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ALAbyar University of Benghazi

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مجلة آفاق للدراسات
الإنسانية والتطبيقية
كلية الآداب والعلوم الإيبار
جامعة بنغازي
العدد: الثاني — أغسطس 2024



Study about hypothyroidism in Al-Marj city

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Abstract:

Hypothyroidism is one of the most common chronic endocrine conditions. However, as symptoms of hypothyroidism are non-specific, up to 60% of those with thyroid dysfunction are unaware of their condition. Left untreated, hypothyroidism may contribute to other chronic health conditions. This study aimed to determine distribution, determinants, and relation of some demographic characteristics of people in the El-Marj city in occurring of hypothyroidism. The research was carried in EL-Marj city, which is located in north eastern Libya. It lies in an upland valley separated from the Mediterranean Sea by a range of hills, part of the Jebel Akhdar Mountains.

Cross sectional study, Study units were sample of 139 hypothyroidism patients attending endocrinological clinics in El-Marj city in Libya. Data were collected by means of a semi-structured (Appendix I) questionnaire developed in Arabic language. The study is conducted during period from 1/4/2021 to 1/6/2021. During the period of the survey, 139 hypothyroidism patients attending endocrinological clinics in El-Marj city in Libya completed the questionnaire. The distribution of participant according to show most period of age in the study is (45-59 y) 50 %. Interestingly, the female is the predominant sex for occurring of this disease 93 %. Hypothyroidism is a common and often under diagnosed disease in the Libya in general countries. The prevalence of hypothyroidism varies with age, sex and co-morbidities such as diabetes and rheumatoid arthritis.

Keywords: Hypothyroidism, Thyroid gland, El-Marj-Libya.

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دراسة حول قصور الغدة الدرقية في مدينة المرج

¹قاسم محمد عطية عبدالله، ²عبدالله علي حامد القاسي، ³صلاح محمد علي عبدالجليل، ⁴رجب سعيد مفتاح مشاظمي.

1، 2، 3، 4. قسم المختبرات الطبية، المعهد العالي للعلوم والتقنيات الطبية - المرج - ليبيا

المخلص

قصور الغدة الدرقية هو أحد أمراض الغدد الصماء المزمنة الأكثر شيوعاً. ومع ذلك، نظراً لأن أعراض قصور الغدة الدرقية غير محددة، فإن ما يصل إلى 60٪ من المصابين بخلل في الغدة الدرقية لا يدركون حالتهم. إذا ترك قصور الغدة الدرقية دون علاج فقد يساهم في الإصابة بحالات صحية مزمنة أخرى. هدفت هذه الدراسة إلى تحديد توزيع ومحددات وعلاقة بعض الخصائص الديموغرافية لسكان مدينة المرج في حدوث قصور الغدة الدرقية. تم إجراء البحث في مدينة المرج الواقعة شمال شرق ليبيا. تقع في وادي مرتفع منفصل عن منطقة المرج، كان نوع الدراسة مقطعية، كانت وحدات الدراسة عينة مكونة من 139 مريضاً يعانون من قصور الغدة الدرقية الذين يترددون على عيادات الغدد الصماء في مدينة المرج في ليبيا. تم جمع البيانات عن طريق استبيان شبه منظم (الملحق الأول) تم تطويره باللغة العربية. تجرى الدراسة خلال الفترة من 2021/4/1 إلى 2021/6/1 خلال فترة المسح، قام 139 من مرضى قصور الغدة الدرقية الذين يترددون على عيادات الغدد الصماء في مدينة المرج في ليبيا بإكمال الاستبيان. توزيع المشاركين حسب معظم فترات العمر في الدراسة هو (45-59 سنة) ومن المثير للاهتمام أن الأنثى هي الجنس السائد لحدوث هذا المرض بنسبة 93%. قصور الغدة الدرقية هو مرض شائع وغالباً ما لا يتم تشخيصه في ليبيا بشكل عام. يختلف انتشار قصور الغدة الدرقية باختلاف العمر والجنس والأمراض المصاحبة مثل مرض السكري والتهاب المفاصل.

الكلمات المفتاحية: قصور الغدة الدرقية، الغدة الدرقية، المرج -ليبيا.

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INTRODUCTION:

Thyroid hormones act on almost all nucleated cells and are essential for normal growth and energy metabolism, **(Dumont, et.al., 2011)**. Thyroid dysfunction is common, readily identifiable and easily treatable, but if undiagnosed or untreated, it can have profound adverse effects. **(Chaker, et.al., 2017)**... Despite an increase in thyroid disease awareness and the availability of sensitive laboratory assays for the measurement of thyroid hormones, cases of extreme thyroid dysfunction occasionally still occur. **(Taylor, et.al., 2015)**. Hypothyroidism and hyperthyroidism commonly arise from pathological processes within the thyroid gland (primary thyroid disease), although in rare cases, they can arise from disorders of the hypothalamus or pituitary (central hypothyroidism) or from peripheral causes, such as Struma ovarii, or functional thyroid cancer metastases. **(Persani, 2011)**

In iodine replete populations, thyroid dysfunction is most commonly due to thyroid autoimmunity. The autoimmune thyroid disorders comprise Graves disease, Hashimoto thyroiditis and postpartum thyroiditis, in which the presence of circulating thyroid-specific auto-reactive antibodies is characteristic. Solitary or multiple autonomous nodule formation within the thyroid gland are also frequent causes of hyperthyroidism, while less common causes include thyroid gland inflammation or thyroiditis and adverse effects of medication, such as amiodarone and lithium. Both iodine deficiency and excess can result in hypothyroidism as well as hyperthyroidism. **(Taylor, et.al., 2018)**.

The clinical presentation of thyroid disease is highly variable and often nonspecific; therefore, the diagnosis of thyroid dysfunction is predominantly based on biochemical confirmation. The complex inverse association between the pituitary-derived TSH and T4 and T3 renders TSH the more sensitive marker of thyroid status. **(Chadlow, et.al., 2013)**. Accordingly, overt hypothyroidism is defined by TSH concentrations above the reference range and free T4 levels below the reference range, while subclinical hypothyroidism is defined as TSH levels above the reference range when lev



els.of.free.T4.are.within.the.populati
on.reference.range.(Pearce,.et.al.,20
13)..Likewise,.the.reverse.hormone.p
attern.is.applied.in.the.definition.of.o
vert.(low.TSH.and.high.T4).and.subc
linical.hyperthyroidism.(low.TSH.an
d.normal.T4)..

Iodine.is.an.integral.componn
t.of.thyroid.hormones,.but.the.global
distribution.of.iodine.is.uneven,.mea
ning.some.areas.are.iodine.rich,.whil
e.other.are.iodine.deficient.(Zimmer
mann,.2009)..Over.a.billion.people.
worldwide.live.in.an.iodinedeficient.
area,.with.the.populations.at.greatest.
risk.residing.in.remote.mountainous.
egions,.such.as.in.Southeast.Asia,.So
uth.America.and.Central.Africa.(Van
derpump,.2011)..Population.differen
ces.in.iodine.nutrition.have.a.major.r
ole.in.the.global.prevalence.of.thyroi
d.dysfunction..Nodular.thyroid.disor
ders.are.more.prevalent.in.areas.wher
e.iodine.deficiency.is.more.common,
.while.autoimmune.thyroid.disorders,
.including.Hashimoto.thyroiditis.and.
Graves.disease,.occur.more.frequentl
y.in.iodinereplete.populations;howe
ver,.a.multitude.of.other.risk.factors,.
including.genetic.(Medici,.et.al.,201

4)and.ethnicsusceptibility.(Sichieri,.
et.al.,2007),.sex.(De.Groot,.et.al.,2
012),.smoking.status.(Wiersinga,.20
13),.alcohol.consumption.(Zimmer
mann,.2009),.presence.of.other.autoi
mmune.conditions.(Boelaert,.et.al.,
2010),.syndromic.conditions.(Pearce
,.et.al.,2017).and.exposure.to.some.t
herapeutic.drugs.(Shine,.et.al.,2015)
CLINICAL.PRESENTATION:

The.clinical.signs.and.sympto
ms.of.hypothyroidism.may.be.broad.
and.nonspecific.and.vary.from.paten
t.to.patient..Common.symptoms.incl
ude.fatigue,.menstrual.irregularities.a
nd.lack.of.concentration,.while.other.
symptoms.associated.with.hypothyro
idism.may.include.cold.intolerance,.c
onstipation.and.hair.loss,.among.othe
rs.(Islam,.et.al.,2017)..The.number.
of.these.symptoms.a.patient.has.refle
cts.the.degree.of.thyroid.dysfunction.
(Canaris,.et.al.,1997).

The.clinical.signs.of.hypothyro
idism.may.include.(but.are.not.limit
ed.to).oedema,.weight.gain,.goitre,.c
ognitive.impairment.and.delayed.rela
xation.phase.of.deep.tendon.reflexes.
.Laboratory.results.may.show.elevate
d.C-



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reactive.protein,.hyperprolactinaemia
,.hyponatraemia,.increased.creatine.k
inase,.increased.low-
density.lipoprotein.(LDL).cholesterol
,.increased.triglycerides,.normocytic.
anaemia.and.proteinuria.(**Ladenson,.
et.al.,2000**)..Possible.electrocardiogr
aphy.findings.include.bradycardia,.lo
w.voltage.and.flattened.T-
waves..Clinical.presentation.of.sever
e.hypothyroidism.can.be.confused.wi
th.septic.shock,.with.clinical.signs.in
cluding.pericardial.effusion,.pleural.e
ffusion,.haemodynamic.instability.an
d.coma.(**Islam,.et.al.,2017**).

.Management.of.Hypothyroidism:

....Currently,.the.treatment.of.choice.
for.hypothyroidism.is.levothyroxine.
sodium.due.to.its.efficacy,.favourabl
e.safety.profile,.ease.of.administratio
n,.good.intestinal.absorption,.long.se
rum.half-life.and.cost-
effectiveness.(**Verloop,.et.al.,2012.
and.Jonklaas,.et.al.,2014**)..Syntheti
c.levothyroxine.sodium.is.indicated.f
or.replacement.of.thyroid.hormones.i
n.primary,.secondary.or.tertiary.cong
enital.or.acquired.hypothyroidism..L
evothyroxine.acts.as.an.endogenous.t
hyroxine.once.absorbed.and.undergo

es.deiodination.to.the.biologically.act
ive.triiodothyronine.(T3).(Persani,.e
t.al.,2000.and.Abbott.Laboratories
,.2018)..Although.the.majority.of.pat
ients.with.hypothyroidism.respond.to
.levothyroxine.treatment,.some.indivi
duals.experience.persistent.symptom
s.despite.adequate.serum.thyroxine.c
orrection..The.combined.use.of.levo
thyroxine.and.liothyronine,.a.syntheti
c.form.of.T3,.has.been.investigated.i
n.patients.who.have.persistent.sympt
oms.of.hypothyroidism.with.levothyr
oxine.monotherapy;however,.there.i
s.inconsistent.evidence.of.the.superio
rity.of.combination.therapy.over.mon
otherapy.with.levothyroxine.(**Jonkla
as,.et.al.,2014**).

Levothyroxine.monotherapy.i
n.solid.formulation,.taken.on.an.empty
y.stomach,.is.the.treatment.of.choice.
.The.presence.of.clinical.features.of.
hypothyroidism,.with.biochemical.co
nfirmation.of.overt.hypothyroidism,i
s.the.indication.for.treatment.initiatio
n..No.rationale.exists.for.avoiding.th
e.prescription.of.generic.preparatio
but.switches.between.levothyroxine.
products.in.patients.who.are.stable.ar
e.not.recommended.(**Jonklaas,.et.al.**



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..(2014)..The optimal.daily.dose.in.ov
rt.hypothyroidism.is.1·51·8.µg.per.k
g.of.bodyweight..In.patients.with.cor
onary.artery.disease.,the.starting.dos
e.is.generally.12·525·0.µg.per.day.an
d.should.be.gradually.increased.on.th
e.basis.of.symptoms.and.TSH.conce
ntrations..This.regimen.is.often.prefe
rred.in.the.elderly.,especially.in.patie
nts.with.many.comorbidities.(Jonkla
as.,et.al.,2014)..In.younger.patients.
without.comorbidities.,the.full.dose.c
an.usually.be.given.from.the.start.wit
h.adequate.monitoring.to.avoid.overt
reatment..After.the.initiation.of.thera
py,
TSH.measurement.is.repeated.after.4
12.weeks.and.then.every.6.months.an
d.,once.stabilised.,annually..Adjustm
ents.should.be.made.according.to.lab
oratory.findings.,keeping.in.mind.tha
t.in.some.patients.(i.e.,those.with.lo
w.bodyweight.or.older.patients).smal
l.changes.in.dose.can.have.substantia
l.effects.on.serum.TSH.concentration
s..The.clinical.significance.of.low.trii
odothyronine.concentrations.in.some
.patients.despite.reaching.normal.TS
H.concentrations.is.unknown..Routin
e.measurement.of.triiodothyronine.sh

ould.not.be.used.to.assess.treatment.e
ffectiveness.(Abdalla.and.Bianco,2
014).

OBJECTIVE:

This.study.aimed.:

- 1.To..determine.distribution.,de
terminants.,and.relation.of.some.dem
ographic.characteristics.of.people.in.t
he.ElMarj.city.in.occuring.of.hypoth
yroidism.
- 2.To.idemtify.the.relationship.b
etween.the.age.and.hypothyrodism.
- 3.To.idemtify.the.relationship.b
etween.the.gender.and.hypothyrodisi
m.
- 4.To.idemtify.the.relationship.b
etween.the.family.history.and.hypoth
yrodism.
- 5.To.idemtify.the.relationship.b
etween.the.occupation.of.patients.an
d.hypothyrodism.
- 6.To.idemtify.the.relationship.b
etween.the.immunopathy..and.hypot
hyrodism.

METHODOLOGY

Materials.and.methods

1.Site.of.study.:the.research.was.car
ried.in.ELMarj.city.,which.is.located.
in.north.eastern.Libya...It.lies.in.an.u
pland.valley.separated.from.the.Medi



terranean.Sea.by.a.range.of.hills,.part
.of.the.Jebel.Akhdar.Mountains..It.ha
s.an.estimated.population.of.111370a
ccording.to.civilian.registry.of.the.cit
y.2012.

2.Type.of.study.:Cross.sectional.stu
dy

3.Units.of.the.study.:Study.units.w
ere.sample.of.139.hypothyroidism.pa
tients.attending.endocrinological.clin
ics.in.El-Marj.city.in.Libya..

4..Data.collection.:Data.were.collec
ted.by.means.of.a.semi-
structured.(Appendix.I).questionnair
e.developed.in.Arabic.language..

5..Study.period.:the.study.is.conduc
ted.during.period.from.1/4/2021.to.1/
6/2021

6..Statistical.analysis.:Descriptive.s
tatistics.as.mean,.median.and.mode.

were.used..Data.were.presented.in.fo
rm.of.tables.and.figures,.were.the.fig
ures.done.by.SPSS.version.21.and.ex
cel..

Results:

This.study.was.conducted.between.1/
4/2021.and.1/6/2021.in.endocrinolog
y.clinics.in.the.city.of.AL-Marj.-
.Libya.

From.the.data.recorded.in.table.(1).a
nd.fig..(1).It.is.clear.that.most
of.the.cases.observed.with.this.disea
se.were.aged.from.45..50.(17.%),50..55
.(16.%),.and.55..59.(17.%),.which.eq
uates.to.a.total.of.50%.from.the.age.o
f.45.to.59.There.are.only.3.cases.(2.2
.%)..out.of.139.who.were.infected.wi
th.the.hypothyroidism.from.birth.

Table.(1).Is.this.disease.from.birth?

		Frequency	Percent	Valid.Percent	Cumulative.Per cent
Valid	Yes	3	2.2	2.2	2.2
	No	136	97.8	97.8	100.0
	Total	139	100.0	100.0	

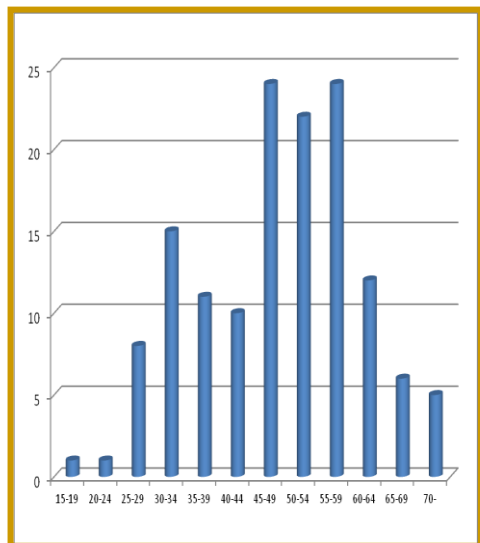


Figure.(1):.Distribution.of.the.sample .according.to.the.age.of.the.participant

From.the.inspection.of.the.dat a.presented.in.and.fig..(2),.the female .is.the.predominant.sex.for.occuring. of.this.disease.93.%,.while.the.perce ntage.of.men.infected.with.the.diseas e.did.not.exceed.7%,.out.of.a.total.of. 139.cases.of.thyroid.disorder.

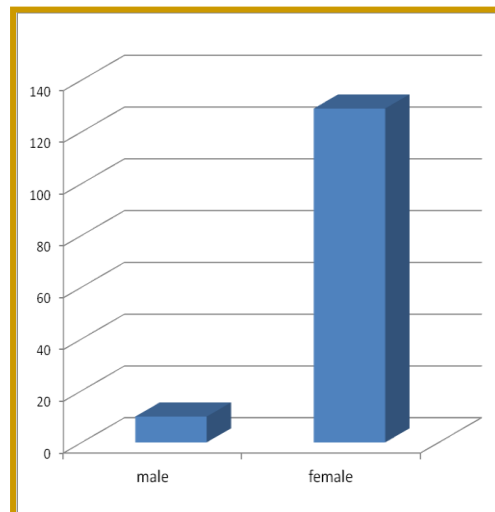


Figure.(2):.Distribution.of.the.sample .according.to.the.gender.of.the.partici pant

Data.recorded.for.the.any.imu nopathy.are.presented.in.table.(2).an d.fig..(3)it.was.found.that.diabetes.w as.present.in.36.cases.(25.9%).out.of .139.cases,.and.10.patients.(7.2%).h ad.rheumatoid.arthritis,.and.4.patient s.(2.9%).had.both.diseases.(diabetes. and.rheumatoid.arthritis),While.it.wa s.found.that.85.cases.(61.2%).did.no t.suffer.from.any.disease.associated. with.hypothyroidism.and.hyperthyroi dism,.With.1.case.(0.7%).abstaining. from.answering.

Table.(2)::If.there.is.any.immunopathy

		Frequency	Percent	Valid.Percent	Cumulative.Percent
Valid	Diabetes	36	25.9	25.9	26.6
	No	85	61.2	61.2	87.8
	no.answer	1	.7	.7	88.5
	Rheumatoid.arthritis	10	7.2	7.2	95.7
	Diabetes.and.Rheumatoi d.arthritis	4	2.9	2.9	98.6
	Other	2	1.4	1.4	100.0
	Total	139	100.0	100.0	

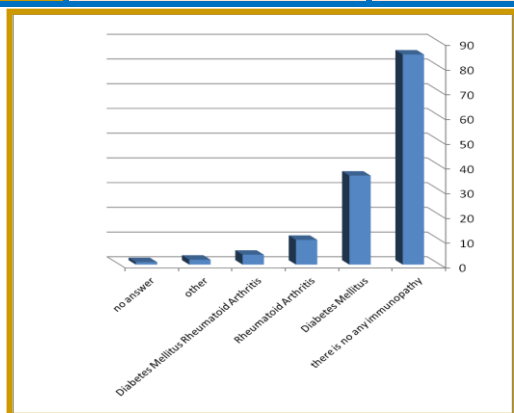


Figure.(3)::there.is.any.immu
nopathy.Out.of.a.total.of.139.cases,.1
24.case.(89.2%).were.found.to.have.
hypothyroidism,and.15.cases.(10.8%)
.were.found.to.be.suffering.from.hyp
erthyroidism,.As.shown.in.table.(3).a
nd.fig.(4)..

Table.(3).the.type.of.disease

		Frequency	Percent	Valid.Percent	Cumulative.Percent
Valid	Hypothyroidism	124	89.2	89.2	89.2
	Hyperthyroidism	15	10.8	10.8	100.0
	Total	139	100.0	100.0	

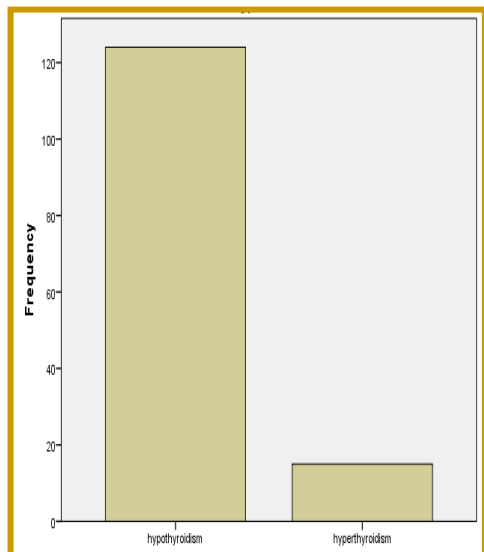


Figure.(4):.types.of.disease.In .this.study,.it.was.found.that.most.pat ients.with.thyroid.disorders.were.usi ng.the.same.treatment.(levothyroxin) .125.patients.(89.9.%),.which.is.cons idered.the.most.common.treatment.a mong.patients.with.hypothyroidism,. and.it.comes.in.second.place.(Carbi mazole5.mg)."tablets",.12.cases.(8.6 %),.and.two.patients.(1.4.%).also.did .not.give.any.answers,.as.recorded.in. table.(4).and.fig.(5).

Table.(4).the.type.of.treatment

		Frequency	Percent	Valid.Percent	Cumulative.Pe rcent
Valid		2	1.4	1.4	1.4
	Levothyroxine	125	89.9	89.9	91.4
	other.(Carbimazole.5.mg.Tablets)	12	8.6	8.6	100.0
	Total	139	100.0	100.0	

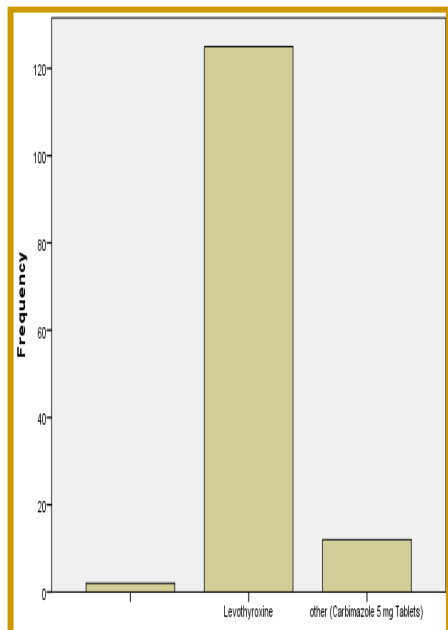


Figure.(5):.types.of.treatment

The study also showed that the incidence of the disease is high between 40-49 years old (almost 50 cases) at a rate of 36%, then those between the ages of 30-39 years (equivalent to 29 cases) at a rate of 21%. At a rate of 20% (about 28 cases) from the ages of 20-29 years, followed by a rate of approximately 15% (21 patients) from the ages of 50-59 years, a rate of 5.7% (8 cases) from the ages of 60-69 years, and finally at a rate of about 2.3% (3 cases) from the ages of 10-19 years.

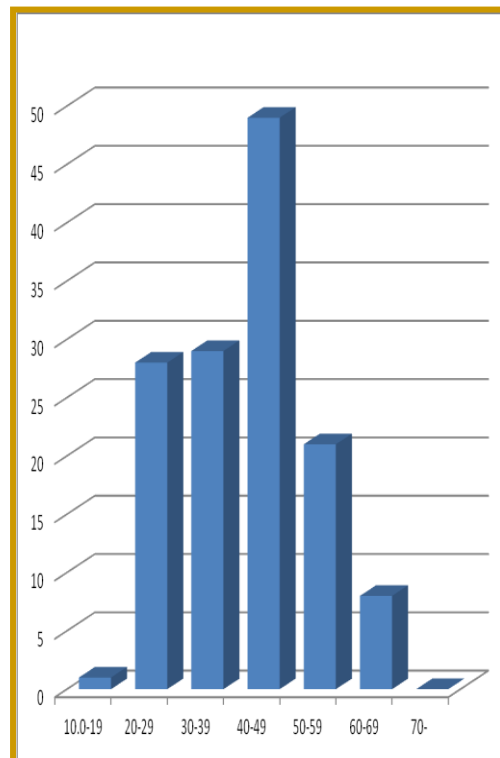


Figure.(6):.Distribution.of.the.sample according.to.the.answer.of.question(which.age.did.the.disease.start?)

From the scrutiny of the data presented in and fig. (7), the study also showed that 69% of the patients had no family history of hypothyroidism, while 25% of them had a mother who had the disease, at the same time it was found that 4.3% were related to the father, and 1.7% were related to both the father and the mother.

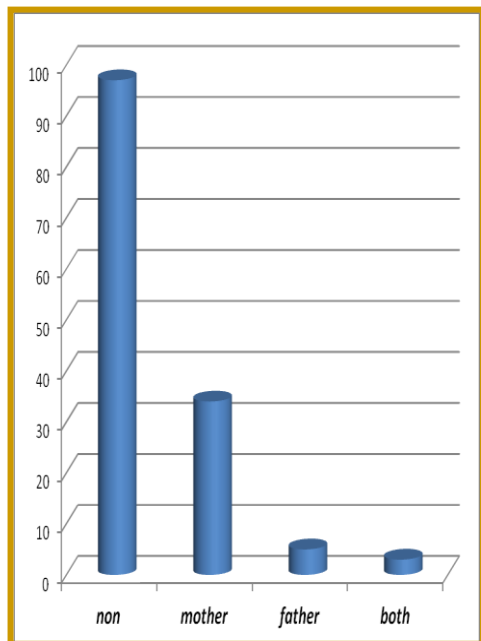


Figure.(7):.Distribution.of.the.sample .according.to.the.family.history.of.th e.disease

In.fig.(8).were.noticed.that.th e.year.in.which.the.highest.incidence .of.thyroid.disorders.was.recorded.w as.the.year.2017.(19.cases),.followed .by.the.year.2018.(18.cases), then.the.year.2019.(15.cases),.and.fol lowed.by.a.lower.percentage.in.the.y ear.2016.(12.cases).

A.much.lower.infection.rate. was.recorded.in.each.of.the.followin g.years(1981,.1994,.1991,.1995,.200

0,.2001,.2008,.and.finally.2021),.at.r ate.of.one.case.per.year.

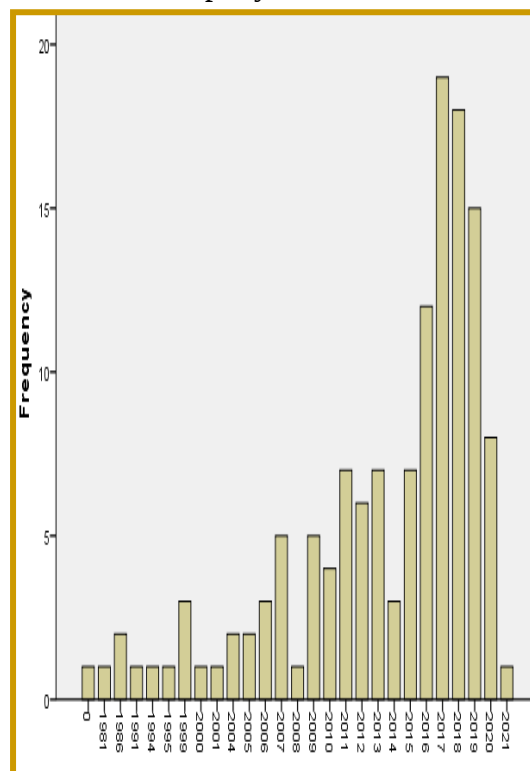


Figure.(8):.the.year.of.start.the.disease

The.study.also.included.an.ex planation.of.the.professions.most.fre quently.reported.in.cases,.and.the.res ults.showed.that.the.housewife.was.t he.most.affected,.with.a.rate.of.(43%),.followed.by.teachers,.with.a.rate.of (23.%)of.the.total.cases,.then.the.em ployee.(18.7%),.and.the.lowest.infec

tion.rate.was.among.laboratory.technicians.(1.4.%).

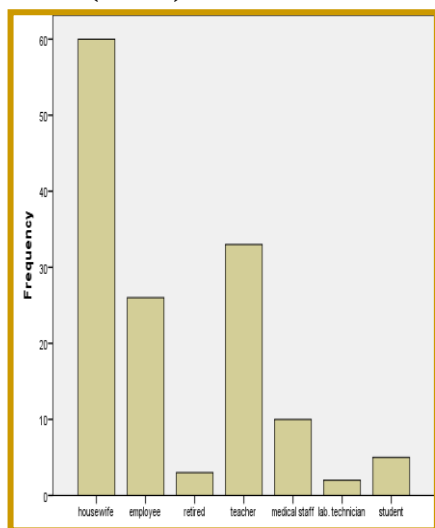


Figure.(9):.the.occupation.of.patients

DISCUSSION:

During.the.period.of.the.survey,.139.hypothyroidism.patients.attending.endocrinological.clinics.in.El-Marj.city.in.Libya.completed.the.questionnaire..The.distribution.of.participant.according.to.show.most.period.of.age.in.the.study.is45-50.17%.,.50-55.16%.and.5559.(17%)total.equal.50.0%.(45-59.y).

Interestingly,.the.female.is.the.predominant.sex.for.occuring.of.th.is.disease.93.%.When.it.was.asked.about.any.one.of.the.family.has.this.di

sease.previously.was.the.answer.that.about.69.%.of.participants.no.has.a.family.history,.while.25.%.of.them.were.their.mother.has.this.disease..als,.when.we.asked.about.which.age.was.with.a.highfrequency.occuring.onset.of.the.disease.is...period.of.age.from.40.to.49.years.are.most.one.with.percentage.36.%.then.30.to.39.(21.%)

An.association.between.diabetes.and.thyroid.disorders.has.also.been.postulated,.as.both.diseases.are.caused.by.endocrine.dysfunction.and.both.insulin.and.thyroid.hormones.contribute.to.body.metabolism;disruption.in.either.hormone.can.impair.the.function.of.the.other..In.this.study.26%.of.the.cases.of.hypothyroidism.have.comorbidity.with.Diabetes.Mellitus.while.in.a.case.control.study.of.100.Saudi.patients.with.type.2.diabetes.was.conducting.at.King.Abdulaziz.University.Hospital,.thyroid.autoimmunity.was.detected.in.10%.of.patients.with.diabetes.versus.5%.of.controls.(Alzahrani,.et.al.,.2020)..

While.rheumatoid.arthritis.occuring.in.7%.of.the.cases..The.majority.of.cases.haven't.any.comorbidity.Is.there.any.Immunopathy.



Majority of patients have no a family history of hypothyroidism. (69%). The majority of the cases are belonging to hypothyroidism. (89%). and remain deranged. are hyperthyroidism. (11%)... most cases treat with levothyroxine. (91%). In the other hand the most occupation was frequency in the cases is housewife. (43%). and teacher form 23% of all cases.

CONCLUSION

Hypothyroidism is a common and often underdiagnosed disease in Libya in general countries. The prevalence of hypothyroidism varies with age, sex and comorbidities such as diabetes and rheumatoid arthritis.

And predominantly spread in females, notably the age period from 45 to 55 years that the most age which the disease start on it is, and we also concluded in this study that the family history (genetic factors) has no or little effect and association in occurring of hypothyroidism.

RECOMMENDATIONS:

In this study could be recommended the following pointing:

1. Provide the treatment for all patients at primary health care center or public pharmacy.
2. Providing free laboratory services for examination and diagnosis of clinical and subclinical hypothyroidism and hyperthyroidism in the community.
3. Conduct screening for early detection and thus participate in prevention from another sequela.
4. Identified risk factors are potentially modifiable, emphasizing the importance of public health programs that are aimed at tackling such determinants...
5. Future longitudinal studies are needed to investigate the prognosis and determinants of this condition in Libya.
6. This study recommended early detection and prevention of disease at the primary level by educating the population should be practiced.
7. Establishment factory for production thyroxine and other thyroid gland and medicine in Libya.



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