Are physicians suspicious enough? Assessing knowledge level in diagnosing multiple myeloma in Nigeria.

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Abstract

Multiple myeloma (Kahler's disease) is a hematological disorder resulting from proliferation of plasma cells in the bone marrow characterized by hypercalcaemia, bone lesion, renal impairment, and anaemia which causes a monoclonal protein-secreting disorder called paraproteinemias. Globally, it is commoner in blacks than in Caucasians and Asians although Africans show a lower incidence rate. It is a disease of the elderly with a median age incidence of 65 years in Western countries and 58 years in Nigeria. The male to female ratio is 2-3:1. Objectives: This study was carried out to assess the extent of knowledge of physicians with regards to multiple myeloma. Our research also explored the state of multiple myeloma diagnosis across health care facilities in Ondo State, outlining the challenges resulting from lack of knowledge and proposing possible solutions. Methodology: The research wasconducted among physicians working across Ondo State. This was a specific and direct study of physicians and specialists working at the health facilities using a semi-structured questionnaire. SPSS version 23 was used for statistical analysis and chi square was used to check the significant association in the study with p-value <0.05 being significant. Results: A total of 205 doctors were involved. There was a general poor knowledge of the disorder although the specialists had a better understanding. Bone pain and anemia are the major clinical features seen in their patients with multiple myeloma. Significant association exists between area of specialty, years of experience and knowledge of physicians in the studied population. Conclusion: There's poor knowledge which was influenced by years of experience, area of specialty and lack of retraining programmers among other factors. To aid early referral, we recommend that physicians have a high index of suspicion. In patients with multiple myeloma, newer treatment options should be considered.

Keywords: Myeloma, Suspicion, Physicians, Knowledge Assessment.

Introduction

Multiple Myeloma (MM) is a chronic haematological disorder of varying severity which affects terminal differentiated B lymphocytes characterized by proliferation and accumulation of clonal immunoglobulin producing neoplastic plasma cells in the bone marrow leading to hyperkalemia, bone lesion, renal impairment and anaemia; a condition known as paraproteinemia [1]. MM is a spectrum of diseases which evolves from Monoclonal Gammopathy of Unknown Significance (MGUS) to smouldering multiple myeloma and advances to symptomatic stage of MM [2].

Globally, MM constitutes about 2% of all cancers and also accounts for 13.4% of all lymphohematopoietic cancers, 19% mortality cases related to hematological malignancies, and 2% of all cancer-related mortality. Studies in Nigeria show that MM accounts for 8.2% all of hematological malignancies with a median age of 58 years as compared to 65 years in the Western world [3,4]. Higher incidence is seen in black Americans as compared to their counterparts in Africa. A high prevalence rate is also seen in African population with an incidence rate of 12.7% (21 million people) of total population of Nigeria while the male to female ratio in Nigeria is 2-3:1[5].

The exact cause of MM is unknown. However, like all cancers, the disorder develops when genetic mutations cause particular cells to grow uncontrollably [6]. Specific proteins such as KRAS, BRAF, NRAS and TP53 have been implicated in many cases of MM. Other implicated factors include: exposure to ionizing radiations, exposure to chemicals of benzene derivatives, genetic predispositions (associated with with HLA-Cw5 or HLA-Cw2), chromosomal translocations involving the immunoglobulin's heavy chain locus on chromosome 14 in 20-40%; and monosomy [7].

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At the cellular level, there's secretion of osteoclast-activating factors such as interleukin IL-6, (IL)-1B and TNF-B that are responsible for the myeloma related end organ damage and tissue impairment. These are induced by adhesion of myeloma cells to bone marrow. Also, the microenvironment created by the cytokines is known to enhance angiogenesis, which allow malignant plasma cells to thrive [8].

Common features in MM are: Bone Pain, Anemia, Fatigue, Fracture, Vertebrae Collapse, Spinal cord compression, recurrent infections and Renal and Neurological complications. The disease can progress to end organ damage. These are all characteristics of CRAB showing hyperkalemia, renal impairment, anemia, bone lesion, bone pain, bleeding.

Diagnosis of MM is often done using full blood count, Erythrocyte Sedimentation Rate, peripheral blood film, bone marrow aspirate, electrolyte, serum chemistry, urea and creatinine. Total protein albumin and globulin, serum protein electrophoresia and complication, Bence Jone Protein and free light chains electrophoretic test. B2 micro globulins level and skeletal x ray of the bones and MRI [9].

MM outcomes have improved drastically over the last decades as a result of novel therapies, several of which are now commonly continued to disease relapse. Autologous stem cell transplantation has been included in management of MM as it gives a form of Pseudocure and often, the myeloma relapses after a few years. However, in SubSaharan regions including Nigeria, funding has been a huge hindrance to purchase these therapies which resulted in the heavy reliance on the old therapies. In this mini review, we explored the state of MM diagnosis across our state and near, outlining the challenges to diagnosis and proposing possible solutions.

Materials & Methods

Study design

The study employed a quantitative research method in order to access the knowledge of MM among physicians across Ondo State in the study location. Besides, we employed a quantitative research method in order to be able to have a broader view of the knowledge of MM and make inference from the study location.

Study area

The study was conducted at health care facilities across Ondo State, SouthWestern Nigeria which included: General Hospital, Comprehensive Hospital, Health Centre, Private Hospitals and Teaching Hospital all across Ondo State Table 1.

The structured questionnaire was developed which was divided into the following parts:

1. Socio demographic information of the respondents.

2. General knowledge of Clinical features of Multiple myeloma.

Table 1. *Socio-Demographic Characteristics.*

Variable	Frequency	Percentage (%)
Designation		
Medical Officer cadre	106	51.7
Senior Registrar	42	20.5
Junior Registrar	16	7.8
House Officers	8	3.7
Consultants	33	16.3
Total	**205**	**100**
Officer Cadre		
Chief Medical Officer	1	0.9
Principal Medical Officer	2	1.9
Senior medical officers	38	35.8
Medical officer	65	61.3
Total	**106**	**100**
Years of Experience		
<2 years	61	29.8
2 – 5 years	65	31.7
6 – 10 years	58	28.3
>10 years	21	10.2
Total	**205**	**100**
Institution where you Practice		
Teaching Hospital	85	41.5
Specialist Hospital	45	22
Federal Medical center	20	9.8
General Hospital	12	5.9
Comprehensive Health Centre	8	3.9
Health Centre	4	2
Private Hospital	31	15.1
Total	**205**	**100**

Study population

The study consists of all physicians of all cadres who participated in the survey voluntarily. A total of 205 physicians were involved in the research. Majority of the physicians in our study are within the age range of 21-60 years Figure 1.

Sampling method

The sample size for this study was derived from the Krejcie and Morgan. The sample sizes are at 0.95 percent level of confidence. A total sample of 205 was arrived at using the Table 2.

Data analysis

SPSS version 23 was used for statistical analysis and chi square was used to check the significant association in the study with p value <0.05 being significant

Ethical consideration

Ethical consideration is gotten from the Ministry of Health, Ondo State.

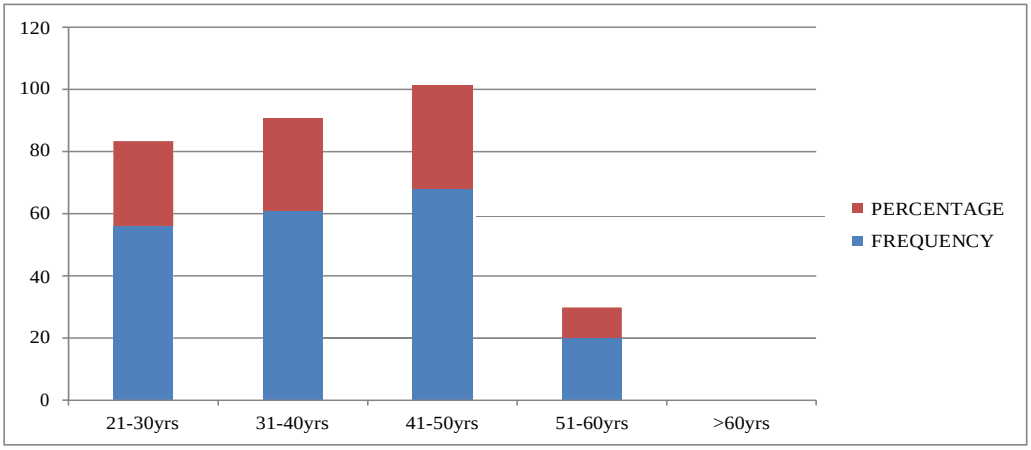

Figure 1. *The chart indicates the designation of the age of medical doctors involved in the analysis.*

Table 2. *Assessment of knowledge of clinical features of MM Clinical Features.*

Features	Frequency	Percentage
Backache		
Yes	199	97.1
No	5	2.4
Don't know	1	0.5
Total	**205**	**100**
Renal Failure		
Yes	189	92.2
No	6	2.9
Don't Know	10	4.9
Total	**205**	**100**
Anaemia		
Yes	173	84.4
No	5	2.4
Don't Know	27	13.2
Total	**205**	**100**
Hypercalcemia		
Yes	143	69.8
No	13	6.3
Don't know	49	23.9
Total	**205**	**100**
Pathologic Fracture		
Yes	142	69.3
No	5	2.4
Don't Know	58	28.3
Total	**205**	**100**
Inability to walk		
Yes	132	64.4
No	5	2.4
Don't Know	68	33.2
Total	**205**	**100**

Discussion

This research also draws out the hierarchy importance of the physicians in relation to their knowledge extent**.**

Majority of the physicians in our study are within the age range of 21-60 years. This slightly differs in correlation with study done [10,11] with the median age of 50 years. 52% of the physicians in our study are females; however this is not in accordance with study in Nigeria with majority of physicians in the study being male. Medical Officers had the highest number of physicians used in this study with most of them practicing in health facilities across the state with 2-5 years of working experience; this is also similar to a study [12]. It was also noticed that majority out of the 164 medical officers had a poor knowledge (57.32%) while 42.68% represented the percentage of them that had good knowledge of MM [13]. Among the Specialists which involved the consultants and residents, it was noticed there was a shift of knowledge as well. The consultants had a good knowledge of MM which varies with the departments they fell into Table 3. The residents also showed an appreciable knowledge of the disease. Backache has been seen to be one of the major features of MM seen among the physicians in our study. This is in correlation with study done by [14]. Patients with MM are also diagnosed with renal failure as seen in study done by. Common presenting signs seen among MM patients are anemia and bone pain. This presentation is important in resource-constrained contexts when clinical judgments are relied upon rather than diagnostic equipment Figure 2.

The most common diagnostic methods seen in our study include Bone marrow aspiration, Protein electrophoresis, Doppler Ultrasound, Elevated ESR, Total protein and albumin. This is in correlation with study done. It can be seen in our study that majority of the physicians had a poor knowledge on MM where it was noticed that the 65% of medical officer's cadre were the most affected with little knowledge of the disease. This is in accordance with study. The poor knowledge of MM among physicians in our study had led misdiagnosis of patients with MM hence could pose a serious threat to the health condition of the people Table 4. Factors responsible for the poor knowledge of physicians on MM are few years of experience and lack of medical equipment due to poor resource state of the country [15].

A positive correlation occurs between the type of institution of practice and the level of knowledge in our study Figure 3. In most specialist and tertiary hospital, availability of good medical facilities with skilled personnel contributes to the good knowledge of the physicians on MM whereas in remote general hospital, comprehensive health center and primary health care have lack of skilled man power and physicians with less knowledge of multiple myeloma which is responsible for misdiagnosis of patients with MM. Our study also shows statistical association between socio-demographic variables of physicians and their knowledge on MM. It can be inferred from our study that significant association was seen between the level of knowledge of physicians and educational qualification with a p value <0.001. Rank of the physicians was also seen to have a significant association

Table 3. *Knowledge of method of Assessment of MM.*

Methods	Frequency	Percentage
Bone Marrow Biopsy/ Aspiration		
Yes	128	62.4
No	2	1.0
Don't Know	75	36.6
Total	**205**	**100**
Protein Electrophoresis		
Yes	140	68.3
No	3	1.5
Don't Know	62	30.2
Total	**205**	**100**
Elevated ESR		
Yes	147	71.7
No	7	3.4
Don't Know	51	24.9
Total	**205**	**100**
Roleaux Formation		
Yes	118	57.6
No	20	9.8
Don't Know	67	32.7
Total	**205**	**100**
Doppler Ultrasound		
Yes	150	73.2
No	7	3.4
Don't know	48	23.4
Total	**205**	**100**
Total Protein & Albumin		
Yes	142	69.3
No	3	1.5
Don't Know	**60**	**29.3**

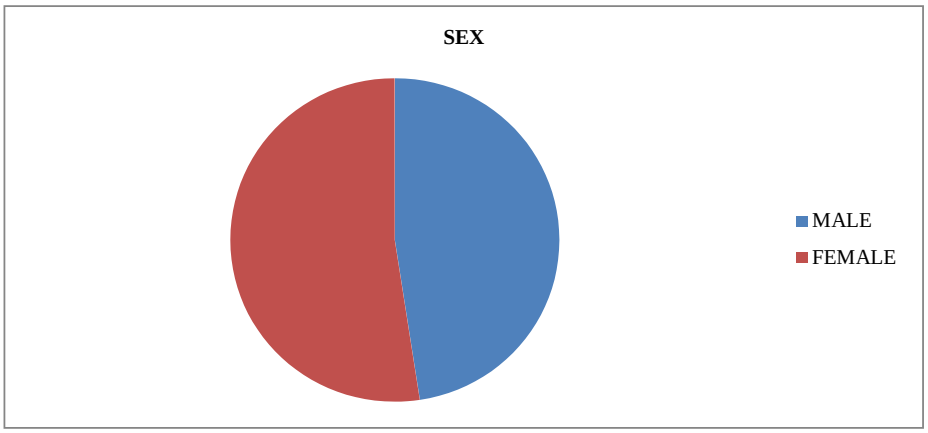

Figure 2. *The chart indicates the designation of the sex of medical doctors involved in the analysis.*

Table 4. *Knowledge based Assessment of different diseases.*

Knowledge	Frequency	Percentage
MM is an infectious disease		
Yes	129	62.9
No	11	5.4
Don't Know	65	31.7
Total	**205**	**100**
MM is a B Malignant disorder		
Yes	139	67.8
No	8	3.9
Don't know	58	28.3
Total	**205**	**100**
MM can be triggered by HIV		
Yes	89	43.4
No	59	28.8
Don't Know	57	27.8
Total	**205**	**100**
MM can appear as loss of Tumor		
Yes	119	58.0
No	12	5.9
Don't Know	74	36.1
Total	**205**	**100**
CRAB is not a supportive diagnostic		
Yes	127	62.0
No	20	9.8
Don't Know	58	28.3
Total	**205**	**100**
Bence Jones Proteinemia & Paraproteinema		
Yes	132	64.4
No	9	4.4
Don't Know	64	31.2
Total	**205**	**100**
60% or more plasma can suggest MM		
Yes	136	66.3
No	4	2.0
Don't Know	65	31.7
Total	**205**	**100**
MM is a T – cell Malignant disorder		
Yes	87	42.4
No	35	17.1
Don't know	83	40.5
Total	**205**	**100**
Paget Disease and Osteitis Fibrosis Cystica		
Yes	115	56.1
No	6	2.9

Don't Know	84	41.0
Total	**205**	**100**
MM involves multidisciplinary Management		
Yes	129	62.9
No	1	0.5
Don't Know	75	36.6
Total	**205**	**100**
Referral Pattern of Patients with Multiple Myeloma in your centre		
Interdepartmental		
Yes	80	39.0
No	12	5.9
Don't Know	113	55.1
Total	**205**	**100**
Other teaching hospital		
Yes	45	22.0
No	7	3.4
Don't Know	153	74.6
Total	**205**	**100**
Federal Medical Centre		
Yes	38	18.5
No	13	6.3
Don't Know	154	75.1
Total	**205**	**100**
State Specialist		
Yes	61	29.8
No	9	4.4
Don't Know	135	65.9
Total	**205**	**100**
Steroid based Chemotherapy used for treatment		
Yes	140	68.3
No	2	1.0
Don't know	63	30.7
Total	**205**	**100**
Patients with MM benefit from anticoagulant		
Yes	159	77.6
No	0	0
Don't know	46	22.4
Total	**205**	**100**
Analgesics are part of treatment regimen		
Yes	162	79.0
No	0	0
Don't Know	43	21.0
Total	**205**	**100**
Biophosphate drugs are invaluable in Management		
Yes	161	78.5
No	2	1.0
Don't Know	42	20.5
Total	**205**	**100**
Bortezomib is an important Chemotherapy Regimen		
Yes	172	83.9
No	0	0
Don't Know	33	16.1
Total	**205**	**100**
Phalidomide, Lenalidomide Cyclophomide used in treatment		
Yes	178	86.8
No	0	0
Don't Know	27	13.2

Total	**205**	**100**
Bone Marrow Transplantation can lead to cure		
Yes	173	84.4
No	0	0
Don't Know	32	15.6
Total	**205**	**100**

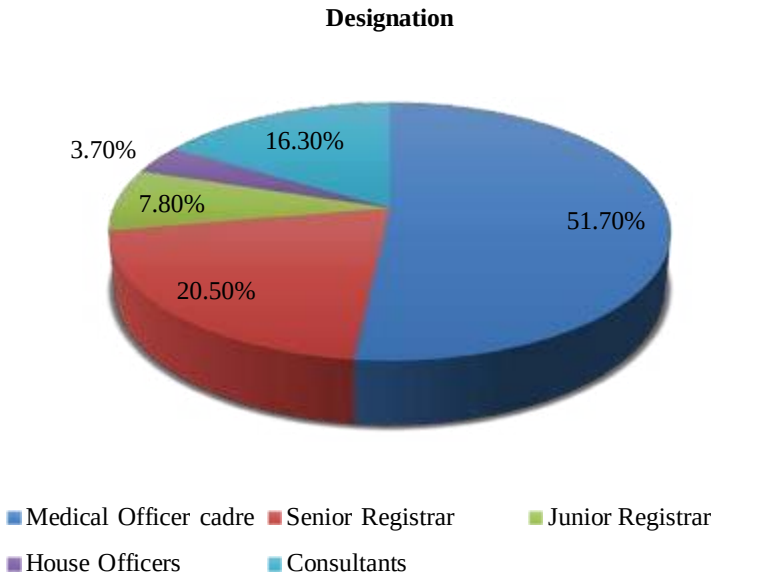

Figure 3. *The chart indicates the designation of the cadre and hierarchy of physicians involved in the analysis.*

Table 5. *Knowledge based Assessment of Variables.*

Variable	Knowledge		Df	Chi – Square	P – value
	Good	Poor			
Age			6	5.047[a]	0.538
21 – 30	24	32			
31 – 40	21	40			
41 – 50	25	43			
51 – 60	7	13			
Total	77	128			
Sex			2	2.625[a]	0.269
Male	42	55			
Female	35	73			
Total	77	128			
Designation					
Consultants	26	7	10	34.309[a]	**0.000**
Medical Officer cadre	31	75			
Senior Registrar	9	33			
Junior Registrar	4	4			
House Officers	7	9			
Total	77	128			
Medical Officer Cadre			6	14.198[a]	**0.027**
Chief Medical Officer	1	0			
Principal Medical Officers	1	1			
Senior Medical officers	5	33			
Medical Officers	70	94			
Total	77	128			
Years of Experience			6	8.130[a]	0.229
< 2 years	25	36			
2 – 5 years	21	44			
6 – 10 years	20	38			
>10 years	11	10			
Total	77	128			

Health Facilities General Hospital	3	9			
Comprehensive Hospital	3	5			
Health Centre	2	2			
Private Hospital	10	21			
Total	77	128			

with sociodemographic variables. Years of experience plays a significant role in the treatment and diagnosis of patients with MM as seen in our study showing a significant association with the demographic variables Table 5. This is in correlation with study [16].

Moreover, there are few medical officer cadre in particular CMO, PMO with more than 10 years of experience in our study tend to have good knowledge on MM. Also, years of experience also plays a major role in the knowledge of physicians on MM as seen in our study that majority of the physicians had less than 2 years of experience in particular HO and JMO which contributes to the poor knowledge of the physicians due to their training and exposure to MM compared to those with more than 10 years' experiences have seen a lot of cases of MM patients.

No significant association had been seen with age and sex in correlation with knowledge of physicians on MM. This correlates the findings of [17].

Conclusion

The study confirms that there is a poor knowledge of MM among physicians. To aid early referral, we recommend that physicians have a high index of suspicion in patients with bone pain and anemia. Newer treatment techniques such as stem cell transplantation should be used. Bone pain and anemia especially in the elderly patients are critical clinical indicators that should prompt a physician in a resource-limited situation to investigate cases of MM. Seminars and presentations should be carried out frequently to re-educate and retrain the younger physicians on MM. Government should invest in the health insurance coverage for cancer patients. Creative approaches such as online training, research and capacity building should be explored for MM and other cancer related diseases.

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