlying cause may be idiopathic. The most common causes include head trauma, labyrinthitis, vestibular neuritis, and anterior vestibular artery ischemia. It is caused by the free-floating of this degenerative debris in the endolymph which originates from the macula of the utricle. This occurred during head movement and gravitates into one of the semicircular canals. The commonest affected canal was the posterior followed by the horizontal, and rarely by the anterior semicircular canal⁵. Clinical presentation of benign paroxysmal positional vertigo was acute vertigo after certain head movements which are associated with a characteristic paroxysmal positional nystagmus. This disorder may also play an essential role in the pathophysiology of the development of the subsequent depressive disorder. The nystagmus can be elicited with specific diagnostic positional manoeuvres, like Dix Hallpike and Pagnini-McClure test (supine manoeuvre)⁶.

The diagnosis of this disorder is confirmed by a positioning test called Dix-Hallpike maneuver which reveals vertigo and/or nystagmus. Benign paroxysmal positional vertigo is divided into canalithiasis and cupulolithiasis base on the affected part of the canal. Treatment of benign paroxysmal positional vertigo was by several manoeuvres⁷⁻⁹. This is called canalith repositioning manoeuvre. The main aim of the manoeuvres was to return the displaced otoconia to the utricle to prevent the abnormal manifestation of the vestibuloocular reflexes on changing the position of the head.

Management of benign paroxysmal positional vertigo is inadequate in many developing countries. Also, there is a paucity of literature on benign paroxysmal positional vertigo in developing countries including West African countries.

This study aimed at determining the pathological distribution, clinical presentation, comorbid illnesses, patients limitations, prehospital and Specialist treatment of benign paroxysmal positional vertigo in our center. It will also form the basis for further study on benign paroxysmal positional vertigo.

Materials and Methods

This was a prospective hospital-based study of all patients with the diagnosis of benign paroxysmal positional vertigo in ear, nose and throat department of Ekiti state university teaching hospital, Ado Ekiti, Nigeria. The study was carried out over a period of five years between a period of November 2013 to October 2018. The American Academy of Otolaryngology-Head and Neck Surgery Foundation 2008 guideline was used in diagnosing our patients.

The sample sized was determined using Fisher's formula for the minimum sample size. The standard normal deviate was set at 1.96 (95% confidence interval), degree of accuracy was set at 0.05 and the proportion of medical student with the characteristic of interest from the previous study was 21%. Correction of sample size for a population less than 10,000 (finite population correction) was done using:

$$no = \frac{n}{1 + \frac{n-1}{N}}$$

Where n_0 is the sample size for a population less than 10,000, n is the desired sample size for a population greater than 10,000 and N is the population of the study group. To compensate for non-response, an upward adjustment of 10% was done giving a total of the sample size of 154 respondents that were recruited for this study.

Pretested interviewer assisted questionnaire was administered by us in a sister Federal medical Institution(Federal Teaching Hospital Ido-Ekiti) regarding medical history, history of falls or imbalance relative to vertigo, anxiety, onset with the progression of symptoms, and provoking factors. Also, data on comorbid illnesses were obtained.

The overall examination conducted to confirm the diagnosis of benign paroxysmal positional vertigo in all the examinees were otoscopic examination, otoneurologic review, followed by mandatory Dix Hallpike maneuver and supine roll test (Pagnini-McClure test) was performed on all patients to diagnose posterior, lateral or anterior canal benign paroxysmal positional vertigo to induce intense vertigo in conjunction with a burst of nystagmus with associated typical characteristics of latency, crescendo, fatigability, and transience was considered necessary to establish our diagnosis. In addition, horizontal canal type of benign paroxysmal positional vertigo was diagnosed by the presence of horizontal geotropic (in the geotropic form the fast phase of the nystagmus always beats towards the lowermost ear and the affected side is where nystagmus is the strongest) and apogeotropic (in apogeotropic lateral canal paroxysmal nystagmus is directed always toward the uppermost ear and the affected side is where the nystagmus is the weakest) paroxysmal nystagmus provoked by turning the head from the supine to either lateral position. In this study, diagnosis and treatment of benign paroxysmal positional vertigo followed the guideline published by Bhattacharyya et al ².

All the patients were treated appropriately by Epley manoeuvre and Semont liberation manoeuvre. Subsequent to the appropriate manoeuvre applications all the patients were re-examined after 1 week during outpatient followed up for cases of successful treatment, failure or incomplete remission of the symptoms. In case of failure or incomplete remission of the symptoms, the same manoeuvre was repeated. On the assessment of the successful treatment which included both patient's report of relief from vertigo and negative Dix-Hallpike test result. In case of a new failure, the liberatory maneuver of Semont manoeuvre was finally used.

All patients with benign paroxysmal positional vertigo seen our department over the studied period were enrolled, except those that declined (therefore, there was no need for randomisation). There also no bias since everybody was to be sampled. Vertigo, dizziness, and imbalance(VDI) questionnaire was used to access the quality of life of the patients with vertigo symptoms. The VDI symptoms and the VDI health-related quality of life scales were administered to the patients before the commencement of treatment, in the course and after completion of treatment.

Exclusion criteria were the detection of central nervous system diseases in patients following clinical examination, laboratory findings, or imaging studies. Inclusion criteria were patients seen during the study period in our center and consented patients only.

Limitations of this study were there are no instruments to measure daily activity and quality of life of patients.

In the statistical analysis of all the obtained data. All the data obtained were collated and analysed by using SPSS version 18.0. Descriptive statistics by frequency table, percentage, bar and pie charts were used to express the data.

Ethical clearance for this study was sought for and obtained from the ethical committee of the hospital. Informed consent was obtained from each parent and only consented patients were enrolled in the study.

Results

From this study youngest patients was 10 years while the oldest patients were 94 years old. The mean age of the patients was 48.7 while the standard deviation was 14.4. Males accounted for 71 (46.1%) while female accounted for 83 (53.9%) with male to female ratio of 1:1.2.

Unilateral benign paroxysmal positional vertigo in 153 (99.4%) patients was commoner than bilateral paroxysmal positional vertigo in 1 (0.6%). There were 99 (64.3%) right paroxysmal positional vertigo which was noted to be commoner than 54 (35.1%) left paroxysmal positional vertigo. Based on the anatomical location, 102 (66.2%) posterior semicircular canal was the commonest followed by 38 (24.7%) lateral (horizontal) canal and 1 (0.6%) anterior (superior) canal.

Majority 129 (83.8%) had more than 4 episodes prior to the presentation followed by 25 (16.2%) 3 to 4 episodes and nil had 1 to 2 episodes prior to presentation. Commonest clinical experience among our patients was vertigo, nystagmus and loss of balance in 131 (85.1%), 126 (81.8%) and 124 (80.5%) respectively. Acute cases (less than 3 months) of benign paroxysmal positional vertigo in 11 (7.1%) and was less common than chronic cases (greater than 3 months) of benign paroxysmal positional vertigo in 143 (92.9%). One hundred and forty-one (97.2%) patients were reviewed in ear, nose and throat outpatient clinic while 3 (2.1%) were reviewed in the hospital ward(Table 1).

The major comorbid illnesses associated with benign paroxysmal positional vertigo in this study was visual disorder in 43 (27.9%)(Table 2).

Commonest sources of referral of patients to ear, nose and throat department was a general practitioner in 89 (57.8%)(Figure 1).

Benign paroxysmal positional vertigo limits the daily activities of patients commonly by 49 (31.8%) movement restrictions. This was followed by 46 (29.9%) avoid turning on bed and 38 (24.7%) indoor(Figure 2.)

The commonest affected quality of life among patients with benign paroxysmal positional vertigo was anxiety in 49 (31.8%). Other were embarrassments and depression in 48 (31.2%) and 38 (24.7%) respectively (Table 3).

Majority 112 (72.7%) of the patients had one or more form of prehospital treatment and remedies prior to presentation. Some of these were 71 (46.1%) pharmacy consultation, 47 (30.5%) over the counter drugs and 68 (44.2%) spiritual intervention. Majority 101 (65.6%) of the patients were on one or more form of medication(s) at the presentation which was labyrinthine sedative (stugeron or stemetil) 97 (63.0%)(Table 4).

Conservative treatment 122 (79.2%) was in form of assurance, stop alcohol and stop smoking in 83 (53.8%), 23 (14.9%) and 11 (7.1%) respectively(Figure 3). Only 91 (59.1%) had canalith repositioning manoeuvres at presentation while others were stable at presentation. Canalith repositioning manoeuvres were offered as one session in 13 (8.4%) and two or more sessions in 78 (50.6%) Patients. Comorbid illnesses in 101 (65.6%) were responsible for referral for experts review and management in 14 (9.1%) patients.

Discussion

BPPV has 1 of 2 clinical variants: BPPV of the posterior semicircular canal (posterior canal BPPV) or BPPV of the lateral semicircular canal. Posterior canal BPPV variant is more common than horizontal canal BPPV, constituting approximately 85% to 95% of BPPV cases. Posterior canal BPPV, arguably is most commonly thought to be due to canalithiasis, wherein fragmented otolith particles (otoconia) entering the posterior canal become displaced, cause inertial changes to the cupula in the posterior canal, and thereby result in abnormal nystagmus and vertigo when the head encounters motion in the plane of the affected semicircular canal. Vertigo has been defined as an “illusory sensation of motion of either the self or the surroundings. The symptoms of vertigo resulting from posterior canal BPPV are typically described by the patient as a rotational or spinning sensation when she or he changes head position relative to gravity.

This is the first study done on the management of benign paroxysmal positional vertigo in our community (10, 11).

In this study, all the studied age group suffered benign paroxysmal positional vertigo but commoner at an advanced age due to degenerative changes (12). In this study, the mean age of benign paroxysmal positional vertigo among our patients was slightly younger though there may be higher unrepresented elderly patients in the community (2,13). Lower age group prevalence was recorded in another study (14). Our findings might further be due to a growing level of awareness of benign paroxysmal positional vertigo and the use of diagnostic manoeuvre in this study. The previous study shows that benign paroxysmal positional vertigo mainly affects elderly patients, resulting from various degenerative changes associated with aging (15).

In this study, female gender had a slightly higher prevalence compared to males. Female is more conscious and seek health care intervention than men. There was equal representation of both sexes in a study done on benign paroxysmal positional vertigo secondary to injury¹⁶. Another study revealed there was no difference in age according to gender (17).

On Lateralisation of benign paroxysmal positional vertigo, the right labyrinth was commoner than the left labyrinth. A Previous study found that benign paroxysmal positional vertigo affects predominantly the right labyrinth than left labyrinth (17). From a previous study, it has been reported that most patients had the habit of sleeping on their right side (18). It has also been demonstrated that a significant correlation has been found between head position during sleep and the side affected by benign paroxysmal positional vertigo (19).

Primary (idiopathic) cause of benign paroxysmal positional vertigo is commoner than combined secondary causes from trauma, migraine and inner ear disorder in this study. The previous record revealed similar findings on primary (idiopathic) and secondary causes such as head trauma, vestibular neuritis, Meniere's disease, otitis media, otosclerosis, inner ear surgery, migraine, ototoxicity and viral diseases (19,20).

Posterior canal benign paroxysmal positional vertigo was the commonest form in this study followed by the lateral semicircular canal. Anterior semicircular canal type was the least in this study (21).

Recurrent cases were commonest while a single episode was not seen as in another study (22). This may be due to poor diagnosis and recurrent natures of the illness. This may be the reason for commoner chronic cases than acute cases. Common clinical presentation in this study was vertigo, nystagmus, and loss of balance which were worrisome to patients. These findings were reported in another study (23). Most of the patients were seen and reviewed in ear, nose and throat department outpatient clinic and emergency presentation is not common in this study. This may be due to mild, sudden, short duration and transient nature of this disorder.

Common associated Comorbid illnesses among the patients were a visual disorder, hypertension, arthritis, and diabetes mellitus. These were associated with causative or risk factors in a reported study (24,25).

Sources of referral among the majority of the patients were from their family physician who mainly offered medical treatment only. Due to patients and family discussion on feeling and sources of treatment some patients were informed lead to self-reporting in our outpatient's clinic. Other patients were referred from their specialist physician. Benign paroxysmal positional vertigo led to limitations of daily activities among patients which include movement restrictions, avoid turning on the bed, indoor and sick leave. This has affected qualities of life such as anxiety, embarrassment, depression, aggressiveness, and social dysfunction among the patients. These findings were reported in other studies (24,25).

Prehospital management of illnesses is a common bad practice among patients benign paroxysmal positional vertigo is not exempted. This is due to poor knowledge of diseases aetiopathogenesis. The wrong approach to diseases led most pharmacy, patent medicine, spiritual houses, and herbalist. Inappropriate treatment was offered to these patients like labyrinthine sedative, sedative, and antibiotics as recorded in this study. This practice does not only failed but also time-wasting, wastage of money and associated complications. Medical intervention is the last results due to failed treatment. General practitioner and others were consulted who subsequently referred to an appropriate specialist as revealed in this study.

In our practice, patients are assured due assured to alleviate their fear, affectation of quality of life and limitations of patients daily activities as documented in our findings. Majority of our patients benefited tremendously on canalith repositioning manoeuvre although many of the patients were cured after two sessions. In this study, associated illnesses with benign paroxysmal positional vertigo were treated simultaneously as documented in our findings. Referral to appreciate specialist was done to severe and uncontrolled cases for further expert review and management.

Conclusion

Benign paroxysmal positional vertigo is a common otologic disorder with significant comorbid illnesses which limits patients daily activities and affect their quality of life. The illness was associated with late presentation and poorly treated by an unskilled hand, thus there is a need for public enlargement on vertigo and treatment. Most of our patients did well with canalith repositioning manoeuvre and some were cured after two sessions of it.

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Competing interests

All the authors declare that there were no competing interests.

References

1. Papacharalampous GX, Vlastarakos PV, Kotsis GP, Davilis D, Manolopoulos L. The Role of Postural Restrictions after BPPV Treatment: Real Effect on Successful Treatment and BPPV's Recurrence Rates. *Int J Otolaryngol*. 2012;2012:932847.
2. Bhattacharyya N, Gubbels SP, Schwartz SR, Edlow JA, El-Kashlan H, Fife T, et al. Clinical practice guideline: benign paroxysmal positional vertigo (update). *Otolaryngol Head Neck Surg*. 2017;156(3):S1–S47.
3. You P, Instrum R, Parnes L. Benign paroxysmal positional vertigo. *Laryngoscope Investig Otolaryngol*. 2019;4(1):116–23.
4. Horinaka A, Kitahara T, Shiozaki T, Ito T, Wada Y, Yamanaka T, et al. Head-Up Sleep May Cure Patients With Intractable Benign Paroxysmal Positional Vertigo: A six-Month Randomized Trial. *Laryngoscope Investig Otolaryngol*. 2019;4(3):353–8.
5. Hsu CL, Tsai SJ, Shen CC, Lu T, Hung YM, et al. Risk of benign paroxysmal positional vertigo in patients with depressive disorders: a nationwide population-based cohort study. *BMJ Open*. 2019;9(3):e026936.
6. Parnes LS, McClure JA. Free-floating endolymph particles: a new operative finding during posterior semicircular canal occlusion. 1992. *Laryngoscope*. 2015;125(5):1033.
7. Kansu L, Aydin E, Gulsahi K. Benign paroxysmal positional vertigo after nonotologic surgery: case series. *J Maxillofac Oral Surg*. 2015;14(1):113–115.
8. Balatsouras DG, Ganelis P, Aspris A, Economou NC, Moukos A, Koukoutsis G. Benign paroxysmal positional vertigo associated with Meniere's disease: epidemiological, pathophysiologic, clinical, and therapeutic aspects. *Ann Otol Rhinol Laryngol*. 2012;121(10):682–8.

9. Anagnostou E, Kouzi I, Spengos K. Diagnosis and treatment of anterior-canal benign paroxysmal positional vertigo: a systematic review. *J Clin Neurol*. 2015;11(3):262–7.
10. Shim DB, Ko KM, Kim JH, Lee W-S, Song MH. Can the affected semicircular canal be predicted by the initial provoking position in benign paroxysmal positional vertigo? *Laryngoscope*. 2013;123(9):2259–63.
11. Adegbiyi WA, Aremu SK, Alabi BS, Nwawolo CC, Olajuyin OA. Vertigo presentation in developing country, Nigeria. *American Journal of Research Communication*. 2014;2(5):258-71.
12. Van der Zaag-Loonen HJ, van Leeuwen RB, Bruintjes TD, van Munster BC. Prevalence of unrecognized benign paroxysmal positional vertigo in older patients. *Eur Arch Otorhinolaryngol*. 2015;272:1521-4.
13. Kollén L, Frändin K, Möller M, Fagevik Olsén M, Möller C. Benign paroxysmal positional vertigo is a common cause of dizziness and unsteadiness in a large population of 75-year-olds. *Aging Clin Exp Res*. 2012;24:317-23.
14. Yetiser S, Ince D. Demographic Analysis of Benign Paroxysmal Positional Vertigo as a Common Public Health Problem. *Annals of Medical and Health Sciences Research*. 2015;5(1):50-3.
15. Jilla AM, Roberts RA, Johnson CE. Teaching Patient-Centered Counseling Skills for Assessment, Diagnosis, and Management of Benign Paroxysmal Positional Vertigo. *Semin Hear*. 2018;39(1):52-66.
16. Suarez H, Alonso R, Arocena M, Suarez A, Geisinger D. Clinical characteristics of positional vertigo after mild head trauma. *Acta Otolaryngol*. 2011;131:377-81.
17. Sacco RR, Burmeister DB, Rupp VA, Greenberg MR. Management of benign paroxysmal positional vertigo: a randomized controlled trial. *J Emerg Med*. 2014;46:575-81.
18. Büki B, Mandalà M, Nuti D. Typical and atypical benign paroxysmal positional vertigo: literature review and new theoretical considerations. *J Vestib Res*. 2014;24(5-6):415-23.
19. Sato G, Sekine K, Matsuda K, Takeda N. Effects of sleep position on time course in remission of positional vertigo in patients with benign paroxysmal positional vertigo. *Acta Otolaryngol*. 2012;132:614-7.
20. Shim DB, Kim JH, Park KC, Song MH, Park HJ. Correlation between the head-lying side during sleep and the affected side by benign paroxysmal positional vertigo involving the posterior or horizontal semicircular canal. *Laryngoscope*. 2012;122:873-6.
21. Imai T, Takeda N, Ikezono T, Shigeno K, Asai M, Watanabe Y, et al. Classification, diagnostic criteria and management of benign paroxysmal positional vertigo. *Auris Nasus Larynx*. 2017;44(1):1-6.
22. Esra E. Importance of Accurate Diagnosis in Benign Paroxysmal Positional Vertigo with Videonystagmography and the Success Rate of the Maneuvers. *Ann Pharmacol Pharm*. 2017;2(7):1039.
23. West N, Hansen S, Møller MN, Bloch SL, Klokke M. Repositioning chairs in benign paroxysmal positional vertigo: implications and clinical outcome. *Eur Arch Otorhinolaryngol*. 2016;273(3):573–80.
24. Anagnostou E, Ioanna Kouzi, and Konstantinos Spengos. Diagnosis and Treatment of Anterior-Canal Benign Paroxysmal Positional Vertigo: A Systematic Review. *J Clin Neurol*. 2015 Jul; 11(3): 262–267.
25. Sundararajan I, Rangachari V, Sumathi V, Kumar K. Epley's manoeuvre versus Epley's manoeuvre plus labyrinthine sedative as management of benign paroxysmal positional vertigo: prospective, randomised study. *J Laryngol Otol*. 2011;125:572–575.

Table 1 Clinical presentations among the patients

Clinical presentations	Number(n)	Percentage (%)
Recurrence (Episodes)		
1-2	0	0
3-4	25	16.2
>4	129	83.8
Clinical features		
Vertigo	131	85.1
Loss of balance	124	80.5
Nausea	12	7.8
Vomiting	3	1.9
Nystagmus	126	81.8
Fall	23	14.9
Duration		
<3/12	11	7.1
>3/12	143	92.9
Treatment ward		
Clinic	141	97.2

Hospital ward	3	2.1
Emergency ward	1	0.7

Table 2 Comorbid illnesses of among the patients

Comorbid illnesses	Number (n)	Percentage (%)
Diabetes mellitus	4	2.6
Hypertension	36	23.4
Arthritis	34	22.1
Visual disorder	43	27.9
Nil	14	9.1

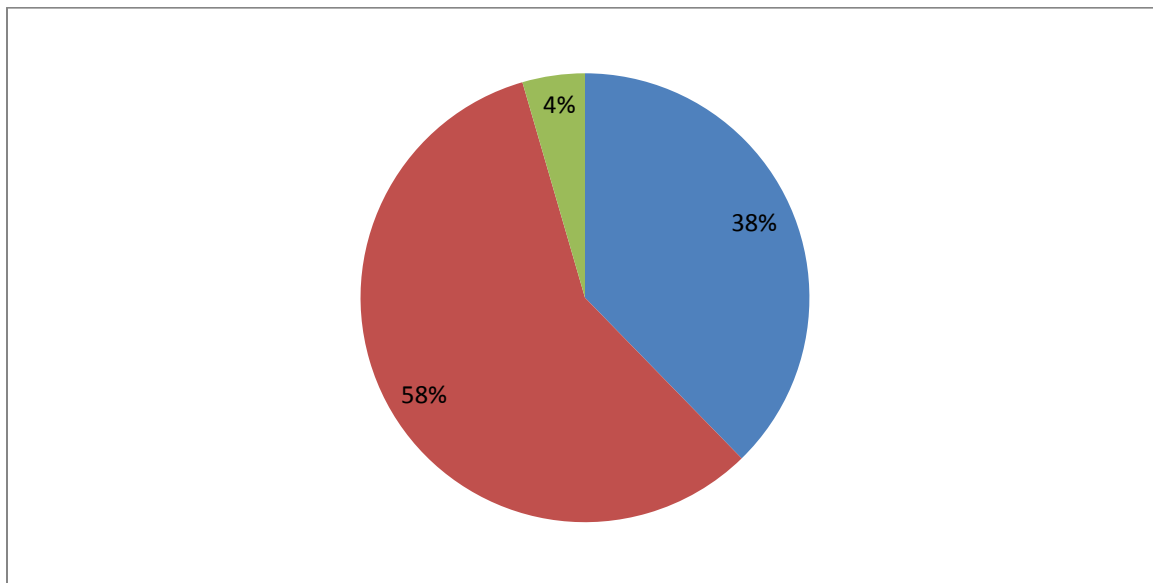


Figure 1 Sources of Referral of the patients

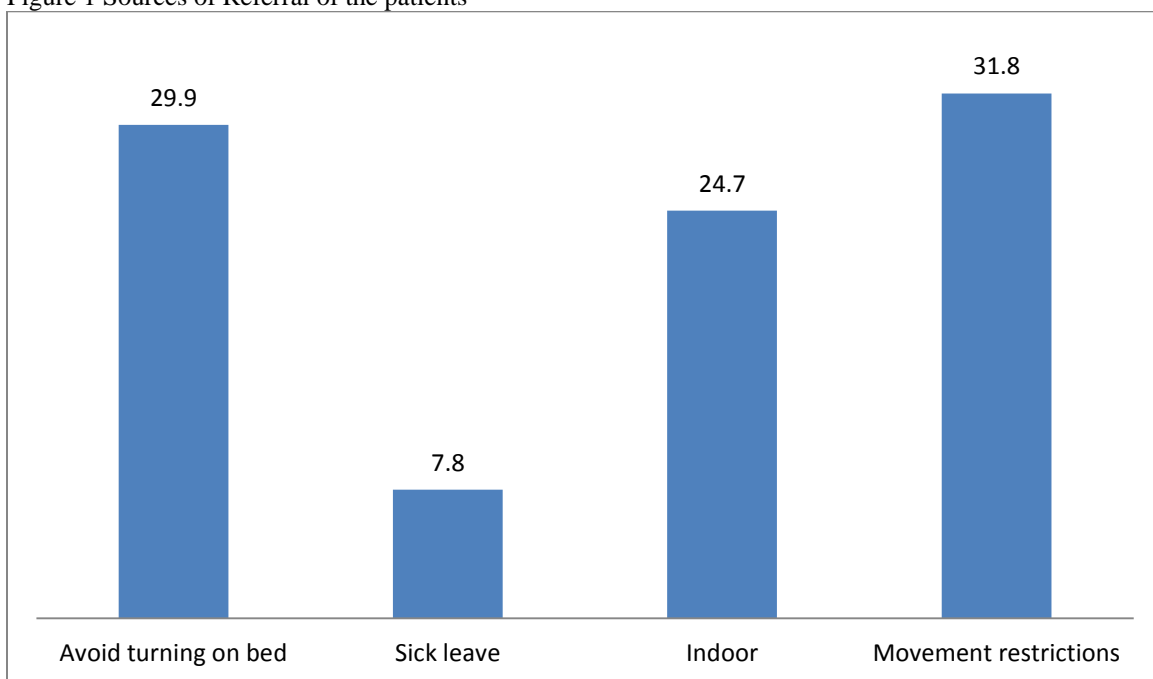


Figure 2 Limitations of daily activities among patients

Table 3 Quality of life among the patients

Quality of life	Number(n)	Percentage (%)
Social dysfunction	31	20.1
Isolation	27	17.5
Aggressiveness	32	20.8
Embarrassment	48	31.2
Anxiety	49	31.8
Depression	38	24.7

Table 4 Prehospital management of patients

Prehospital management	Number(n)	Percentage (%)
Pharmacy consultation	47	30.5
Over the counter drugs	71	46.1
Herbal medication	36	23.4
Spiritual intervention	68	44.2
Dietary approach	8	5.2

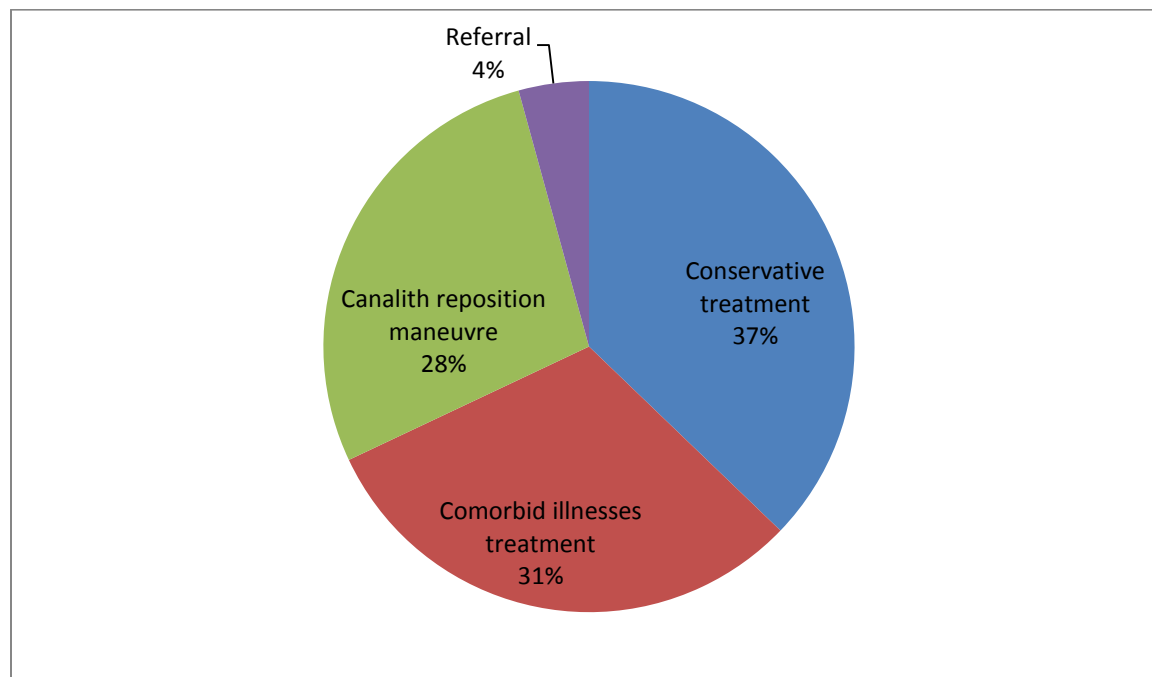


Figure 3 Management of patients