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Uptake of Hyperbaric Oxygen Therapy as a Treatment Option in the Management of Selected Medical Conditions Among a Cohort of Doctors

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ABSTRACT

Background: Hyperbaric oxygen therapy (HBOT), which involves administering oxygen at pressures higher than normal atmospheric levels, is a highly effective treatment for a number of approved medical conditions, including air or gas embolism, carbon monoxide poisoning; cyanide poisoning; smoke inhalation, clostridial myositis and myonecrosis (gas gangrene), decompression sickness.

Objectives: This study explores the awareness and acceptance of Hyperbaric Oxygen Therapy (HBOT) as a treatment modality among a cohort of medical doctors.

Methodology: The study used a structured survey to assess participants' knowledge of HBOT indications, perceptions about its efficacy, and willingness to refer patients in the future for diseases that would benefit from this treatment.

Results: Findings indicate a rising awareness of HBOT's role in the management of selected medical conditions, including chronic wounds, radiation injuries, and certain infections. Notably, most respondents expressed openness to incorporating HBOT into patient care plans where appropriate.

Conclusion: These results suggest growing recognition of HBOT within the medical community and highlight the need for continued education and access to facilitate its broader integration into clinical practice.

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INTRODUCTION

Hyperbaric oxygen therapy (HBOT) is a treatment modality in which a person breathes 100% Oxygen while being subjected to increased atmospheric pressure.[1] HBOT is carried out in either a mono- (single person) or multi-place (typically 2 to 14 patients) chamber. Pressures applied while in the chamber are usually 2 to 3 atmospheres absolute (ATA), the sum of the atmospheric pressure (1 ATA) plus additional hydrostatic pressure equivalent to one or two atmospheres (1 atmosphere = a pressure of 14.7 pounds per square inch or 101 kPa).[2] Such doses of oxygen have a few beneficial biochemical, cellular, and physiologic effects including improved angiogenesis. Treatments are usually about 1.5 to 2 hours long, depending on the indication and may be performed one to three times daily. Monoplace chambers are usually compressed with pure O_2. Multiplace chambers are pressurized with air and patients breathe pure O_2 through a tight-fitting face mask, a hood, or an endotracheal tube. During treatment, the arterial O_2 tension often exceeds 2000 mmHg and levels of 200 to 400 mmHg occur in tissues.[2]

Boyle's law states that the volume of gas in an enclosed space is inversely proportional to the pressure exerted on it, and this explains some of the beneficial effects of hyperbaric oxygen in conditions caused by the formation of gas bubbles. Administering 100 percent oxygen at ambient (normobaric) pressure increases the amount of oxygen dissolved in the blood fivefold to 1.5 ml per decilitre, and at 3 atmospheres, the dissolved-oxygen content is approximately 6 ml per deciliter, more than enough to meet resting cellular requirements without any contribution from oxygen bound to haemoglobin.[3] The sudden formation of inert-gas bubbles in blood vessels and tissues causes decompression sickness and air embolism.[3] At 2.8 atmospheres, bubble volume is reduced by almost two thirds. In addition, hyperbaric oxygen hastens the dissolution of the inert-gas bubble by replacing the inert gas in the bubble with oxygen, which is then rapidly metabolized by the tissues. The use of hyperbaric oxygen also prevents the formation of new bubbles.[4]

Hyperbaric oxygen therapy (HBOT) is increasingly utilised in several areas of medical practice although with a unique intervention and poorly understood method of action. Thus, clinicians may request its use for their patients but often will not fully understand its mechanisms. The effects of HBOT are based on the gas laws, and the physiological and biochemical effects of hyperoxia.[5]

The Undersea and Hyperbaric Medical Society (UHMS) lists fifteen conditions in which HBOT are indicated, for which research data and extensive positive experience have become convincing.[6] The UHMS approved indications for hyperbaric oxygen therapy include: air or gas embolism, carbon monoxide poisoning including that complicated by cyanide poisoning, clostridial myositis and myonecrosis (gas gangrene), crush injury, compartment syndrome, and other acute traumatic ischemia, decompression sickness, central retinal artery occlusion and enhancement of healing in selected problem wounds due to insufficient arterial blood flow, including the diabetic foot, exceptional blood loss (anaemia), intracranial abscess, necrotizing soft tissue infections (necrotizing fasciitis), osteomyelitis (refractory), delayed radiation injury (soft tissue and bony necrosis), skin grafts and flaps (compromised), thermal burns (early), idiopathic sudden sensorineural hearing loss, and avascular necrosis.[6]

HBOT is relatively safe, but does carry some risks, due to the increased pressure and hyperoxia. The commonest effect of oxygen toxicity is a progressive, reversible myopia, thought to be due to physical lens deformation.[7] There is however no evidence of other optical side-effects such as cataracts.[7] Central nervous system toxicity may occur, and has been known since Paul Bert documented the seizure-potentiating effect of hyperbaric oxygen in 1878,[8,9] but the UHMS feel this is not justified within well-defined oxygen tolerance limits.[10] Interestingly, a 2003 paper reported an apparent increase in oxygen-induced convulsions over recent years, though the reasons for this were unknown.[11] Middle ear and sinus barotraumas are preventable by equalization techniques or tympanostomy tubes,[12,13] and otitis media can be prevented with pseudoephidrine.[14] Inner ear barotrauma is extremely rare, but tympanic rupture can result in permanent hearing loss, tinnitus and vertigo. Pulmonary barotrauma and pneumothorax are extremely rare, particularly without pre-existing lung disease. Dental barotrauma may rarely cause pain under a dental filling.[14]

There have been some concerns that HBO could stimulate malignant growth by increasing tumour oxygenation. This was not supported by Feldmeier in his report of 1994,[15] or his review in 2003,[16] and he concluded that a history of malignancy should not be a

contra-indication for HBO therapy. Clinical and experimental evidence does not support claims that HBO during pregnancy can cause a range of foetal complications, including spina bifida and limb defects.[17] Psychological side-effects such as claustrophobia are common. Accidents are a risk due to the enriched oxygen and inaccessibility, with over 50 reported deaths due to fire in the last 20 years.[18]

The only absolute contraindication to HBO is an untreated tension pneumothorax, and this must be excluded before treatment.[6] Relative contraindications include impaired pressure equalization, and cardiac disease.

Justification for the study

There is a scarcity of research in HBOT based on a thorough review of the literature and anecdotal reports.[19,20] This is concerning because oxygen is a critical component in the treatment of critically ill patients, and its appropriate use or lack thereof can have a negative impact on patients' outcomes. Considering the foregoing, this study was conducted to fill any knowledge gaps by evaluating the uptake of HBOT as an alternative therapy in the management of some medical conditions. Moreover, the frontier of hyperbaric medicine is fast gaining grounds and more indications for the HBOT is discovered especially in developed countries. There is a need to ascertain how much HBOT is embraced and utilised in the management of certain diseases making use of a diverse study population who have interest in hyperbaric medicine.

Aim of the study

This study aims at assessing the utilization of HBOT as a treatment option for the management of certain medical conditions among a cohort of medical doctors.

Specific objectives of the study

1. To ascertain the knowledge of the indications for HBOT.
2. To assess the factors hindering the utilization of HBOT as an alternative medical therapy in the management of certain diseases.
3. To determine the willingness to embrace HBOT as an alternative medical therapy in the management of certain disease conditions.
4. To assess the influence of the respondents' years of practice as a medical doctor, years of practice as a hyperbaric physician, current grade and specialty; on the acceptance of HBOT as an alternative therapy in the management of selected medical conditions.

LITERATURE REVIEW

Hyperbaric oxygen therapy was first documented in 1662, when Henshaw built the first hyperbaric chamber, or 'domicilium'.[21] Since then, several reports of beneficial effects from increased pressure have emerged, and by 1877, chambers were used widely for many conditions, although with little scientific rationale or evidence. In 1879, the surgical application of hyperbaric therapy in prolonging safe anaesthesia was realized and explored.[22] Cunningham[23] reported in 1927 the improvement in circulatory disorders at sea level and deterioration at altitude, and a patient who was grateful to Cunningham for his recovery after HBO treatment, built the huge 'steel ball hospital' chamber, but this was closed when Cunningham failed to produce evidence for its use.

Early chambers used compressed air rather than oxygen, due to early reports of oxygen toxicity.[24] Drager was the first to explore the use of pressurized oxygen in decompression sickness, and his protocols were put into practice by Behnke and Shaw in the late 1930s.[25] Research conducted by the US military after the Second World War brought greater knowledge about survivable pressures. As a result, the use of HBO increased, and throughout the late 1950s and early 1960s, HBO was used to potentiate radiotherapy effects,[26] prolong circulatory arrest during surgery,[27] and to treat anaerobic infections[28] and carbon monoxide poisoning.[29] Unfortunately, HBO has also been used without a solid evidence base in conditions such as dementia, emphysema and arthritis. Concerns about lack of scientific progress and regulation led the UHMS to form a *Committee on Hyperbaric Oxygen Therapy* in the late 1970s, which is now the international authority on HBO.

Today, patients are treated in either monoplace chambers or multiplace chambers. The pressurized oxygen exerts its effects by several different mechanisms, including creating a diffusion gradient for inert gases, oxygenating ischemic tissues, limiting reperfusion injuries, inactivating certain toxins, and supporting angiogenesis and leukocyte function.[30] There are 259 hyperbaric facilities in the United States with 344 single-occupant ("monoplace") hyperbaric-oxygen chambers.[31,32]

MATERIALS AND METHODS

This study was conducted with the use of anonymized questionnaire comprising 24 questions using google forms. The study design is a total sampling of all doctors who attended the 2022 Hyperbaric and Undersea Medical Society (UHMS) physician's training in dive medicine, and who gave consent were recruited into the study. Two scoring systems were used to gauge subject's knowledge on HBOT. Participants were questioned on the approved indications by the Undersea and Hyperbaric Medical Society (UHMS) and uptake of HBOT as an alternative treatment option in the management of certain disease conditions. "Yes" or "No" answers with a negative scoring system were used, and subjects are allowed to complete the questionnaire only once.

Study population

All medical doctors who attend the 2022 Hyperbaric and Undersea Medical Society (UHMS) physician's

training in dive medicine were invited to participate. The UHMS physician's training in hyperbaric medicine course was started in 1977 with financial support from the department of energy and cooperation of the US Navy. Further influence has been based on internationally accepted training objectives that were agreed upon by the Diving Medical Advisory Committee (DMAC), the European Diving Technology Committee (EDTC), and the European Committee for Hyperbaric Medicine (ECHM).

The UHMS physician's training course encompasses the recognition and treatment of diving medical emergencies by making use of course educational methodology including lectures, case presentations, video clips, printed support materials, and practical exercises. It also entails practical hands-on experience in operating a decompression chamber, and the use of commercial and military diving equipment.

Inclusion Criteria

1. All medical doctors who attend the 2022 Hyperbaric and Undersea Medical Society (UHMS) physician's training in dive medicine and who gave consent.

Exclusion Criteria

1. All non-doctors attending the 2022 Hyperbaric and Undersea Medical Society (UHMS) physician's training in dive medicine
2. All doctors attending the 2022 Hyperbaric and Undersea Medical Society (UHMS) physician's training in dive medicine but do not give consent.

Statistical analysis

Numerical data is presented as numbers, with categorical data described using percentages. Two types of models were used to relate each dependent variable to the 12 independent variables. Binomial logistic regression model was used for categorical dependent variables, since the categorical dependent variables comprised two categories. On the other hand, generalized linear model was used when the dependent variable is numerical; using the IBM® SPSS® Statistics package version 24 (IBM Corporation, Armonk, New York).

Measurement of Variables

The data comprised of 21 variables in total. Four of the variables were considered as dependent variables and they include: years of practice as a doctor and hyperbaric physician, current grade and specialty. The remaining 17 variables were considered as independent variables and they are: age, marital status, gender, country of basic medical training, previous hyperbaric unit (HBU) visit, previous scuba dive, previous dry dive in a hyperbaric chamber, previously attended lectures on hyperbaric medicine, ever received HBOT, location of hyperbaric chambers, HBOT indications, location of functioning hyperbaric unit, ever referred patients for HBOT, willingness and possible barriers for HBOT referrals and pressure at which HBO is delivered.

All questions except biodata, indications for HBOT, possible barriers for HBOT referrals and pressure at which HBO is delivered are in "Yes" and "No" format. The correct answers are given a score of 1, while wrong answers are scored 0. The mean score of each participant was calculated and graded in percentages. Overall knowledge of HBOT was categorized using Bloom's cut off point method and classified into very low (0 to 25%), low (26% to 50%), high (51% to 75%), and very high (76% to 100%).[33]

Ethical consideration

Permission was sought from the organisers of the 2022 Hyperbaric and Undersea Medical Society (UHMS)

Physician's Training in Dive Medicine and ethical approval was sought from the Lily Hospital's Limited, Health Research and Ethics Committee.

RESULTS

Table 1: Summary of Socio–Demography of the Study Participants (N=15)

Variable	Frequency	Percentage
Age Group (Years)		
31 – 40	4	26.7%
41 – 50	6	40.0%
51 – 60	5	33.3%
Marital Status		
Divorced	2	13.3%
Married	10	66.7%
Single	3	20.0%
Gender		
Female	3	20.0%
Male	12	80.0%
Years Practicing as a Doctor		
1-10 years	8	53.3%
11-20 years	4	26.7%
Above 30 years	3	20.0%
Years Practicing as a Hyperbaric Physician		
0-5 years	11	73.3%
6-10 years	2	13.3%
11-15 years	2	13.3%
Country obtained basic medical training		
Canada	2	13.3
United States of America	12	80.0
Others	1	6.7
Current grade		
Consultant	8	53.3
Medical Officer	5	33.3
Resident Doctor	2	13.3
Specialty		
Anaesthesia and Intensive Care	3	20.0
General Practice/Family Medicine	4	26.7
General Surgery	1	6.7
Otorhinolaryngology	1	6.7
Rehabilitation Medicine	1	6.7
Others	5	33.3

TABLE 2. Knowledge of HBOT

Variable	Frequency	Percentage
Overall Knowledge of HBOT		
Very High	8	53.3%
High	7	46.7%
Low	0	0.0%
Awareness of HBOT indications relevant to specialty		
Yes	14	93.3%
No	1	6.7%
HBOT Indications		
All of the above	11	73.3%
Carbon monoxide poisoning	3	20.0%
Gas embolism	1	6.7%

Table 2 Showed a high awareness among the medical doctors regarding HBOT indications: Out of 15 doctors surveyed, 93.3% (14) reported being aware of HBOT indications relevant to their specialty. Only 6.7% (1) were not aware. The majority (73.3%, 11 doctors) recognized "All of the above" indications for HBOT, including carbon monoxide poisoning and gas embolism. Carbon monoxide poisoning was identified by 20.0% (3 doctors), and gas embolism by 6.7% (1 doctor).

For overall knowledge, 53.3% of the respondents were categorised as very high ((76% to 100%) of the Bloom's scoring), while 46.7% were high (51% to 75%), and none in the low category (26% to 50%).

Method: Seven questions were used to access the knowledge/awareness level of HBOT indications. They are ever visited a hyperbaric chamber; Ever carried out SCUBA diving;

Ever carried out a dry dive in a hyperbaric chamber; Ever attended seminar hyperbaric medicine; Ever received HBOT; Aware of functioning hyperbaric unit in your Country; Beneficial HBOT pharmacological effects. A Yes response was scored as one and No response was scored as zero.

Table 3. Barriers to HBOT utilization

Variable	Frequency	Percentage
Objective 2: Factors hindering the utilization of HBOT as an alternative medical therapy in the management of certain diseases.		
Efficacy of HBOT	1	6.7%
Logistics	7	46.7%
No concerns	4	26.7%
Others	3	20.0%

Table 3, shows Logistics being the most frequently cited barrier (46.7%, 7 doctors), followed by **No concerns** reported by 26.7% (4 doctors). **Efficacy of HBOT** and **Others** were less commonly reported as barriers.

Table 4. Willingness to embrace HBOT

Questions	Response	Frequency	Percentage
Possible Future HBOT Referral	Yes	15	100.0%
Aware of Functioning Hyperbaric Unit in Country	Yes	15	100.0%
Ever Referred a Patient for HBOT	Yes	10	66.7%
	No	5	33.3%

The result in Table 4, shows a high willingness among doctors to embrace HBOT, with future referrals indicating all surveyed doctors (100%) considering referring patients for HBOT in the future. All doctors were aware of a functioning hyperbaric unit in their country and are willing to refer. Doctors who had previously referred patients for HBOT were also more likely to be willing to refer in the future (66.7%).

Table 5. Influence of selected socio-demographics on acceptance of HBOT

Variables	Ever referred a patient for HBOT			
	Yes (%)	No (%)	X^2	P-value
Years Practicing as Doctor				
1-10 years	4 (26.7%)	4 (26.7%)	2.625	0.269
11-20 years	3 (20.0%)	1 (6.7%)		
Above 30years	3 (20.0%)	0 (0.0%)		
Years Practicing as a Hyperbaric Physician				
0-5 years	6 (40.0%)	5 (33.3%)	2.727	0.256
11-15 years	2 (13.3%)	0 (0.0%)		
6-10 years	2 (13.3%)	0 (0.0%)		
Current Grade				
Consultant	6 40.0%	2 13.3%	0.600	0.741
Medical Officer	3 20.0%	2 13.3%		
Resident Doctor	1 6.7%	1 6.7%		
Specialty				
Medical	5 33.3%	3 20.0%	1.163	0.559
Surgical	2 13.3%	0 0.0%		
Others	3 20.0%	2 13.3%		

The result in table 5 shows that years practicing as a doctor (p-value = 0.269), years practicing as hyperbaric physician (p-value = 0.256), current grade (p-value = 0.741) and specialty (p-value = 0.559) had no significant influence on the acceptance of hyperbaric therapy.

DISCUSSION

This study examined the uptake of hyperbaric oxygen therapy (HBOT) as a treatment option among a cohort of doctors. The common indications for HBOT include: air or gas embolism, carbon monoxide poisoning; cyanide poisoning; smoke inhalation, clostridial myositis and myonecrosis (gas gangrene), crush injuries, compartment syndromes and other acute traumatic peripheral ischaemia, decompression sickness, enhancement of healing in selected problem wounds, exceptional blood loss anaemia, intracranial abscess, necrotizing soft tissue infections, refractory osteomyelitis, skin flaps and grafts (compromised), delayed radiation injury (soft tissue and bony necrosis) and thermal burns.

Findings from this study showed a high awareness among the medical doctors regarding HBOT indications: Out of 15 doctors surveyed, a significant proportion of them reported being aware of HBOT indications relevant to their specialty. However, only 6.7% of the respondents were not aware of the indications of HBOT. The study further revealed that majority of the respondents have good knowledge of HBOT.

This high levelof awareness is positive and in dicates that HBOT is becoming more widely accepted as a useful supplementary therapy in clinical settings. Compared to earlier studies,this result is much higher. For example, a 2020 survey conducted in a major hospital in Malta by Magri et al found that just 65% of doctors knew what HBOT indications were.[34] These discrepancies could be due to regional variances in postgraduate education programs, exposure to HBOT facilities, or the availability of continuing medical education (CME) programs that focus on advanced therapies.

Given the foregoing, it is necessary to create uniform HBOT education and training across healthcare systems to address the noted disparity between this study and others. As a result, professional associations and public health stakeholders should embrace HBOT-related content in medical education courses and continuing medical education to promote the evidence-based use of cutting-edge treatments like HBOT. These practical

steps and doable actions will help close the knowledge gap by guaranteeing fair access to training and education.

The findings of this study demonstrate a very high level of awareness of HBOT indications related to their specialty, and it also highlights the barriers to utilization of HBOT as an alternative medical therapy in the management of certain diseases. Logistics is the most frequently cited barrier in this research, and this is similar with findings by Magri K, Bigeni S, Azzopardi CP, et al with logistical problems (15.8%) being the highest concern to referrals for HBOT [34]. On the other hand, Rosemary D. Byrne et al reported lack of education and financial constraints as the major barriers to accessing HBOT. Recent incidents and expert opinions highlight safety concerns, regulatory limitations and lack of clinical evidence are some of the challenges to the utilization of HBOT.[35]

The research also demonstrates that there is a high willingness among doctors to embrace HBOT as well as future referrals for patients with clinical conditions that are indicated for intervention. However, there was no statistically significant correlation between years of practicing as a doctor, a hyperbaric physician, current grade and specialty of the respondents with the acceptance of hyperbaric therapy as an alternative treatment for selected medical conditions. Hyperbaric oxygen therapy (HBOT) is becoming more recognised among healthcare professionals in the treatment of a variety of medical conditions and increased referrals. A meta-analysis by Kranke et al. in *Diabetes Care* demonstrated that HBOT significantly improves the healing rates in chronic diabetic foot ulcers, thus reducing the need for amputations.[36]

CONCLUSION/RECOMMENDATIONS

This study demonstrates the rising awareness of HBOT in the treatment of certain medical conditions and the willingness for future referral. The following are recommended based on the findings of this study:

1. Campaigns for Awareness in Low-Exposure Areas: To fill in the few knowledge gaps identified by this research, there is dare need for a focused awareness campaigns which should be carried out in hospitals and areas where HBOT is underutilised.
2. Given the proven benefits of awareness on clinical referral practices. HBOT-related materials should be more widely included in continuing medical education programs, especially for specialities that regularly manage HBOT-amenable illnesses (such as surgery, emergency medicine, and endocrinology)
3. To guarantee that those eligible receive prompt assistance, healthcare organisations should endeavour to increase access to hyperbaric treatment facilities and create explicit referral policies.

Future Research Considerations

Although the current study provides valuable insights, the findings' generalisability is hampered by the small sample size. Therefore, to confirm and expand on the current findings, future studies need include a bigger, more varied cohort.

In addition to increasing statistical power, broadening the population base would enable subgroup analyses that might reveal differences in clinical or demographic traits. Furthermore, longitudinal designs may help clarify temporal dynamics and causal linkages that are difficult for cross-sectional approaches to fully capture. The findings would be much more solid and applicable in larger situations if such thorough research were conducted.

Limitations of Study

This study utilised participants at a training in hyperbaric medicine that had few participants, thereby making it difficult for generalization. Additionally, being a cross - sectionally study is also a limiting factor to the findings obtained.

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APPENDIX 1

QUESTIONNAIRE

Tick as appropriate

1. Age at last birthday: 25-29 [ ] 30- 34 [ ] 35-39 [ ] 40-44 [ ] 45-49 [ ] 50-54 [ ] 55-59 [ ] Above 60 [ ]

2. Marital status: a. Single [ ] b. Married [ ] c. Divorced [ ] d. Separated e. Widowed [ ]
3. Sex: Male [ ] Female [ ]

4. How long have you been practicing as a medical doctor?
1-10 years [ ] 11- 20 years [ ] 21- 30 years [ ] Above 30 years [ ]

5. How long have you been practicing as a hyperbaric physician
0-5 years [ ] 6-10 years [ ] 11-15 years [ ] 16-20 years [ ] Above 20 years [ ]

6. In what country did you have your basic medical training?
United Kingdom [ ] United States of America [ ] Australia [ ] Canada [ ] Nigeria [ ]
Others, please specify ……

7. What is your current grade?
Consultant [ ] Resident Doctor [ ] Medical Officer [ ] Foundation Doctor [ ]

8. What is your specialty?
Anaesthesia and Intensive Care [ ] Community/Preventive Medicine [ ] Emergency Medicine [ ] General Practice / Family Medicine [ ] Forensic Medicine [ ] General Surgery [ ] Genetics [ ] Geriatrics [ ] Haematology [ ] Obstetrics and Gynaecology [ ] Occupational Medicine [ ] Oncology [ ] Ophthalmology [ ]Oral and Maxillo-Facial Surgery [ ] Orthodontics [ ] Orthopaedic Surgery [ ] Otorhinolaryngology [ ] Paediatrics Pathology [ ] Palliative Medicine [ ] Plastic Surgery [ ] Psychiatry [ ] Radiology [ ] Rehabilitation Medicine [ ] Sports and Exercise Medicine [ ] Urology [ ] Virology [ ]
Others, please specify……

9. Have you ever visited a hyperbaric unit or a hyperbaric chamber?
Yes [ ] No [ ]

10. Have you ever carried out SCUBA diving?
Yes [ ] No [ ]

11. Have you ever carried out a dry dive in a hyperbaric chamber?
Yes [ ] No [ ]

12. Have you ever attended a lecture/seminar/talk regarding hyperbaric medicine?
Yes [ ] No [ ]

13. Did you ever receive hyperbaric oxygen therapy HBOT?
Yes [ ] No [ ]

14. Are you aware of the indications for Hyperbaric Oxygen Therapy (HBOT) relevant to your specialty?
Yes [ ] No [ ]

15. Which of the following are indications for HBOT?
Carbon monoxide poisoning [ ] Diabetes mellitus [ ] Gas embolism [ ] Anaerobic or mixed anaero-aerobic bacterial infections [ ] Multiple Sclerosis [ ] Delayed wound healing [ ] Autism [ ] Chronic refractory osteomyelitis [ ] Parkinson's disease [ ]

16. Are you aware of any hospital(s) with a functioning hyperbaric unit in your Country?
Yes [ ] No [ ]

17. Have you ever referred a patient for HBOT?
Yes [ ] No [ ]

18. Do you think hyperbaric oxygen therapy can have beneficial pharmacological effects?
Yes [ ] No [ ]

19. Hyperbaric oxygen therapy (HBOT) is delivered at:
Lower than atmospheric pressure [ ] Atmospheric pressure [ ] Higher than atmospheric pressure [ ]

20. What is your main concern(s) which may prevent you from referring a patient for HBOT?
Efficacy of HBOT [ ] Safety of HBOT [ ] Logistics [ ] No concerns [ ]
Others: _____

21. Would you consider referring any of your patients for HBOT in the future?
Yes [ ] No [ ] Undecided [ ]

APPENDIX 2

INFORMED CONSENT FORM

My name is Dr. Omobamidele Benson Betiku and am carrying out a study that aims at assessing the utilization of HBOT as a treatment option for the management of certain medical conditions among a cohort of medical doctors. There is no risk or inconvenience attached to this study, and the questionnaire can be completed in less than 15 minutes.
All information volunteered will be strictly confidential and used for academic purpose only. Your participation is fully voluntary, and you are free to withdraw at any time of your choosing.

Dr. Omobamidele Benson Betiku
Name of Researcher

_____
Date

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