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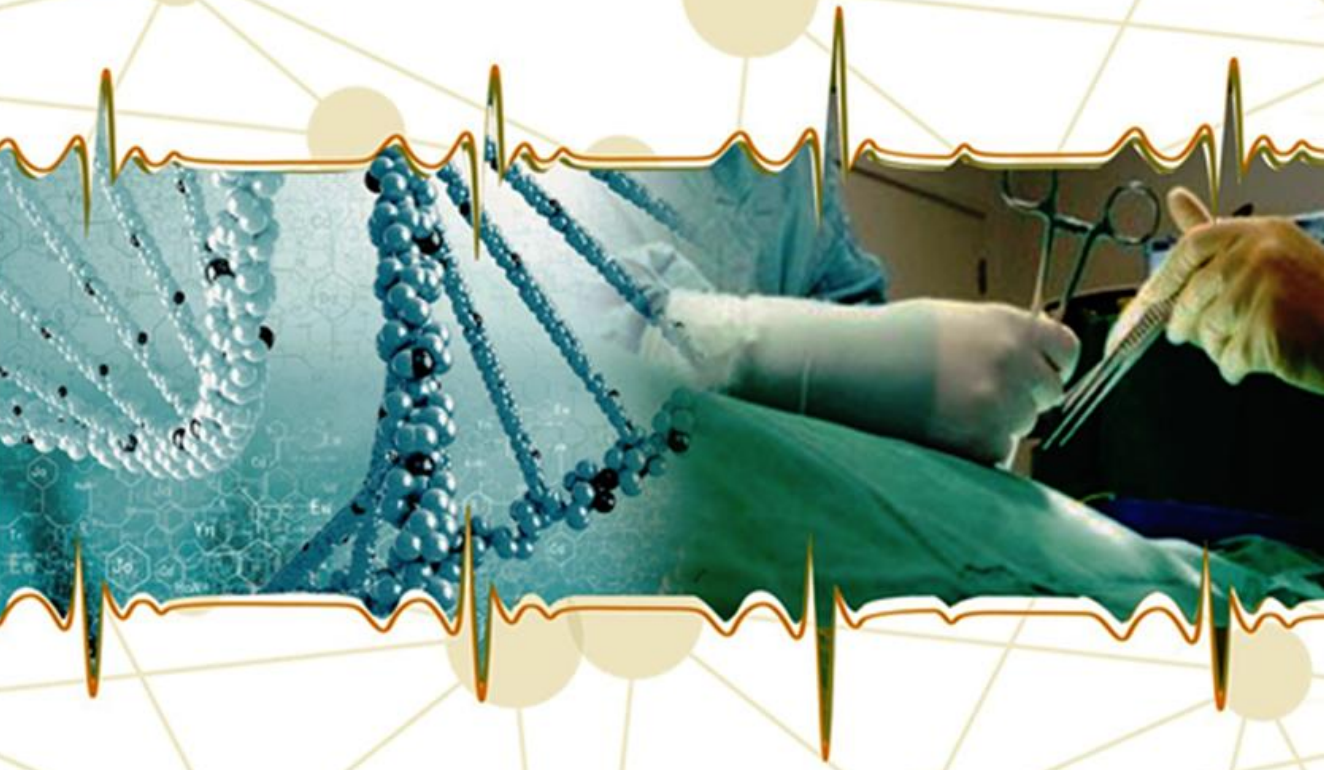

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IN THE NAME OF ALLAH,
THE MOST GRACIOUS,
THE MOST MERCIFUL

JUMJ EDITORIAL BOARD AND DESCRIPTION

AUMJ DEVELOPMENT HISTORY

Jouf University Medical Journal (JUMJ) is issued under the general supervision of his esteem **Dr Salim M. ALanazy**, The vice-Rector of Jouf University for Graduate Studies and Scientific Research.

The inaugural issue of JUMJ first appeared September 1, 2014 with Prof. Dr. Saleh A. Al-Damegh, Founding Dean of Unaizah College of Medicine and Applied Medical Sciences and General Supervisor for Unaizah Colleges New Campus at Qassim University, Qassim University, Qassim, Saudi Arabia, as the Founding Editor-In-Chief.

The journal was initially name as Aljouf University Medical Journal (AUMJ). As the university name changed into Jouf University, the journal's name was also modified into Jouf University Medical Journal (JUMJ) starting from the 3rd issue of the year 2018.

AUMJ DESCRIPTION AND SCOPE

JUMJ (pISSN: 1658-6700) is an online Open-Access and printed General Medical Multidisciplinary Peer-Reviewed International Journal that is published quarterly (every 3 months; March, June, September and December) by the Deanship for Graduate Studies and Scientific Research as the official medical journal of Jouf University, Sakaka, Saudi Arabia (http://vrgs.ju.edu.sa/jer.aspx).

JUMJ full text articles and their serial code Digital Object Identifier (DOI) address number (according to the International DOI Foundation) are accessible online through searching Journals for Aljouf University Medical Journal at Al-Manhal Platform (https://platform.almanhal.com/Search/Result?q=&sf_21_0_3=Aljouf+University+Medical+Journal&opsf_21_0=1&f_title_type_exact_loc_en=Article&opf_title_type_exact_loc_en=2). JUMJ is indexed by the three major players in the world of academic library discovery services: EBSCO Discovery Services (EDS), OCLC (Worldcat Discovery) and ProQuest (SUMMON). The DOI of AUMJ is 10.12816.

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4. While insuring integrity and declaration of any conflict of interest, JUMJ is adopting an unbiased, fast, and comprehensively constructive one-month peer review cycle from date of submission to notification of final acceptance.

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Jouf University Medical Journal (JUMJ), 2019 March 1; 6(1)

Original Article

Early Post-Operative Parathyroid Hormone Level and Kinetics Predict Hypocalcemia Following Total Thyroidectomy

Hany Abd-El-Fatah El-Hady[1,2*], Abdullah N. Alrasheedi[3]

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Abstract

Background: Post-thyroidectomy hypocalcemia increases hospital-stay and morbidity and may necessitate readmission that increases costs.

Objectives: The current prospective study aimed to monitor the incidence, pattern, and kinetics of serum calcium in the 1st 48 hours following total thyroidectomy, and to assess the role of post-operative parathyroid hormone (PHT) and phosphorus levels in predicting such complication.

Patients & Methods: Fifty consecutive patients underwent total thyroidectomy for simple multinodular goiter (n = 37; 76%), controlled secondary toxic goiter (n = 3; 6%), recurrent simple goiter (n = 5; 10%), and papillary thyroid carcinoma (n = 4; 8%). Their male/female distribution was 41 (82%)/9(18%). Their age mean ± SD is 39.3 ± 12.2 years. Full pre-operative laboratory and image assessment in addition to serial assessment of serum calcium (pre-operative, and, 6-, 12-, 24- and 48-hour post-operative), phosphorus (pre- and 6-hour post-operative), and PTH (pre- & 6-hour post-operatively) were done.

Results: Hypocalcemia (<8.4 mg/dL) were detected in 10 (20%) cases; 4 (40%) of them on the operation day and 6 (60%) at 24 - 48-hour post-surgery. Calcium and PTH showed significant reduction post-surgery (p = 0.001 for each), and phosphorus showed significant increase (p = 0.001). Compared to patients without hypocalcemia, those with hypocalcemia had significantly more frequency of toxic goiter (p = 0.037), less mean absolute PTH level at 6-hour post-surgery (p = 0.001), greater mean delta and percentage reduction in PTH at the same time-point (p = 0.001 for each), higher mean % increase in phosphorus (p = 0.044), and more frequency of post-operative PTH levels <10 pg/mL (p = 0.001). By multivariate analysis, only % change in PTH independently predicts hypocalcemia post-thyroidectomy (Odd ratio = 0.825, p = 0.010, and 95% Confidence interval (CI) = 0.712 - 0.955).

Conclusions: Hypocalcemia is common after total thyroidectomy (20%). Serum PTH level 6-hour post-operatively can predict hypocalcemia and help early prophylactic calcium supplementation. The future development of a rapid, simple, bed-side point-of-care test for PTH quantification can be of help in the optimal utilization of such predictor.

Key Words: Hypocalcemia, Total thyroidectomy, Serum calcium, Phosphorus, Parathormone.

Citation: El-Hady HA-E, Alrasheedi AN. Early Post-Operative Parathyroid Hormone Level and Kinetics Predict Hypocalcemia Following Total Thyroidectomy. JUMJ, 2019 March 1; 6(1): 1- 12.

Introduction

During thyroidectomy, failure to preserve the parathyroid glands by devascularization, hematoma formation, and/or accidental removal leads to decreased parathyroid function and

hypocalcemia[1]. The incidence of post-thyroidectomy hypocalcemia ranges from 1.0 - 68.0% (mostly 20 - 30%), with clinical manifestations ranging from no symptoms (especially if calcium levels are reduced only mildly) to numbness and fully manifested tetany, that may not manifest itself during the first 24 hours after surgery[2]. Hypocalcemia typically occurs 24 - 48 hours after thyroidectomy and requires frequent monitoring and usually leads to more morbidity, longer hospital stay and higher treatment costs[3].

Serum calcium levels usually normalize within a few months, with spontaneous recovery of parathyroid function. However, in a few patients, hypoparathyroidism persists for more than a year and must then be considered permanent[4]. The British Association of Endocrine and Thyroid Surgeons audit reported rates of 27.4% and 12.1% for transient and permanent post-thyroidectomy hypocalcaemia, respectively[5]. Risk factors for post-operative hypocalcemia following total thyroidectomy include thyroid gland size, substernal extension of the thyroid, type of thyroid disorder, extent of surgery, and whether re-operation is necessary[6]. Risk factors also include, female gender, preexisting low vitamin D level[7]. Another controversial issue for postoperative hypocalcemia is the potential of prolonged operative time[8].

The current prospective study aimed to monitor the incidence, pattern, and kinetics of serum calcium in the 1st 48 hours following total thyroidectomy, and to assess the role of peri-operative PHT and phosphorus levels in predicting such complication.

Patients and Methods

This prospective study was conducted on 50 consecutively enrolled patients for total thyroidectomy at the Department of General Surgery, Al-Zahraa University Hospital, Cairo, Egypt; in the period from January 2012 to January 2015. The study was approved by the local Ethics Committee. Written informed consent was obtained from each participant.

Patients were excluded from the study if he/she had preoperative abnormal PTH, Ca^{2+} or Mg^{2+} levels, previous parathyroid gland surgery, chronic renal disease, hypoalbuminemia, vitamin D disorder, malabsorption syndromes and/or idiopathic hypocalcemia. Every patient in this study was preoperatively subjected to full medical history, general physical examination, local thyroid gland examination and indirect laryngoscopy. In addition to the routine preoperative laboratory tests (CBC, fasting blood sugar, liver and kidney functions and prothrombin time and concentration), the following laboratory tests were also done: Serum free T3, T4, TSH, PTH, total calcium and phosphate and albumin levels. Calcium and phosphorus were assessed by the automated multichannel analyzer (Roche Modula DP System; their reference ranges were 8.4 - 10.2 mg/dL and 3.4 - 4.5 mg/dL, respectively). PTH was assessed with the immunometric assay Immulite 2000® (the normal threshold range is 11 - 67 pg/mL). The thyroid gland was evaluated by ultra-sonography, Technetium-99^{m} scintigraphy whenever indicated. Plain X-ray to assess the thoracic inlet, tracheal deviation or retrosternal extension was also done. CT scan was also performed if thyroid malignancy was suspected.

Total thyroidectomy was performed under general anesthesia with endotracheal intubation and with identifying and preserving the parathyroid glands and the recurrent laryngeal nerve(s) (RLNs) on both sides. Patients with preoperative symptoms and signs of thyrotoxicosis underwent surgery after reaching their euthyroid state. Post-operatively, all patients were clinically carefully observed for hypocalcemia both clinically (numbness, paresthesia, carpo-pedal spasm) and laboratory (serum calcium levels at 6-, 12-, 24- and 48-hour post-surgery, serum phosphorus and PTH at 6-hour post-surgery). Then, patients were divided into 2 groups depending on their serial serum calcium levels into: Cases with hypocalcemia (Group 1), and, cases without hypocalcemia (Group 2). Patients were observed for any post-operative complication such as bleeding, dyspnea, hoarseness of voice and chocking as indications for RLN palsy. The final

thyroid pathology and need for readmission were report.

Definitions & calculations: Hypocalcemia was defined by serum calcium level <8.4 mg/dL in one measurement[9]. Corrected serum calcium was calculated as [0.8 X (normal albumin - patient's albumin)] + serum Ca^{2+} level. The normal albumin level is defaulted to 4 mg/dL. RLN palsy was defined as the presence of hoarseness or loss of voice quality associated with vocal cord paralysis at laryngoscopy. RLN palsy was considered transient if vocal cord motility was proven normal by laryngoscopy within 6 months from surgery. After this time, RLN palsy was considered permanent[10]. % change in Ca^{2+} was calculated as [(serum Ca^{2+} at time X – serum Ca^{2+} pre-operative) * 100] / serum Ca^{2+} pre-operative. % change in P was calculated as [(serum P post-operative – serum P pre-operative) * 100] / serum P pre-operative. % change in PTH was calculated as [(serum PTH post-operative – serum PTH pre-operative) * 100] / serum PTH pre- operative. Calcium: PTH ratio was calculated as serum Ca^{2+} 6-hr post-operative / serum PTH 6-hr post-operative. Calcium: phosphorus ratio was calculated as serum Ca^{2+} 6-hr post-operative / serum P 6-hr post-operative. PTH: phosphorus ratio was calculated as serum PTH 6-hr post-operative / serum P 6-hr post-operative. Delta (Δ) change was calculated as level post-operative – level pre-operative for the biomarker.

Data management & statistical analyses: Statistical analysis was performed using the Statistical Package for Social Sciences version 22.0 for Windows (SPSS Inc., Chicago, IL, USA). Numeric and categorical variables were expressed as mean ± SD and n (%), respectively. Comparisons were tested using Mann Whitney-U test, One-Way ANOVA and Post-Hoc tests and Chi-Square tests as appropriate. Pearson's or Spearman's correlation between numeric variables was used to test for associations as appropriate. The independent predictors of hypocalcemia were assessed using binary logistic regression analysis. Area under the receiver-operator curve (ROC) was calculated for detection of the independent variable(s). A p value of ≤0.05 was considered statistically significant.

Results

Patients' characteristics are shown in Table 1. Our 50 patients were 41 females (82%) and 9 males (18%). Their age range was 20 - 69 years with a mean age ± SD of 39.3 ± 12.2 years. Indications for surgery were simple multinodular goiter, controlled secondary toxic goiter, recurrent simple goiter and papillary thyroid carcinoma in 38 (76%), 3 (6%), 5 (10%) and 4 (8%) patients, respectively. Preoperatively, the mean ± SD (range) of serum calcium, phosphorus and PTH were 9.29 ± 0.35 (8.9 - 10.2) mg/dL, 3.66 ± 0.44 (2.7 - 4.2) mg/dL and 38.54 ± 6.55 (25 - 60) pg/mL, respectively.

As shown in Table 2, ten (20%) cases experienced hypocalcemia (serum calcium level <8.4 mg/dL); of them, 2 had recurrent goiter, 1 had malignant goiter, 2 had controlled secondary toxic goiter and 5 had simple multinodular goiter. Symptomatic hypocalcemia developed in 3 patients (numbness, tingling and carpopedal spasm). The onset of postoperative hypocalcemia happened within 48 hour post-surgery in 4/10 patients (40%; one at 6-hour, one at 12-hour and two at 24-hour post-surgery). These 4 patients needed acute management of hypocalcemia (IV calcium gluconate then oral calcium supplementation) for a few days. The remaining 6 (60%, and, 12% of the total number of patients operated) patients developed milder hypocalcemia within 24 - 48 hours and required oral calcium supplements. No patients experienced hypocalcemia later than 48 hour post-surgery. Out of these hypocalcemic ten patients, 2 (4%) patients needed treatment for >6 months and were considered as permanent hypocalcemic. The remaining 8 (16%) patients required supplementation for 2 weeks only and were considered as temporary hypocalcemic. The remaining non-hypocalcemic patients (n = 40; 80%) didn't require calcium treatment. The mean ± SD hospital-stay was 3.8 ± 1.5 (Median 3 days) and range was 2.8 – 12 days. Temporary RLN paralysis occurred

in 4 (8%) cases and recovered between 1 - 2 months after surgery. Fortunately, no permanent nerve paralysis was encountered in this cohort. Postoperative hemorrhage occurred in only 1 (2%) case and reoperation was immediately performed with complete success in bleeding control (Table 2).

Table 1: Demographics and baseline clinical and laboratory characteristics of the thyroidectomy patients (n = 50). Data are expressed as mean ± SDM (range) or frequencies; n (%).

Variable	Unit or Category	Result
Age	Years	39.3 ± 12.2 (20 - 69)
Gender	Male/Female	9 (18)/41 (82)
Thyroid disease	Simple multinodular goiter	38 (76)
	Controlled secondary toxic goiter	3 (6)
	Recurrent simple goiter	5 (10)
	Papillary thyroid carcinoma	4 (8)
Serum calcium	mg/dL	9.29 ± 0.35 (9 - 10.2)
Serum parathormone	pg/mL	38.54 ± 6.55 (25 - 60)
Serum phosphorus	mg/dL	3.66 ± 0.44 (2.7 - 4.2)

Table 2: Hospital stay and post-thyroidectomy complications. Data are expressed as mean SDM (range) or frequencies; n (%). * required calcium therapy for >6 months. ** required treatment for 2 months. *** recovered ≤2-month post-surgery. # 4 patients needed IV therapy and 6 patients needed oral therapy only. Data shown are mean SD or frequencies; n (%). RLN = recurrent laryngeal nerve.

Variable	Category/Unit	Result
Hypocalcemia	Calcium level <8.4 mg/dL	10 (20.0)
	Permanent	2 (4.0)*
	Temporary	8 (16.0)**
Need for calcium therapy	No/Yes	40 (80.0)/10 (20.0)#
Complication	Temporary RLN palsy	4 (8.0)***
	Permanent RLN palsy	0 (00)
	Post-operative bleeding	1 (2.0)
Hospital stay	Days	3.8 ± 1.5 (Median = 3, 2.8 - 12)

As shown in Table 3, compared to patients without hypocalcemia (n = 40), those with hypocalcemia (n = 10) had significantly more PTH levels <10 pg/mL, lower mean PTH levels 6-hour post-surgery, greater drop in the mean delta and percentage changes in PTH levels, higher 6-hour calcium/PTH ratio (p = 0.001 for all), but similar 6-hour calcium/phosphorus ratio (p = 0.325). The univariate analysis comparing patients without hypocalcemia (n = 40) vs. patients with hypocalcemia (n = 10) showed significantly more frequency of toxic goiter (p = 0.037), less mean absolute PTH level at 6-hour post-surgery (p = 0.001), greater mean delta and percentage reduction in PTH at the same time-point (p = 0.001 for each), more mean % increase in phosphorus (p = 0.044), and more frequency of post-operative PTH levels <10 pg/mL (p = 0.001). Both groups were similar regarding age, gender, other indications of surgery, and, pre-operative calcium, PTH and phosphorus levels. Using multivariate binary regression analysis, only % change in PTH level at 6-hour independently predicts hypocalcemia post-thyroidectomy (Odd ratio = 0.825, p = 0.010, and 95% Confidence interval (CI) = 0.712 - 0.955).

Post-operative changes (kinetics) in serum calcium are shown in Figure 1. The mean baseline (pre-operative) serum calcium dropped significantly at 6-hour post-surgery (p = 0.01) that was further aggravated at 12-, 24- and 48-hour post-surgery (p = 0.001). A significant drop occurred in serum PTH levels (p = 0.001), but phosphorus showed significant rise (p = 0.001).

Table 3: Comparison between thyroidectomy patients with (n = 10) and without post-operative hypocalcemia (n = 40). Data are expressed as mean SD or frequencies; n (%) and p value. PTH = parathyroid hormone, MNG = multinodular goiter, PTC = papillary thyroid carcinoma, and, RMNG = recurrent multinodular goiter.

Variable	Unit/Category	No hypocalcemia	Hypocalcemia	P
Age	Years	36.70 ± 7.13	40.03 ± 13.18	0.658
Gender	Male/Female	8 (20)/32 (80)	9 (90)/1(10)	0.665
Thyroid disease	MNG	33 (82.5)	5 (50.0)	0.172
	RMNG	3 (7.5)	3 (30.0)	0.239
	PTC	3 (7.5)	1 (10.0)	0.089
	Toxic goiter	1 (2.5)	2 (10.0)	0.037
Calcium (pre-operative)	mg/dL	9.33 ± 0.36	9.33 ± 0.31	0.278
PTH (pre-operative)	pg/mL	38.95 ± 7.00	36.80 ± 4.66	0.363
PTH/Calcium	ratio	24.26 ± 4.14	25.44 ± 4.30	0.641
PTH 6-hour post-operative	pg/mL	28.95 ± 5.09	10.96 ± 4.29	0.001
	Δ change	-10.0 ± 3.04	-25.84 ± 5.18	0.001
	% change	-24.31 ± 14.23	-70.22 ± 10.40	0.001
	ratio to Ca^{2+}	32.77 ± 6.70	86.60 ± 22.99	0.001
	<10 pg/mL	0 (0)	7 (70)	0.001
	≥10 pg/mL	40 (100)	3 (30)	
Phosphorus (pre-operative)	mg/dL	3.70 ± 0.44	3.56 ± 0.46	0.393
Phosphorus 6-hour post-operative	mg/dL	3.87 ± 0.49	3.86 ± 0.42	0.942
	Δ change	0.18 ± 0.18	0.30 ± 0.24	0.077
	% change	4.79 ± 4.82	8.90 ± 8.29	0.044

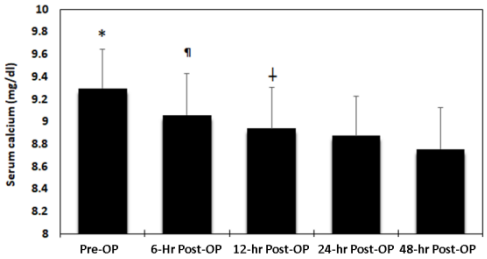

Figure 1: Pre- and post-thyroidectomy serum calcium levels in all patients (n = 50). Data are expressed as mean ± SD. * = pre-operative serum calcium vs. 6-hour post- operative (p = 0.01) and vs. 12-, 24- and 48-hour post-operative (p = 0.001 for each). ¶ = serum calcium 6-hour post-operative vs. 24-hour (p = 0.01) and vs. 48-hour post-operative (p = 0.001). † = serum calcium 12-hour post-operative vs. 48-hour post-operative (p = 0.012). OP = Operative

The post-operative % reduction from baseline of serum calcium levels at each of the 4 time-points (6, 12, 24, 48 hours) correlated significantly and positively (r = 0.601, r = 0.544, r = 0.509, and, r = 0.533, respectively; with p = 0.001 at all time-points) with % drop in serum PTH at 6-hour post-surgery. This indicates that the more the % reduction in calcium, the more the % decrease in PTH (Figure 2).

The % change in calcium levels correlated negatively with the % increase in phosphorus level at the post-operative same time-points (i.e., the more the % reduction in calcium, the more the % increase in phosphorus), but at a less significance level (r = -0.302 & p = 0.033, r = -0.454 & p = 0.001, r = -0.340 & p = 0.016, and, r = -0.323 & p = 0.022) (Figure 3).

However, at 6-hour post-surgery, there was no correlation between the % change in PTH and that of phosphorus (r = -0.163, p = 0.111; Figure 4).

The area under the Receiver Operator Characteristic (ROC) curve for PTH absolute value, delta change, % change, and in its ratio to calcium levels at 6-hour postoperative were 0.995, 0.943, 0.990

and 0.985, respectively (Figure 5 and Table 4). Sensitivity and 1-specificity of each at any cut-off value is provided in Supplement 1. Overall, absolute PTH levels ≤13.5 pg/mL give 100% sensitivity and 20% specificity in predicting post-thyroidectomy hypocalcemia.

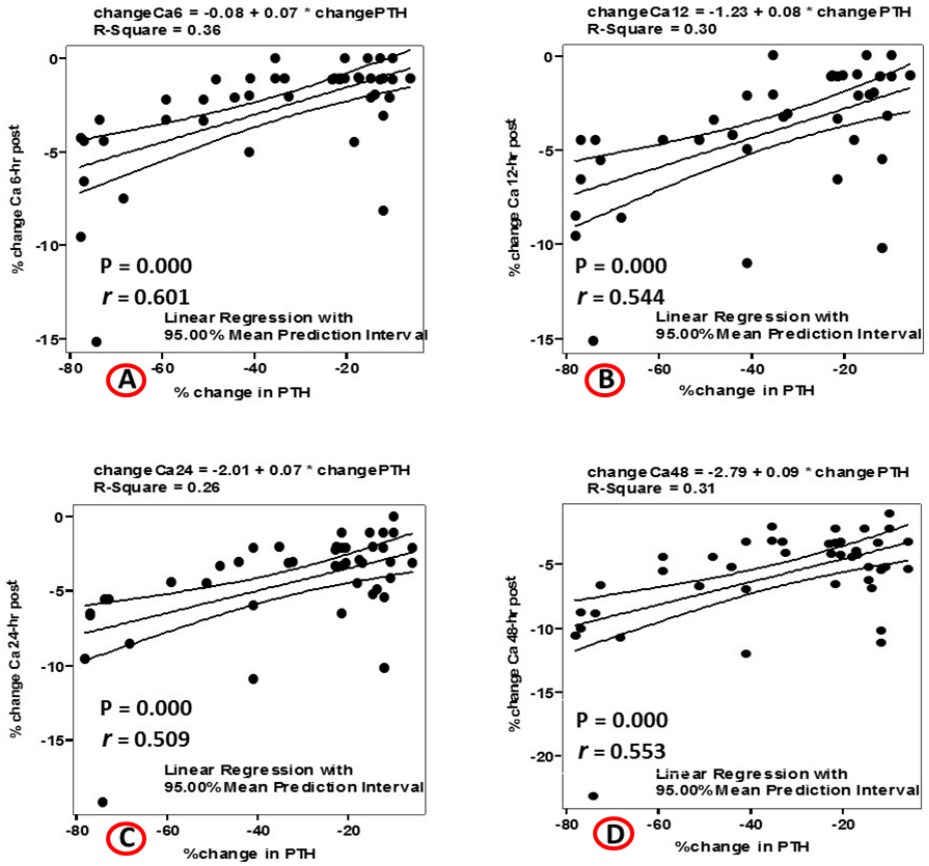

Figure 2: Correlations between thyroidectomy post-operative % change in serum parathyroid hormone level with serum calcium at 6 (A), 12 (B), 24 (C) and 48-hour (D) post-operative.

Discussion

Postoperative hypocalcemia is an important and common complication following thyroid surgery. It has a widely different reported incidence from 1.6 - 59%[11]. In most instances it is usually a reversible condition but sometimes it persists due to irreversible damage to the parathyroids[4]. In this study the incidence of hypocalcemia was 20% and only 4% developed permanent hypocalcemia. Reportedly, hypocalcemia was evident in 24.8% of cases and 11% of them showed signs and/or symptoms[12]. Also, the present study showed a statistically significant association between postoperative hypocalcemia and the indication for surgery as seen in thyroidectomy for toxic goiter and thyroid carcinoma. This may be explained by technical difficulties and more extensive surgery. On the contrary, other thyroid pathologies, gender and age did not show any statistically significance association. Kumar and Kumar[13], Nahas et al[14] and Abboud et al[4] reported a higher incidence of hypocalcemia following thyroidectomy for malignancy and thyrotoxic goiter when compared to other thyroid diseases. Total thyroidectomy accompanied by neck or paratracheal lymph node dissection were significantly associated with the risk of transient hypocalcemia[15].

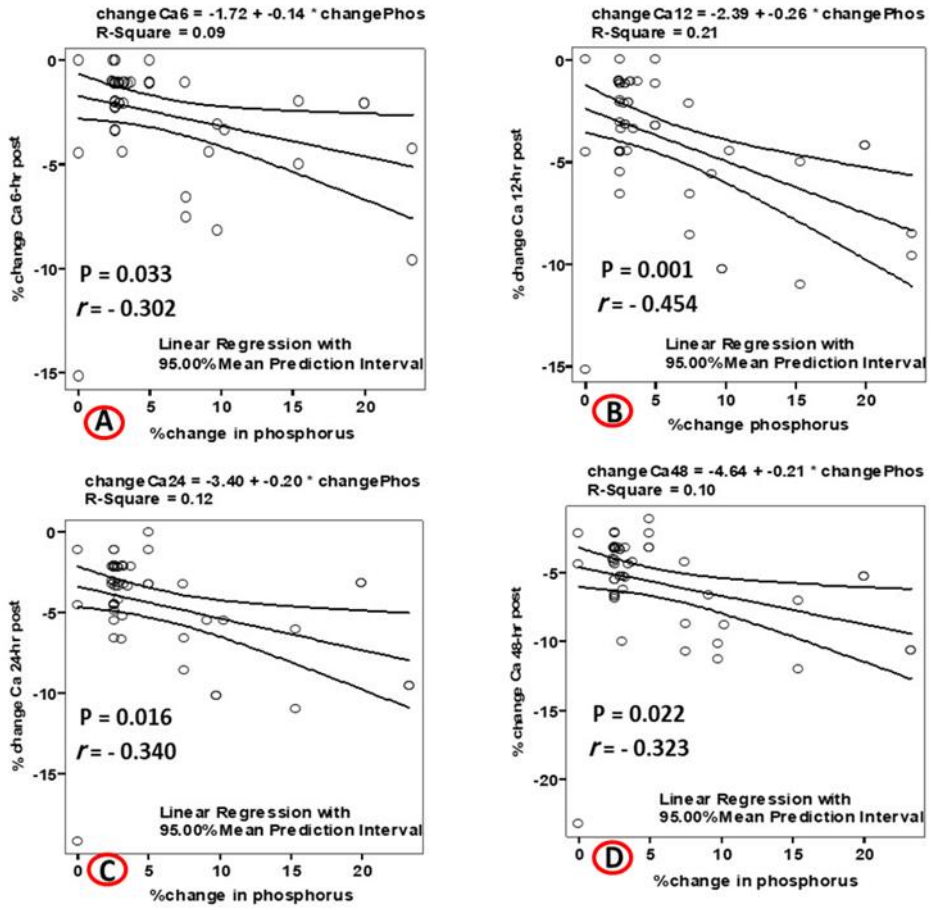

Figure 3: Correlations between thyroidectomy post-operative % change in serum phosphorus level with serum calcium at 6 (A), 12 (B), 24 (C) and 48-hour (D) post-operative.

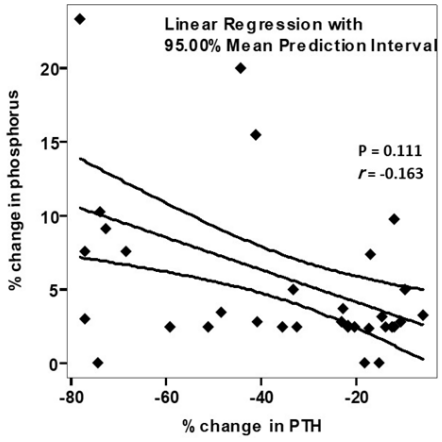

Figure 4: Correlations between thyroidectomy post-operative % change in serum phosphorus level with % change in serum parathyroid hormone (PTH) at 6-hour post-operative.

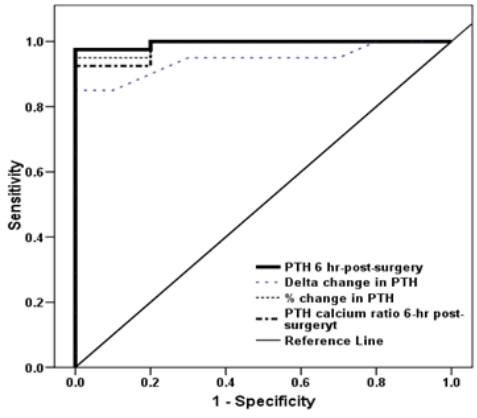

Figure 5: Calculated areas under the Receiver Operator Curve (ROC) for thyroidectomy 6-hour postoperative absolute, delta change and % change in serum PTH level and PTH: calcium ratio that were 0.995, 0.943, 0.990 and 0.985, respectively (see Table 4 for details).

Table 4: the Receiver Operator Curve (ROC) for thyroidectomy 6-hour postoperative absolute, delta change and % change in serum PTH level and PTH:calcium ratio.

Variable	P value	SEM	ROC	95% Confidence Interval	
				Upper Bound	Lower Bound
PTH at 6-hour	0.001	0.007	0.995	0.982	1.008
Delta change in PTH	0.001	0.032	0.943	0.880	1.005
% Change in PTH	0.001	0.010	0.990	0.970	1.010
PTH/calcium ratio at 6-hour	0.001	0.014	0.985	0.958	1.012

The incidence of hypocalcemia following thyroidectomy for multinodular goiter and thyroid cancer was not higher in other studies[12,16]. They attribute this to sufficient surgical experience and skills.

Variation in the prevalence of post-thyroidectomy hypocalcemia may also be attributed to the standard definition of hypocalcemia used. Hypocalcemia is widely defined by a low serum calcium levels that ranges from 7 - 8.5 mg/dL. However, different studies used various cutoff values, e.g., <7 mg/dL in the study of Landry et al[17], <7.5 mg/dL according to Graff et al[18], <8.0 mg/dL in Puzziello et al[19] and Reddy et al[20] studies, and, <8.5 mg/dL for Toniato et al[21] and Gupta et al[22]. In our study, we used the cutoff value of <8.4 mg/dL, similar to Sahli et al[23] and Hujoel[9], since the normal serum calcium range is 8.5 - 10.5 mg/mL[22]. Therefore, the lack of uniform definition of hypocalcemia affects the reporting of the changes of postoperative serum calcium and its correlations.

In this study, in cases with hypocalcemia, hypocalcemia was detected within the first 24 hours in 40% of cases and the remaining cases (60%) required longer post-operative time to be detected (>24 - 48 hours). In a previous study, hypocalcemia developed in 54% of cases within the first postoperative 24 hours[11]. Another study showed that time between the end of surgery and onset of hypocalcemia was less than 24 h in 19 (76%), between 24 – 48 h in 4 (16%) and ≥48 h in 2 (8%) patients[12].

The percent of change in PTH level at 6-hr independently predicted hypocalcemia by using multivariate binary regression analysis. Therefore, this could be used as an early predictor of postoperative hypocalcemia. In such cases, prophylactic oral calcium supplementation can be given even without symptoms of hypocalcemia. This strategy avoids patients the annoying symptoms of hypocalcemia and shortens the costs and hospital stay. Also, it avoids unnecessary calcium intake as a routine prophylaxis. The development of a rapid bedside test for PTH can help to practically use this predictor. Serum calcium level is easy and cheap marker to detect but of course it must follow the changes in PTH level. Sometimes the drop-in serum calcium may take 24-48 h to be evident. Therefore, PTH assay can be used as an early biomarker of hypocalcemia. Using postoperative PTH level to predict postoperative hypocalcemia has been used as a predictor in many studies[24-26]. A lot of debate is still raised about the perfect and the most reliable timing of postoperative PTH measurement. Carr et al[27] measured a single PTH level measurement at 4 h and concluded if the PTH is more than 10 pg/mL the patient will not require routine postoperative calcium supplementation. Sywak et al[28] prospectively studied 100 patients after total thyroidectomy and measured PTH levels at 4 and 23 hours. There was no significant difference that could increase the reliability of one of them as a predictor of hypocalcemia. Kim et al[28] measured PTH at 0, 6, 12, 24, 48 and 72 h in 108 cases of thyroidectomy and showed that at 6 hours postoperative is the most suitable and early predictor of hypocalcemia.

Conclusion

Following total thyroidectomy, hypocalcemia happened in 20% of our patients. Hypocalcemia affects the postoperative course; delaying patient discharge and increasing the costs. Serum PTH can early predict postoperative hypocalcemia but there is a lot of debate about the timing at which it gives a high predictivity of hypocalcemia. PTH level

at 6 hours postoperative time point was a strong predictor of hypocalcemia. We can recommend giving only selected cases with significant risk of hypocalcemia prophylactic calcium replacement not as a routine avoid overtreatment. Owing to the debate about the most suitable time for assessing PTH level and its relatively higher cost in relation to serum calcium test, in the future, we hope for the development of a rapid, simple, bed-side test for PTH quantification that can magnify its optimal utilization as predictor.

Limitations of the Study

- This study was limited by the small number of participants.
- Long-term follow up is needed.
- Changes in color or accidental excision or the histopathological assessment of accidentally removed parathyroid were not considered.
- The operative time and its correlation to the postoperative hypocalcemia were not assessed.

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Conflict of Interests

The authors declared no conflict of interests.

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Supplement 1:

Table A: Coordinates of the ROC Curve: Test Result Variable(s): PTH 6-hour post-surgery. a = the smallest cutoff value is the minimum observed test value minus 1, and the largest cutoff value is the maximum observed test value plus 1. All the other cutoff values are the averages of two consecutive ordered observed test values.

Positive if Greater Than or Equal To (a)	Sensitivity	1 - Specificity
6.900	1.000	1.000
7.950	1.000	0.900
8.250	1.000	0.800
8.750	1.000	0.700
9.250	1.000	0.500
9.600	1.000	0.400
9.850	1.000	0.300
13.500	1.000	0.200
18.000	0.975	0.200
19.500	0.975	0.000
21.500	0.875	0.000
24.000	0.850	0.000
26.000	0.775	0.000
28.000	0.700	0.000
29.500	0.400	0.000
30.500	0.350	0.000
32.000	0.250	0.000
33.500	0.150	0.000
34.500	0.100	0.000
37.500	0.050	0.000
41.000	0.000	0.000

Table B: Coordinates of the ROC Curve: Test Result Variable(s): Delta change in PTH 6-hour post-surgery. The test result variable(s): Delta PTH has at least one tie between the positive actual state group and the negative actual state group.

Positive if Greater Than or Equal To (a)	Sensitivity	1 - Specificity
-33.0000	1.000	1.000
-30.5000	1.000	0.800
-28.7500	0.950	0.700
-27.9000	0.950	0.600
-27.1500	0.950	0.500
-26.2500	0.950	0.400
-22.7500	0.950	0.300
-18.5500	0.850	0.100
-16.5500	0.850	0.000
-15.0000	0.750	0.000
-12.0000	0.675	0.000
-9.5000	0.650	0.000
-8.5000	0.600	0.000
-7.5000	0.450	0.000
-6.5000	0.400	0.000
-5.5000	0.350	0.000
-4.5000	0.250	0.000
-3.5000	0.100	0.000
-2.5000	0.050	0.000
-1.0000	0.000	0.000

Table C: Coordinates of the ROC Curve: Test Result Variable(s): % change in PTH 6-hour post-surgery.

Positive if Greater Than or Equal To (a)	Sensitivity	1 - Specificity
-79.0488	1.000	1.000
-77.5958	1.000	0.800
-77.0849	1.000	0.700
-75.6930	1.000	0.600
-74.0714	1.000	0.500
-73.3205	1.000	0.400
-70.6286	1.000	0.300
-63.7918	1.000	0.200
-55.2329	0.950	0.200

-49.8834	0.950	0.000
-46.4646	0.925	0.000
-42.8105	0.875	0.000
-41.1011	0.825	0.000
-38.2906	0.800	0.000
-34.4444	0.750	0.000
-32.9457	0.700	0.000
-27.8175	0.675	0.000
-22.9021	0.625	0.000
-22.1744	0.600	0.000
-21.0672	0.500	0.000
-19.3473	0.450	0.000
-17.8409	0.425	0.000
-17.2866	0.400	0.000
-16.2289	0.375	0.000
-15.0452	0.350	0.000
-14.2495	0.300	0.000
-13.1466	0.275	0.000
-12.3106	0.225	0.000
-11.4660	0.150	0.000
-10.4054	0.100	0.000
-8.0303	0.050	0.000
-5.0606	0.000	0.000

Coordinates of the ROC Curve: Test Result Variable(s): PTH/calcium ratio 6-hour post-surgery.

Positive if Greater Than or Equal To (a)	Sensitivity	1 - Specificity
90.8605	1.000	1.000
92.4419	1.000	0.900
96.5116	1.000	0.800
102.9412	1.000	0.600
108.1737	1.000	0.500
110.9797	1.000	0.400
115.2709	1.000	0.300
156.1147	1.000	0.200
198.6317	0.975	0.200
207.3040	0.950	0.200
214.4586	0.925	0.200
219.6605	0.925	0.100
224.1015	0.925	0.000
228.5789	0.900	0.000
239.9425	0.875	0.000
259.4086	0.825	0.000
284.4086	0.775	0.000
301.6854	0.750	0.000
304.3170	0.725	0.000
306.8869	0.650	0.000
310.1693	0.600	0.000
314.7375	0.575	0.000
319.9346	0.550	0.000
324.0325	0.475	0.000
329.5880	0.400	0.000
335.1449	0.350	0.000
338.9328	0.275	0.000
347.8739	0.225	0.000
360.2151	0.175	0.000
367.5783	0.150	0.000
370.1759	0.125	0.000
379.8377	0.100	0.000
391.0737	0.075	0.000
414.0205	0.050	0.000
435.7826	0.000	0.000

Original Article

Assessment of Knowledge, Attitude and Practice of Epistaxis among the Population in Different Regions in Saudi Arabia

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Abstract

Background: First aid preserves life and decreases the consequences of illness and injury. Epistaxis (nasal bleeding) has been reported to occur in up to 60% of the general population.

Objectives: We aimed at evaluating knowledge, attitude and practice of the Saudi general population about first aid in the management of epistaxis - considering the socio-demographic characteristics.

Participants and Methods: This observational cross-sectional study was conducted over a period of three months. It voluntarily enrolled 1475 Saudi Arabian participants. The data were collected through an online published and previously validated structured survey about knowledge, attitude and practice of epistaxis.

Results: Most of the participants were female (69.2%). It was found that 81% (n = 1195) of the studied participants had previous experience of exposure to nasal bleeding. Regarding their attitude towards first aid management, 52.21% of them changed the position of head by tilting the head forward and downward, and, 32.18% found that 5-10 minutes was sufficient to stop bleeding. Regarding practice, 58.5% found that they can stop it by pressing the nose, 56.3% by blocking the nose with napkin or piece of cotton, and, 52.4% by putting ice. The total practice and attitude score above median was 71.7% with a mean of 11.486 ± 1.673. The overall total knowledge score was 64%. It was found that age, gender and previous exposure to nasal bleeding affected the total knowledge score.

Conclusion: The overall total knowledge score was good among Saudi Arabian population. Being exposed to previous nasal bleeding affected the total score of knowledge, attitude and practice of exposed participants. We recommend that the knowledge of how to deal with epistaxis is important, and therefore raising public awareness is needed.

Key Words: Knowledge, Attitude, Practice, Epistaxis, First aid.

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Introduction

Epistaxis or nasal bleeding is one of the very common conditions which had been reported to affect nearly 60% of general population and is more common among young adults and children while is very rare in neonate[(1)]. It is caused by either systemic or local causes, the systemic causes included high arterial blood pressure, coagulopathy, vascular disorders, especially hereditary hemorrhagic telangiectasia (HHT) and blood dyscrasias as hematologic malignancies. Local causes involve infection in upper airway, nasal allergic rhinitis, nasal foreign bodies, vigorous nose blowing and deviated or perforated nasal septum[(2)]. Nasal bleeding (epistaxis) occurs in both of the anterior and

posterior part of the nose. Anterior epistaxis usually arises from the rich arterial anastomoses of the nasal septum (Kiesselbach's plexus). This type is the most common and is more common in children and young adults[3], while posterior epistaxis (bleeding from the nasal cavity) is common in old age[4].

Management of patients with epistaxis at any age group begins with resuscitating the patient, detecting the site of bleeding and treatment of the underlying cause[5]. Since most of cases of epistaxis occur out of hospital setting, it is essential for the population to know and understand some of the first aid measures for management of epistaxis - as it is important to reduce the morbidity and mortality[6]. An Indian study assessed knowledge, attitude and practice (KAP) about epistaxis among school students and concluded that there is the essential need for health education programs among students and teachers about first aid measures[7]. Khan et al, 2010[8], reported the inadequate knowledge among universities students in Pakistan and revealed the need for increasing awareness early in school to decrease the incidence of accidents and morbidities. In Saudi Arabia, Almulhim et al, 2017[9] measured KAP about epistaxis among general population and revealed good knowledge about methods of first aid measures and the mean KAP score was good. Knowledge about first aid management and other conditions related to methods of controlling any emergencies is essential to increase the public responsibility and strengthens their role in the society[10].

Although several previous studies assessed the management of epistaxis, there are limited studies assessing KAP of the general population of first aid measures toward epistaxis. The aim of this study was to assess KAP of first aid management of epistaxis among general population of Saudi Arabia & relate them to socio-demographic characteristics of participants.

Participants and Methods

This is an observational cross-sectional study that had been conducted over a period of 3 months from the beginning of October to the end of December 2018. The questionnaire was undertaken by Saudi Arabian participants. The sample was 1475 individuals and comprised persons voluntarily willing to participate and ≥18 years old of both genders who agreed to fill the online informed consent and the questionnaire. Those who were under 18 years old, those unable to fill the questionnaire were excluded from the study. Ethical approval for this study was obtained from ethical review committee of King Abdullah Medical City, Makkah, Saudi Arabia (approval number 19-575). Incompletely-filled questionnaires were excluded from the study. The Sample was conventional sample, and selection of sample done randomly. Once sample size had been completed, the application form was closed.

Sample size was calculated using EPI INFO (Epidemiological Information Package) version (21) 3.5.3. statistical packages assuming that the frequency is (20%) at a confidence interval of 95% and power of 80%. Distribution of sample done according to World bank 2019 reports about Saudi Arabia population as Riyadh represented in central region in the biggest city followed by Jeddah, Makkah and Madinah cities that represented the western region are the second, third and fourth biggest cities in population according to this, these regions represented nearly more than two thirds of sample.

Data collection:

Data were collected through an online published and validated self-administrated questionnaire after obtaining permission to use from Alyahya et al, 2018[11] about KAP of epistaxis among general population in Saudi Arabia applied in a Google form and uploaded on the internet through public page on Twitter, Facebook, and WhatsApp applications.

For the standardized self-administrated questionnaire, Cronbach's Alpha test was used to measure consistency of the questionnaire and a reliability of coefficient of 0.706 was considered to be accepted. Back translation technique was used; as the English version was translated by an expert to Arabic and then back translated into English, to avoid

language barrier. Both original and back translated copies were compared to give the same meaning. A pilot study was carried out on 10% of the sample (148 participants) that was excluded from the results. Some modification had been done by adding and rearranging some questions accordingly. The self-administrated questionnaire included three sectors. 1) First sector included socio-demographic characteristics like; Age, gender, educational level, nationality and previous exposure to nasal bleeding. 2) Second sector included 13 close-ended questions for those who were previously exposed to nasal bleeding about their practice and attitude towards management of the emergency nasal bleeding without hospital setting. The practice questions were focused on the methods used to stop or control the epistaxis, the proper head position of use and using any moisturizer to the nose. Beside two attitude questions regarding the participant's opinion regarding stopping or reducing smoking in-case of being a smoker and if he/she had nasal bleeding, when he/she think should go to emergency department. And, 3) Third sector included six questions measuring the participants' knowledge towards management of epistasis (Table 4). Those questions were regarding when should the patient seek for medical advice after nasal bleeding, and whether chronic diseases, some medications, nasal injury or trauma, or hot weather can increase the risk of nasal bleeding and what constitutes a large amount of nasal bleeding. We classified the studied participants to those who correctly answered more than 50% of questionnaire (named as experienced group) and those who correctly answered less than 50% of the questionnaire (named as inexperienced group).

Scoring of the questionnaire:

Each question was given two points for answer (yes), one for answer (I don't know) and zero for answer (no). For the 2nd, 3rd, 6th and 8th practice questions and the two attitude questions, two points were given for the correct answer and zero was given for the incorrect answer. The total score above median of >60% was considered to be a good knowledge, attitude and practice.

Data Analysis:

The collected data were coded and analyzed by using the software program, Statistical Package for Social Science (version 20, SPSS Inc., Chicago, IL). Quantitative variables were expressed as the mean ± standard deviation (SD) while the qualitative variables were expressed as frequencies; number (n) and percentage (%). ANOVA test was used for comparing mean of more than two groups and student-t test was used for comparing mean between two groups. The results were considered statistically significant at P value <0.05.

Results

Most of the studied participants were female (69.2%), (60.1%) had bachelor's degree, and, only one percent were illiterate (Table 1). It was found that 81% (n = 1195) of the studied participants had previous experience of exposure to nasal bleeding and correctly answered more than 50% of the questionnaire. This indicated that 81% of the studied participants were considered to be experienced and 19% were considered to be inexperienced (Figure 1 and Table 1).

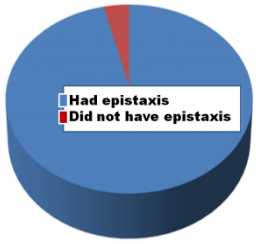

Figure 1: The distribution of studied participants regarding previous experience of epistaxis (n = 1475).

The 1195 studied participants that had experience with nasal bleeding stated different methods for managing the bleeding. 58.5% found that they can stop it by pressing the nose, 56.3% by blocking the nose with napkin or piece of cotton and 52.4% by putting ice. The majority of participants stopped the bleeding by changing the position of the head, where, 52.21% of them tilted the head forward and downward, and 32.18% found that 5-10 minutes is sufficient to stop bleeding after pressing the nose, and, about stopping smoking most of them were non-smoker (84.2%). The total

practice and attitude score was 71.7% above the median with a mean of 11.486 ± 1.673 (Figure 2 and Table 2).

Table 1: Basic characteristics of the studied participants (n = 1475 for all = 100%). Data shown are frequency; n and %.

Characteristics		n	%
Age, Years	>18	264	17.9
	>26	374	25.4
	>36	350	23.7
	>45	487	33
Gender	Male	455	30.8
	Female	1020	69.2
Education	Illiterate	15	1
	Basic School degree	67	4.5
	High school degree	302	20.5
	Bachelor's degree	887	60.1
	Postgraduate degree	204	13.8
Regions	North	131	8.9
	South	76	5.2
	Central	368	24.9
	Western	782	53
	Eastern	118	8
Did you, or any one you known, previously have epistaxis?	Yes	1195	81
	No	280	19

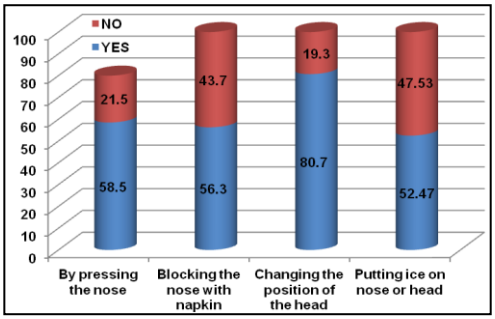

Figure 2: The distribution of the studied participants regarding their major approach to manage nasal bleeding (n = 1195).

The total score of basic knowledge about first aid measurement was 64% above the median which is considered to be a good level of knowledge (Table 3 & Figure 3).

Regarding basic knowledge about how to deal with a case of nasal bleeding, experienced group showed highly significantly better knowledge compared to the inexperienced group in all questions (P <0.001) (Table 4).

It was found that gender and age were significant factors that affected the total knowledge score (P = 0.04 and <0.001, respectively), also previous exposure to nasal bleeding affect the total knowledge score (Table 4 & 5).

By comparing the knowledge, attitude and practice mean scores regarding different regions of the country, there was significant difference regarding knowledge (P = 0.026) and no significant difference regarding practice and attitude (P = 0.087) (Table 6).

Discussion

This cross-sectional study assessed knowledge, attitude & practice of general population about first aid and management of epistaxis among Saudi Arabian population. The study included 1475 participants from different regions of Saudi Arabia. Most of them were female (69.2%). Most of female had bachelor degree and postgraduate degree. The majority of participants stopped the bleeding by changing the position of the head and 52.21% of them properly tilted the head forward and downward. However, only 33.69% demonstrated the correct area of pinching the nose.

Alyahyha et al, 2018[11] conducted a study to evaluate knowledge, attitude and practice of medical students in Kingdom of Saudi Arabia about first aid management of nasal bleeding through online structured questionnaire. Majority of them were females (75.7%). They found that 71% of them identified the correct position of the head and 41.3% of the participants identified the correct site for pinching the nose. A study done by Albouq et al, 2017[12], showed that 80.6%

of the participants revealed the correct position by holding the head forward and downward rather than backward and 73.6% specified the sufficient time needed to stop bleeding, while, 44.3 % of respondents identified the correct site for pinching the nose. The study of Aljuaid et al, 2018[13] showed 56.9% stop epistaxis by leaning forward.

Table 2: Practice and attitude of the experienced participants about the first aid management of the emergency nasal bleeding outside the hospital setting (n = 1195). Data shown are frequency; n and %.

Items		n	%
Have you tried to stop the bleeding or control it by pressing the nose?	Yes	870	72.8
	No	257	21.5
	I don't know	68	5.7
	Total	1195	100.0
Did you pinch the nose as first aid measure to stop bleeding? (which part)	Upper part	575	66.09
	Lower part	295	33.90
	Total	870	100.0
Time of pressing	Less than 5 min	561	64.48
	5-10 min	280	32.18
	10-20 min	19	2.183
	More than 20 min	10	1.149
	Total	870	100.0
Did you try to stop bleeding by blocking the nose with a Napkin, cotton or gauze?	Yes	673	56.3
	No	522	43.7
	Total	1195	100.0
Did you try to stop or control bleeding by changing the position of the head?	Yes	965	80.7
	No	230	19.3
	Total	1195	100.0
What is the proper position helping to stop epistaxis?	Tilting the head forward & downward	624	52.21
	Tilting the head backward	557	46.61
	Tilting the head side	14	1.17
	Total	195	100
Did you try to stop or control bleeding by putting ice on nose or head?	Yes	627	52.47
	No	568	47.53
	Total	1195	100.0
Did you use other methods to stop bleeding?	No	1063	88.95
	Water	84	7.02
	Lemon	32	2.68
	Vinger	14	1.17
	Cucumber	2	0.167
	Total	1195	100
Did you expose to re-bleeding again within 1 week?	Yes	379	31.7
	No	596	49.9
	I don't know	220	18.4
	Total	1195	100.0
Did you try to moisturize the nose with ointment or greasy drops?	Yes	298	24.9
	No	897	75.1
	Total	1195	100.0
Do you think reducing smoking rate decreases the nasal bleeding?	Yes	46	24.3
	No	143	75.3
	Non-smoker	1006	84.2
	Total	1195	
When you have nasal bleeding, when do you think you should go to the emergency department?	In any case	147	10
	Bleeding >20 min	694	47.1
	Bleeding >40 min	227	15.4
	Bleeding >60 min	115	7.8
	I don't know	292	19.8
	Total	1475	100.0
Total Score; mean ± SD (% >Median)	11.486 ± 1.673 (71.7%)		

Table 3: Distribution of the studied participants regarding knowledge and awareness about epistaxis (n = 1475 for all = 100%). Data shown are frequency; n and %.

Items		n	%
When should the patient seek medical advice after nasal bleeding?	In any case	147	10
	Bleeding >20 min	694	47.1
	Bleeding >40 min	227	15.4
	Bleeding >60 min	115	7.8
	I don't know	292	19.8
Chronic diseases increase risk or the likelihood of nasal bleeding?	Yes	656	44.47
	No	90	6.10
	I don't know	729	49.42
Some medications increase the likelihood of occurrence of nasal bleeding?	Yes	636	43.12
	No	90	6.10
	I don't know	749	50.77
Nasal injury or trauma increases the incidence of nasal bleeding?	Yes	650	44.47
	No	140	6.10
	I don't know	370	49.42
Hot weather increases the incidence of nasal bleeding?	Yes	1129	76.54
	No	110	7.46
	I don't know	236	16
What constitutes a large amount of bleeding (epistaxis)?	Quarter cup	375	25.4
	One-third cup	148	10
	Half Cup	204	13.8
	Two-third cup	44	3
	Full Cup	70	4.7
	More than cup	53	3.6
	I don't know	581	39.4
Total Score (% >median of 5)	64%		

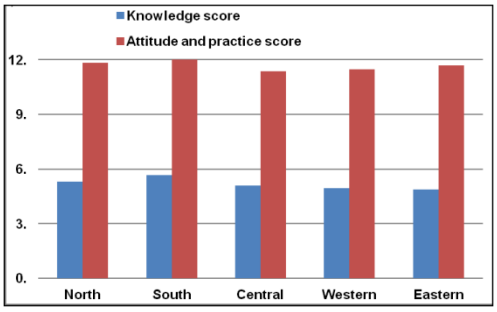

Figure 3: The mean total scores of knowledge, attitude and practice of epistaxis management regarding different Regions.

A study done in Saudi Arabia assessed knowledge regarding first aid measures about epistaxis among 70 clinical staffs. Most of the respondents were nurses. 97% revealed pinching of the nose as first aid management. However, only 38.1% demonstrated the correct site for pinching nose and 76.1% reported the correct position of the head by leaning forward[14]. It is noted that most of the participants in this study and other studies had previous information about first aid measures by pinching the nose. However, a minority knew the correct site of pinching. This may be contributed to lack of knowledge among participants.

In our study, the overall score of total practice and attitude among experienced participants was 8.286 ± 1.47. Another Saudi study conducted by Almulhim et al, 2017[11] reported a mean practice and attitude score of 8.25 ± 1.9. In the current study, knowledge was measured by a set of six questions including factors that may increase the risk of epistaxis. The experienced group showed a significantly higher knowledge score than inexperienced group. Regarding the total knowledge score of the studied participants, we found that 64% of participants had good knowledge above median level. Moreover, being experienced with nasal bleeding was a significant factor to affect the total knowledge score. Also gender and age were significant factors. This may be explained by higher rate of epistaxis among young age and female. However we cannot detect the actual prevalence of epistaxis as it is self-limited disease and most of episodes are not recorded[15]. Almulhim et al, 2017[11] revealed nonsignificant association between age

and the total knowledge score among 1114 Saudi participants, while gender and previous exposure to epistaxis were factors that can influence the total score. Khan et al, 2010[8] in Pakistan, showed very low total mean score of knowledge about first aid measurements of 40.3% among undergraduate students.

In comparison, Saleem et al, 2018[16] reported poor knowledge of the first aid management of epistaxis among Saudi population through survey where only 47% of the respondents had previous information about management of epistaxis. Nevertheless, Asiri et al, 2017[17] and Alshehri et al, 2019[18] reported good knowledge and attitude among most of the participants as their sample subjects were medical and high school students.

Table 4: Comparison between experienced vs. inexperienced participants regarding basic knowledge and awareness about epistaxis. Data shown are frequency; n and %, and P values.

Items		Experienced n (%)	Inexperienced n (%)	P
When you have nasal bleeding, when do you think you should go to emergency department?	In any case	99 (8.3)	48 (17.3)	0.001
	Bleeding >20 min	585 (49)	109 (38.9)	
	Bleeding >40 min	174 (14.6)	53 (18.9)	
	Bleeding >60 min	96 (8)	19 (6.8)	
	I don't know	241 (20.2)	51 (18.2)	
	Total	1195 (100)	280 (100)	
Do you think some chronic diseases increase risk or the likelihood of occurrence of nasal bleeding?	Yes	507 (42.4)	149 (53.2)	0.001
	No	44 (3.7)	44 (15.7)	
	I don't know	644 (53.9)	87 (31.1)	
	Total	1195 (100)	280 (100)	
Do you think some medication increase the likelihood of occurrence of nasal bleeding?	Yes	503 (42.1)	135 (48.2)	0.001
	No	48 (4)	42 (15)	
	I don't know	644 (53.9)	103 (36.8)	
	Total	1195 (100)	280 (100)	
Do you think nasal injury or trauma increases the incidence of nasal bleeding?	Yes	790 (66.1)	173 (61.8)	0.001
	No	96 (8)	44 (15.7)	
	I don't know	309 (25.85)	63 (22.5)	
	Total	1195 (100)	280 (100)	
Do you think that the hot weather increases the incidence of nasal bleeding?	Yes	955 (79.9)	174 (62.1)	0.001
	No	69 (5.8)	41 (14.6)	
	I don't know	171 (14.3)	65 (23.2)	
	Total	1195 (100)	280 (100)	
In your opinion, what constitutes a large amount of nasal bleeding?	Quarter cup	320 (26.8)	55 (19.6)	0.015
	One-third cup	112 (9.4)	36 (12.9)	
	Half cup	159 (13.3)	45 (16.1)	
	Two-third cup	32 (2.7)	12 (4.3)	
	Full cup	50 (4.2)	20 (7.1)	
	More than cup	42 (3.5)	11 (3.9)	
	I don't know	480 (40.2)	101 (36.1)	
	Total	1195 (100)	280 (100)	
Total Score (mean ± SD)		5.623 ± 1.57	5.009 ± 1.39	0.006

Table 5: Comparison between basic knowledge and awareness about epistaxis stratified for gender and age. Data shown are % above median, mean ± SD, and P values for t-test (for gender) and one way ANOVA (for age).

Items		Total Knowledge Score		P
		Mean ± SD	% >median	
Gender	Male	5.1667 ± 1.601	62.6%	0.040
	Female	5.0789 ± 1.368	64.6%	
Age	>18	5.4537 ± 1.105	81.4%	0.001
	>26	5.2299 ± 1.614	64.3%	
	>36	4.9167 ± 1.511	57%	
	>45	4.9703 ± 1.341	60.6%	

Table 6: Comparison between basic knowledge, attitude and practice score about epistaxis stratified for different geographical regions of Saudi Arabia. Data shown are mean ± SD, and F and P values.

Items		Provenance area	F	P
		Mean ± SD		
Knowledge score	Northern	5.314 ± 0.356	2.780	0.026
	Southern	5.667 ± 1.407		
	Central	5.104 ± 1.439		
	Western	4.955 ± 1.426		
	Eastern	4.882 ± 1.740		
Attitude and practice score	Northern	11.854 ± 1.799	2.036	0.087
	Southern	12.00 ± 1.0955		
	Central	11.354 ± 1.744		
	Western	11.487 ± 1.673		
	Eastern	11.706 ± 1.685		

Conclusion

The overall total knowledge score, regarding first aid and management of nasal bleeding, was good among Saudi Arabian participants. Being exposed to previous nasal bleeding affected the total score of attitude and practice but not the knowledge score. Gender (female) and younger age significantly affected the total knowledge score. The southern region had significantly higher knowledge and awareness score than the other regions.

Limitations of the Study

One of limitation of this study is being conveniently sampled and hence may not represent the whole country. There was a gender bias towards females; being more than two folds of male number.

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Conflict of Interests

The authors declared no conflict of interests.

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Corresponding author. The corresponding author should be indicated in addition with a superscript asterisk * immediately after his/her affiliation superscript Arabic number. The corresponding author will handle correspondence at all stages of refereeing, publication, and post-publication. Contact details must be kept up to date by the corresponding author.

Present/permanent address. If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript lower-case letters are used for such footnotes.

Abstract

Page 2 of the typescript should be reserved for the abstract which should be presented in a structured format and should not exceed 350 words. The following headings should be included for research articles followed by a colon: a) Background, b) Hypothesis/Objectives: c) Materials/Patients and Methods: d) Results: e) Conclusions (should be data justified). Suitable headings could be used for other types of publications (Case reports, Review articles, etc.).

A concise and factual abstract is required. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided. Non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

Keywords

Immediately after the abstract, provide a maximum of 10 keywords for full papers, or 5 keywords for Short Communications, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, "and", "of"). Please use terms from the most current issue of medical subject headings of Index Medicus. The key words should cover precisely the contents of the submitted paper and should give readers sufficient information as to the relevance of the paper to his/her particular field. Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

Introduction

Provide adequate background that highlights the importance and gap information of your research point in relation to previous studies but avoiding a detailed literature survey. State the hypothesis or rationale and objectives of the work and a brief description of how you planned to approach them.

Materials or Patients and Methods

Provide sufficient detail to allow the work to be reproduced, with details of supplier and catalogue number when appropriate. Methods already published should be indicated by a reference: only relevant modifications should be described.

Patients and Normal Subjects

If human participants were used in the experiment please make a statement to the effect that this study has been approved by your Institution Ethics Review Board for human studies (the number of the approval should be stated in the methods section and JUMJ may ask for submission of the original ethical approval with the manuscript), and, that patients or their custodians have signed an informed consent that also states right of withdrawal without any consequences. Sample sized should be appropriately calculated. The manuscript should describe how the size of the experiment was planned. If a sample size calculation was performed this should be reported in detail, including the expected

difference between groups, the expected variance, the planned analysis method, the desired statistical power and the sample size thus calculated. For parametric data, variance should be reported as 95% confidence limits or standard deviations rather than as the standard error of the mean. Normal participants and patients criteria, inclusion and exclusion criteria should be stated. Name and address where the work was done and when it was done (time period, from …. to …..) should be clearly stated, too.

Experimental animals

When animals were used in the experiments, a local Institutional Ethics Review Board for animal studies should review and approve the experiment and that all animal procedures were in accordance with the standards set forth in guidelines for the care and use of experimental animals by Committee for Purpose of Supervision of Experiments on Animals (CPCSEA) and according to National Institute of Health (NIH) protocol. The precise species, strain, sub-strain and source of animals used should be stated. Where applicable (for instance in studies with genetically modified animals) the generation should also be given, as well as the details of the wild-type control group (for instance littermate, back cross etc.). The manuscript should describe the method by which animals were allocated (randomized) to experimental groups, particularly for comparisons between groups of genetically modified animals (transgenic, knockout etc.), the method of allocation to for instance sham operation or focal ischemia should be described.

Experimental

Provide sufficient detail to allow the work to be reproduced. Methods already published should be indicated by a reference: only relevant modifications should be described. Where and when the study was conducted should be stated.

Results

Results should be clear and concise. Data should be presented in an appropriately organized tables, figures and/or artworks. The statistical analysis used should be suitable for the objectives of the study and type of data analyzed. Prospective authors are highly advised to consult a biostatician.

Footnotes

Footnotes should be used sparingly. For table footnotes, indicate each footnote in a table with a superscript lowercase letter or add them into the title.

Graphical abstract

A Graphical abstract is optional and should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership online. Authors must provide images that clearly represent the work described in the article. Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. It is preferable to be inserted at its normal place to the relevant text or otherwise be submitted as a separate TIFF, EPS, PDF or MS Office files.

Discussion

This should explore the significance, interpretation and reasoning of the results of the work vs. other studies. Do not repeat describing the results in this section. A combined Results and Discussion section is acceptable. Avoid extensive citations and discussion of published literature. In the same time, avoid speculations without a supporting literature. Avoid discussion based on "Data not Shown" or "Personal Communications".

Limitations and Future Prospective

The authors may wish to pinpoint the limitations of the study and their reason and foresee the next step to go from their study. This may be presented in a short Limitations and Future Prospective section standing alone or as a separate paragraph in the Discussion or Results/Discussion section.

Conclusions

The main conclusions of the study may be presented in a short Conclusions section standing alone or as a separate paragraph at the end of the Discussion or Results/Discussion section. Conclusions should not be biased and should be based on the data, presented and discussed inside the manuscript only.

Gain of Knowledge

Following the conclusion section, it is mandatory for manuscripts submitted for final publication in JUMJ to have a Gain of Knowledge section that is consisted of 2 - 5 bullet points (maximum 90 characters, including spaces, per bullet point) that convey the core findings of the article.

Acknowledgements and Funding

Collate acknowledgements in a separate section at the end of the article before the references. List individuals or organizations that provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.). Whoever would

be acknowledged should be informed and a verification for that could be requested by JUMJ Editor. If funded, the source of funding should be mentioned.

Appendices

If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly, for tables and figures: Table A.1; Fig. A.1, etc.

CASE REPORT WRITING TEMPLATE

Title. Include the words "case report" in the title. Describe the phenomenon of greatest interest (e.g., symptom, diagnosis, diagnostic test, intervention, and outcome).

Abstract. Summarize the following information if relevant: 1) Rationale for this case report, 2) Presenting concerns (e.g., chief complaints or symptoms, diagnoses), 3) Interventions (e.g., diagnostic, preventive, prognostic, therapeutic exchange), 4) Outcomes, and 5) Main lesson(s) from this case report.

Key Words. Provide 3 - 8 key words that will help potential readers search for and find this case report.

Introduction. Briefly summarize the background and context of this case report.

Presenting Concerns. Describe the patient characteristics (e.g., relevant demographics - age, gender, ethnicity, occupation) and their presenting concern(s) with relevant details of related past interventions.

Clinical Findings. Describe: 1) the medical, family, and psychosocial history including lifestyle and genetic information; 2) pertinent co-morbidities and relevant interventions (e.g., self-care, other therapies); and 3) the physical examination (PE) focused on the pertinent findings including results from testing.

Timeline. Create a timeline that includes specific dates and times (table, figure, or graphic).

Diagnostic Focus and Assessment. Provide an assessment of the; 1) diagnostic methods (e.g., PE, laboratory testing, imaging, questionnaires, referral), 2) diagnostic challenges (e.g., financial, patient availability, cultural), 3) diagnostic reasoning including other diagnoses considered, and, 4) prognostic characteristics (e.g., staging) where applicable.

Therapeutic Focus and Assessment. Describe: 1) the type(s) of intervention (e.g., preventive, pharmacologic, surgical, lifestyle, self-care) and 2) the administration and intensity of the intervention (e.g., dosage, strength, duration, frequency.

Follow-up and Outcomes. Describe the clinical course of this case including all follow-up visits as well as 1) intervention modification, interruption, or discontinuation, and the reasons; 2) adherence to the intervention and how this was assessed; and 3) adverse effects or unanticipated events. In addition, describe: 1) patient-reported outcomes, 2) clinician-assessed and -reported outcomes, and 3) important positive and negative test results.

Discussion. Please describe: 1) the strengths and limitations of this case report including case management, 2) the literature relevant to this case report (the scientific and clinical context), 3) the rationale for your conclusions (e.g., potential causal links and generalizability), and 4) the main findings of this case report: What are the take-away messages?

Patient Perspective. The patient should share his or her experience or perspective of the care in a narrative that accompanies the case report whenever appropriate.

Informed Consent. Did the patient or their custodian give the author of this case report informed consent? Provide if requested .

Case Report Submission Requirements: 1) Competing interests, are there any competing interests? 2) Ethics Approval, Did an ethics committee or institutional review board review give approval? If yes, please provide if requested, 3) De-Identification, has all patient's related data been de-identified?

RANDOMIZED CLINICAL TRIALS WRITING TEMPLATE

In this particular type of original study, individuals are randomly allocated to receive or not receive a preventive, therapeutic, or diagnostic intervention and then followed up to determine the effect of the intervention. All randomized clinical trials should include a flow diagram and authors should provide a completed randomized trial checklist (see CONSORT Flow Diagram and Checklist; http://www.consort-statement.org) and a trial protocol.

Authors of randomized controlled trials are encouraged to submit trial protocols along with their manuscripts.

All clinical trials must be registered (before recruitment of the first participant) at an appropriate online public that must be independent of for-profit interest, e.g.:

- http://www.clinicaltrials.gov;
- http://www.anzctr.org.au;

- http://www.umin.ac.jp/ctr;
- http://isrctn.org;
- http://www.trialregister.nl/trialreg/index.asp).

Each manuscript should clearly state an objective or hypothesis; the design and methods (including the study setting and dates, patients or participants with inclusion and exclusion criteria, or data sources, and how these were selected for the study); the essential features of any interventions; the main outcome measures; the main results of the study; a comment section placing the results in context with the published literature and addressing study limitations; and the conclusions.

Data included in research reports must be original. A structured abstract not exceeding 300 words is required. Clinical trials are limited to 2700 words (not including abstract, tables, figures, and references), 40 references, and no more than 5 tables and figures.

REVIEW, MINIREVIEW AND META-ANALYSIS PAPERS

These papers will not have empirical data acquired by the authors but will include historical perspectives, analysis and discussion of papers published and data acquired in a specific area.

Systematic reviews and meta-analyses are a particular type of original articles that perform systematic, critical assessment of literature and data sources pertaining to clinical topics, emphasizing factors such as cause, diagnosis, prognosis, therapy, or prevention. All articles or data sources should be searched for and selected systematically for inclusion and critically evaluated, and the search and selection process should be described in detail in the manuscript. The specific type of study or analysis, population, intervention, exposure, and tests or outcomes should be described for each article or data source. A structured abstract of less than 300 words is required. The text is limited to 3500 words (not including abstract, tables, figures, and references); about 4 tables (a flow diagram that depicts search and selection processes as well as evidence tables should be included) - and no reference limit.

Minireview is a brief historical perspective, or summaries of developments in fast-moving areas covered within the scope of the journal. They must be based on published articles; they are not outlets for unpublished data. They may address any subject within the scope of the journal. The goal of the minireview is to provide a concise very up-to-date summary of a particular field in a manner understandable to all readers.

SHORT COMMUNICATION AND SHORT RESEARCH ARTICLE

Short Communications are urgent communications of important preliminary results that are very original, of high interest and likely to have a significant impact on the subject area of the journal. A Short Communication needs only to demonstrate a 'proof of principle'. Authors are encouraged to submit an Original Research Paper to the journal following their Short Communication. There is no strict page limit for a Short Communication; however, a length of 2500-3500 words, plus 2-3 figures and/or tables, and 15-20 key references is advisable. Short Research Article may be smaller single-result findings as a brief summary that include enough information, particularly in the methods and results sections, that a reader could understand what was done.

POLICY PAPER

The purpose of the policy paper is to provide a comprehensive and persuasive argument justifying the policy recommendations presented in the paper, and therefore to act as a decision-making tool and a call to action for the target audience.

COMMENTARIES/OPINION ARTICLES

An opinion-based article on a topical issue of broad interest, which is intended to engender discussion.

STUDY PROTOCOLS AND PRE-PROTOCOLS

JUMJ welcomes publishing protocols for any study design, including observational studies and systematic reviews. All protocols for randomized clinical trials must be registered and follow the CONSORT guidelines; ethical approval for the study must have been already granted. Study pre-protocols (i.e., discussing provisional study designs) may also be submitted and will be clearly labeled as such when published. Study protocols for pilot and feasibility studies may also be considered.

METHOD ARTICLES

These articles describe a new experimental or computational method, test or procedure, and should have been well tested. This includes new study methods, substantive modifications to existing methods or innovative applications of existing methods to new models or scientific questions. We also welcome new technical tools that facilitate the design or performance of experiments or operations and

data analysis such as software and laboratory and surgical devices, or of new technologies to assist medical diagnosis and treatment such as drug delivery devices.

Maximum length of submissions

Full length original research articles should not exceed 10000 words (maximum 60 references), and up to 6 tables and/or figures.

Short communications comprising up to 1800 words of text, maximum 15 references, and two illustrative items (Tables and/or Figures).

Letters and Case Reports (provide novel insight into disease mechanisms, diagnostic and management applications). *Clinical Laboratory Notes* (technical evaluation or important insight into analytical methodology), or *Letters to the Editor* (focused on a specific article that has appeared in JUMJ within 4 weeks of print issue date of article). For all 3 types of letters listed above, the text should not exceed 600 words, with no abstract, a maximum of 1 table or figure and up to 5 references.

Review Articles, Surveys, Essays, and Special Reports may exceed the word and reference limit for Full-length articles as per the comprehensive nature of these articles. However, both of these articles (Reviews and Special Reports) will still require an abstract (unstructured, 350 word maximum).

Editorials, Meeting summary, Commentaries, Book review and Opinion pieces will not require an abstract and will be limited to 2000 words and up to 20 references. A book review is a brief critical and unbiased evaluation of a current book determined to be of interest to the journal audience. Publication of a submitted book review is at the discretion of the editor.

Artwork

General points

Make sure you use uniform lettering and sizing of your original artwork. Preferred fonts: Arial (or Helvetica), Times New Roman (or Times), Symbol, Courier. Number the illustrations according to their sequence in the text. Use a logical naming convention for your artwork files. Indicate per figure if it is a single, 1.5 or 2-column fitting image. For Word submissions only, you may still provide figures and their captions, and tables within a single file at the revision stage.

Formats

Regardless of the application used, when your electronic artwork is finalized, please 'save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below). Please do not supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); the resolution is too low, supply files that are too low in resolution, and, submit graphics that are disproportionately large for the content.

- EPS (or PDF): Vector drawings. Embed the font or save the text as 'graphics'.
- TIFF (or JPG): Color or grayscale photographs (halftones): always use a minimum of 300 dpi.
- TIFF (or JPG): Bitmapped line drawings: use a minimum of 1000 dpi.
- TIFF (or JPG): Combinations bitmapped line/half-tone (color or grayscale): a minimum of 500 dpi is required.

Color artwork

Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF), or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures the Journal will ensure that these figures will appear in color on the Web regardless of whether or not these illustrations are reproduced in color in the printed version. Because of technical complications which can arise by converting color figures to 'gray scale' please submit in addition usable black and white versions of all the color illustrations.

Figure captions

Ensure that each illustration has a caption (Legend). A caption should comprise a brief title below the figure that describes its content and not to be general. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used in the legend. Figure caption should stand for itself (self-explanatory) without the need for consulting the text.

Tables

Number tables consecutively in accordance with their appearance in the text. Place footnotes to tables below the table body and indicate them with superscript lowercase letters within the table. If necessary, such footnotes could be placed at the end of the table title. Avoid vertical rules. Be sparing in the use of tables and ensure that the data presented in tables do not duplicate results described elsewhere in the article (Figures or text). The table caption (Title) should be brief but describes its content and not to be general. Explain all symbols and abbreviations used in the table in the footnote. Table title should stand for itself (self-explanatory) without the need for consulting the text. The table structure should be scientifically organized

(columns and rows) and its message should be easily comprehendible.

The Editor-in-Chief, on accepting a manuscript, may recommend that additional tables and/or graphs containing important backup data, too extensive to be published in the article, may be published as supplementary material. In that event, an appropriate statement will be added to the text. However, the author should submit such material for consideration with the manuscript.

References

References cited should be relevant, up-to-date and adequately cover the field without ignoring any supportive or conflicting publications. Please ensure that every reference cited in the text is also present in the reference list (and vice versa). If present, unpublished results and personal communications may be mentioned in the text and not in the reference list. Citation of a reference as 'in press' implies that the item has been accepted for publication and shows up on PubMed literature search or a copy of the title page of the relevant article must be submitted. DOI of the references - whenever applicable should be presented. Authors are encouraged to cite primary literature rather than review articles in order to give credit to those who have done the original work.

Reference management software

This journal has standard templates available in key reference management packages EndNote (http://www.endnote.com/support/enstyles.asp) and Reference Manager (http://refman.com/support/rmstyles.asp). Using plug-ins to word processing packages, authors only need to select the appropriate journal template when preparing their article and the list of references and citations to these will be formatted according to the journal style, which is described below.

Reference formatting

There are no strict requirements on reference formatting at submission but should be consistent, complete and up-to-date. Where applicable, author(s) name(s), chapter title/article title, journal title/book title, year of publication, volume number-issue number/book chapter and the pagination must be present. For the book reference, the edition number, editors (if they are not the authors), publisher and its main address (City and Country) should be added as described below in the example. The reference style used by the journal should be applied to the accepted article at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct. Use peer-reviewed references only except for national and international organizational reporting and registers. If you do wish to format the references yourself, they should be arranged according to the following examples:

Reference style

Indicate references by number(s) in curved brackets as a bolded superscript at the end of the cited text(s) before the full stop, e.g., ……. shorter hospital stay and lower cost**(20)**. The actual authors can be referred to, but the reference number(s) must always be given. Number the references in the list in the order in which they appear in the text. The authors list should not be shortened, all authors' names should be mentioned up to 10 authors and end longer list by et al. For further details you are referred to 'Uniform Requirements for Manuscripts submitted to Biomedical Journals' (J Am Med Assoc 1997; 277: 927-34) (see also http://www.nlm.nih.gov/bsd/uniform_requirements.html).

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1. Van der Geer J, Hanraads JAJ, Lupton RA. The art of writing a scientific article. J. Sci. Commun., 2010;163(1):51-9.
2. Leta S, Dao TH, Mesele F, Alemayehu G. Visceral Leishmaniasis in Ethiopia: An Evolving Disease. PLoS Negl Trop Dis., 2014; 8(9):e3131;1-7.
3. Arjmand MH, Ahmad Shah F, Saleh Moghadam M, Tara F, Jalili A, Mosavi Bazaz M, Hamidi Alamdari D. Prooxidant-antioxidant balance in umbilical cord blood of infants with meconium stained of amniotic fluid. Biochem Res Int., 2013;2013:ID270545;1-4.
4. Teferra RA, Grant BJ, Mindel JW, Siddiqi TA, Iftikhar IH, Ajaz F, Aliling JP, Khan MS, Hoffmann SP, Magalang UJ. Cost minimization using an artificial neural network sleep apnea prediction tool for sleep studies. Ann Am Thorac Soc., 2018 Jul 28 (ahead of print).
5. Alduraywish AA, Almani AZ, Alanazi AD-A, Alruwaili FS, Alolaywi AN, Almaeen AH, El-Metwally TH. Vitamin D insufficiency among healthy participants

and type 2 diabetic patients from the northern Al-Jouf region of Saudi Arabia: Correlation with the prognostic indices of the disease. International Medical J, 2019 (Accepted for publication; http://www.seronjihou.co.jp/imj/).

Reference to a book: Strunk Jr W, White EB (Editors). The elements of style, 4th Edition, Longman, New York; 2000, pp. 210-9.

Reference to a chapter in an edited book: Mettam GR, Adams LB. How to prepare an electronic version of your article. In: Jones BS, Smith RZ (Editors), Introduction to the electronic age, 1st Edition, E-Publishing Inc., New York, 2009, Chapter 2: pp. 281-304.

Reference to a homepage: It is acceptable to refer to an Organizational Guidelines, Reports, Forms, Data sheets, Questionnaires, etc. It should follow the following format. World Health Organization. Non-communicable Diseases (NCD) Country Profile, 2014 (http://www.who.int/globalcoordinationmechanism/publications/ncds-country-profiles-eng.pdf; last accessed March 1, 2017).

Journal abbreviations source

Journal names should be abbreviated according to the List of Title Word Abbreviations: http://www.issn.org/services/online-services/access-to-the-ltwa/.

Abbreviations and units

Standard abbreviations as listed in the Council of Biology Editors Style Manual may be used without definition. Use non-standard abbreviations sparingly, preceding their first use in the text with the corresponding full designation. Use units in conformity with the standard International System (SI) of units.

Video data

The journal accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. To ensure that your video or animation material is directly usable, please provide the files in one of our recommended file formats with a preferred maximum size of 50 MB. Video and animation files supplied will be published online in the electronic version of your article. Since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

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JUMJ encourages authors to create an Audio Slides presentation with their published article as supplementary material. This gives authors the opportunity to summarize their research in their own words and to help readers understand what the paper is about. Authors of this journal will automatically receive an invitation e-mail to create an Audio Slides presentation after acceptance of their paper.

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Each supplementary material file should have a short caption which will be placed at the bottom of the article, where it can assist the reader and also be used by search engines.

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Submission checklist

The following list will be useful during the final checking of an article prior to sending it to the journal for review. Please consult this Guide for Authors for further details of any item.

To avoid unnecessary errors, you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details for all authors:

- E-mail address.
- Full postal address.
- Telephone.

All necessary files have been uploaded, and contain:

- Keywords.
- All figures and their captions.
- All tables (including title, description, footnotes).

Further considerations:

- Manuscript has been 'spell-checked' and 'grammar-checked'.
- All references mentioned in the Reference list are cited in the text, and vice versa.
- Permission has been obtained for use of copyrighted material from other sources (including the Web).
- Color figures are clearly marked as being intended for color reproduction on and in print, or to be reproduced in color electronically and in black-and-white in print.

PEER REVIEW PROCESS

High quality manuscripts are peer-reviewed by minimum of two peers of the same field along with a biostatistician in the case the study requires. Pre-reviewing advice and help will be provided by the Editor-In-Chief on first submission for initial improvements to meeting the minimum criteria of peer-reviewing. The journal follows strict double-blind fold constructive review policy to ensure neutral evaluation. During this review process identity of both the authors and reviewers are kept hidden to ensure unbiased evaluation. A cycle of one-month reviewing process is the target of the journal from submission to final acceptance. For meeting this goal, the Editor-In-Chief is expecting strict compliance from author hastening corrections and replying editorial requests. Continuous post-publication open peer reviewing is highly encouraged through submitting comments to the Editor on any of the published article that will show up with author reply in the subsequent issue to the journal.

The reviewers' comments are sent to authors once received. With the help of the reviewers' comments, FINAL decision (accepted or accepted with minor revision or accepted with major revision or rejected) will be sent to the corresponding author. Reviewers are asked if they would like to review a revised version of the manuscript. The editorial office may request a re-review regardless of a reviewer's response in order to ensure a thorough and fair evaluation.

In order to maintain this journal's mission of one-month publication cycle, authors are encouraged to submit the revised manuscript within one week of receipt of reviewer's comment (in case of minor corrections). However, revised manuscript submission should not go beyond 2 weeks (only for the cases of major revision which involves additional experiment, analysis etc.). Along with corrected manuscript authors will be requested to submit filled a point-by-point answers to the reviewers' comments and any rebuttal to any point raised. The Editor-In-Chief of the journal will have exclusive power to take final decision for acceptance or rejection during any dispute.

Under special circumstance, if the review process takes more time, author(s) will be informed accordingly. The editorial board or referees may re-review manuscripts that are accepted pending revision. Manuscripts with latest and significant findings will be handled with the highest priority so that it could be published within a very short time. The journal is determined to promote integrity in research publication. In case of any suspected misconduct, the journal management reserves the right to re-review any manuscript at any stages before final publication.

Our massage to JUMJ potential reviewers says "Although the Manuscript General Evaluation Form is attached, we like to instigate a policy of constructive reviewing and to do our best to make the submitted manuscripts publishable - provided that it is genuine and contain no major frauds of republication, duplicate use of self-data or plagiarism of intellectual properties of the others. Please, make your changes and insert your corrections, comments and suggestions directly into the manuscript text but in a different color. Please also make sure that the author(s) presented an inclusive and updated list of genuine references, applied proper statistics and extracted justified conclusions".

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The Manuscript Assigned Number and Title: ……..

Although the following manuscript general evaluation form is sent to reviewers, JUMJ asks the reviewer for further meticulous one-

word-at-a-time revision, please. Please insert corrections, changes, suggestions, questions, comments and points of deficiency directly into the manuscript text but in a different color. Also, please do not worry much for the formatting.

The Manuscript Evaluation Score: Please, score the manuscript from 0 to 4 (highest) for each of the following items, and sum the total score. Please, also check if the statistics of the results require revision.

Items / Scores	0	1	2	3	4	Item Score
The Study is a Priority Problem						
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Significance of the Work						
Research Design						
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Standard and Reproducible Methodology						
Results Presentation and Appropriate Statistics						
Relevant Discussion and Justified Conclusions						
Tables/ Illustrations/ Figures						
References: Inclusive and Updated						
Total score						
Requires Statistical Revision (Mark Please)				Yes		No

Justification for Decision & Feedback for the Author (REQUIRED): JUMJ recommends the reviewer to introduce such justifications and feedback into the text at the appropriate places within the manuscript (Specific and Comprehensive Revision).

Note to the Editor (WELCOMED): JUMJ welcomes reviewer writing a note to the Editor including conflict of interest that will not be disclosed to the Author(s).

The Decision: Should JUMJ publish the manuscript? Please, check the appropriate box.

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