

## Article

# Farg‘ona viloyatida yod bilan ta‘minlanganlik va qalqonsimon bez funksional holati

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**Annotatsiya:**

**Dolzarbli.** Yod tanqisligi qalqonsimon bez kasalliklarining asosiy oldini olsa bo‘ladigan sababi hisoblanadi. O‘zbekistonda yodlangan tuz dasturiga qaramay, yod bilan ta‘minlanganlik hududlar bo‘yicha notekis bo‘lib qolmoqda, Farg‘ona vodiysida esa siydikdagi yod konsentratsiyasi va qalqonsimon bez funksiyasi o‘rtasidagi bog‘liqlik kam o‘rganilgan.

**Maqsad.** Farg‘ona viloyatining 6 ta hududida o‘rta yoshli erkaklarda yod bilan ta‘minlanganlik va qalqonsimon bez funksional holatini baholash hamda ular o‘rtasidagi bog‘liqlikni aniqlash.

**Materiallar va usullar.** 2025-yil may – 2026-yil avgust oylarida Beshariq, Dang‘ara, O‘zbekiston, Quva, Yozyovon tumanlari va Farg‘ona shahrida 36–58 yoshdagi 175 nafar erkak maqsadli (tasodifiy bo‘lmagan) tanlanma asosida tekshirildi. Siydikdagi yod konsentratsiyasi (SYK) bir martalik ertalabki siydik namunasida Sandell–Kolthoff usulida, TTG, erkin T4 va erkin T3 immunoferment usulida aniqlandi, qalqonsimon bez ultratovush tekshiruvi o‘tkazildi.

**Natijalar.** Umumiy tanlanmada SYK mediani 85 mkg/l bo‘lib, 111 nafar (63,4%) shaxsda 100 mkg/l dan past bo‘ldi. Hududlar o‘rtasida yod tanqisligi uchrashi bo‘yicha statistik ahamiyatli farq aniqlanmadi (58,6–70,4%;  $p=0,95$ ). SYK TTG bilan kuchli teskari ( $r=-0,88$ ), erkin T4 bilan to‘g‘ri ( $r=0,69$ ) bog‘liqlikka ega bo‘ldi ( $p<0,001$ ). SYK 100 mkg/l va undan yuqori bo‘lganda gipotireoz 9,4%, 50–99 mkg/l da 83,5%, 50 mkg/l dan pastda 100% holatda aniqlandi; manifest gipotireoz ulushi mos ravishda 0%, 16,5% va 80,8% ni tashkil etdi. SYK har 10 mkg/l ga oshganda gipotireoz ehtimoli 3,2 baravar kamaydi ( $OR=0,31$ ;  $p<0,001$ ). Yod tanqisligida erkin T3/erkin T4 nisbati oshdi ( $p<0,001$ ), erkin T3 esa o‘zgarmadi.

**Xulosa.** O‘rganilgan tanlanmada yod bilan ta‘minlanganlikning yetarli emasligi tez-tez uchradi va qalqonsimon bez funksiyasining pasayishi bilan dozaga bog‘liq ravishda bog‘landi. SYK 50 mkg/l dan past bo‘lgan shaxslar manifest gipotireoz bo‘yicha yuqori xavf guruhini tashkil etadi. Tanlanma maqsadli tuzilgani sababli aniqlangan ulushlar viloyat aholisidagi tarqalish ko‘rsatkichi sifatida talqin qilinmasligi kerak.

**Kalit so‘zlar:** yod tanqisligi, siydikdagi yod, gipotireoz, TTG, erkin T4, buqoq, Farg‘ona vodiysi.

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## Iodine status and thyroid function in Fergana region

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**Abstract:**

**Background.** Iodine deficiency is the main preventable cause of thyroid disorders. Despite salt iodization, iodine status in Uzbekistan remains uneven, and the relationship between urinary iodine and thyroid function in the Fergana Valley has been poorly studied.

**Aim.** To assess iodine status and thyroid function in middle-aged men in six areas of Fergana region and to evaluate the association between them.

**Materials and methods.** From May 2025 to August 2026, 175 men aged 36–58 years were examined in Beshariq, Dang‘ara, O‘zbekiston, Quva and Yozyovon districts and Fergana city using a purposive (non-random) sample. Urinary iodine concentration (UIC) was measured in a single spot morning urine sample by the Sandell–Kolthoff method, TSH, free T4 and free T3 by enzyme immunoassay, and thyroid ultrasound was performed.

**Results.** Median UIC in the whole sample was 85  $\mu\text{g/L}$ ; 111 men (63.4%) had UIC below 100  $\mu\text{g/L}$ . No statistically significant difference in the frequency of iodine deficiency was found between areas (58.6–70.4%;  $p=0.95$ ). UIC correlated strongly and negatively with TSH ( $r=-0.88$ ) and positively with free T4 ( $r=0.69$ ;  $p<0.001$ ). Hypothyroidism was found in 9.4% of men with UIC  $\geq 100$   $\mu\text{g/L}$ , in 83.5% with UIC 50–99  $\mu\text{g/L}$  and in 100% with UIC  $<50$   $\mu\text{g/L}$ ; the proportion of overt hypothyroidism was 0%, 16.5% and 80.8%, respectively. Each 10  $\mu\text{g/L}$  increase in UIC reduced the odds of hypothyroidism 3.2-fold ( $\text{OR}=0.31$ ;  $p<0.001$ ). The free T3/free T4 ratio increased with iodine deficiency ( $p<0.001$ ), while free T3 remained unchanged.

**Conclusion.** Insufficient iodine status was frequent in the studied sample and was associated with reduced thyroid function in a dose-dependent manner. Men with UIC below 50  $\mu\text{g/L}$  represent a high-risk group for overt hypothyroidism. Because the sample was purposive, the proportions reported should not be interpreted as prevalence estimates for the regional population.

**Keywords:** iodine deficiency, urinary iodine, hypothyroidism, TSH; free T4, goiter, Fergana Valley.

## Kirish

Yod qalqonsimon bez gormonlari tarkibiy qismi bo‘lib, uning yetishmasligi buqoq, gipotireoz va boshqa yod tanqisligi kasalliklariga olib keladi [6,10]. Yodlangan tuz dasturlari tufayli 2020-yilga kelib dunyo aholisining 88% i yodlangan tuz iste‘mol qilmoqda, biroq 21 ta mamlakat hamon yod tanqisligi hududi hisoblanadi [9]. Dunyo aholisining qariyb 30% i yod tanqisligi xavfi ostida qolmoqda [5].

O‘zbekistonda yod tanqisligini bartaraf etish bo‘yicha sezilarli yutuqlarga erishilgan [1]. Shunga qaramay, yetarli yodlangan tuz bilan ta‘minlangan xonadonlar ulushi 36,4% ni, Farg‘ona viloyatida 38,0% ni tashkil etadi, viloyatlar bo‘yicha siydikdagi yod mediani esa 60,9 mkg/l dan 302,3 mkg/l gacha farq qiladi [7]. Respublikaning uch hududida 25 166 nafar aholining 21,2% ida gipotireoz aniqlangan [2]. Mavjud tadqiqotlar asosan ayollar va bolalarga qaratilgan bo‘lib [3,7], kattalar erkaklarda siydikdagi yod konsentratsiyasi va qalqonsimon bez funksiyasi o‘rtasidagi bog‘liqlik, ayniqsa Farg‘ona vodiysida, kam o‘rganilgan.

Tadqiqot maqsadi – Farg‘ona viloyatining 6 ta hududida o‘rta yoshli erkaklarda yod bilan ta‘minlanganlik va qalqonsimon bez funksional holatini baholash hamda ular o‘rtasidagi bog‘liqlikni aniqlash.

### Vazifalar:

1. Hududlar bo‘yicha siydikdagi yod konsentratsiyasini va yod tanqisligi darajasini baholash.
2. Tekshiriluvchilarda qalqonsimon bez funksional holatini (eutireoz, subklinik va manifest gipotireoz) aniqlash.
3. Siydikdagi yod konsentratsiyasi bilan TTG, erkin T4, erkin T3 va gipotireoz uchrashi o‘rtasidagi bog‘liqlikni baholash.

## Materiallar va usullar

Kesma tadqiqot 2025-yil may – 2026-yil avgust oylarida Farg‘ona viloyatining Beshariq, Dang‘ara, O‘zbekiston, Quva, Yozyovon tumanlari va Farg‘ona shahrida o‘tkazildi. Tadqiqotda 36–58 yoshdagi 175 nafar erkak (o‘rtacha yoshi  $45,6 \pm 5,1$  yil) qatnashdi: har bir hududdan qalqonsimon bezida exografik o‘zgarishlari bo‘lgan 19–20 nafar va o‘zgarishsiz 8–10 nafar shaxs. Tanlanma maqsadli (tasodifiy bo‘lmagan) usulda shakllantirilgan va Farg‘ona viloyati o‘rta yoshli erkaklarining populyatsion tasodifiy tanlanmasini aks ettirmaydi; shu sababli olingan ulushlar faqat o‘rganilgan tanlanma doirasida talqin qilinadi.

Siydikdagi yod konsentratsiyasi (SYK) bir martalik ertalabki siydik namunasida yagona laboratoriyada – «ASL MEDLINE» xususiy klinikasi laboratoriyasida (Oltiariq tumani) Sandell–Kolthoff usulida aniqlandi. Yod bilan ta‘minlanganlik JSST mezonlari bo‘yicha baholandi:  $\text{SYK} < 20$  mkg/l –

og'ir, 20–49 – o'rtacha, 50–99 – yengil tanqislik, 100–199 – yetarli,  $\geq 200$  mkg/l – talabdan yuqori [8]. JSST mezonlari populyatsiya darajasidagi baholash uchun mo'ljallangan; bir martalik siydik namunasi kun davomidagi va kunlararo o'zgaruvchanlik sababli individual yod statusini aniq tavsiflay olmaydi, shuning uchun ushbu tasniflash individual tashxis emas, balki shartli guruhlash sifatida qo'llanildi [8].

TTG, erkin T4 va erkin T3 qon zardobida immunoferment tahlil usulida hududlardagi laboratoriyalarda aniqlandi: «Beshariq Medical Diagnostika», «Euromed Diagnostic» (Qo'qon shahri), «Dr. Xaliqov Clinic», «Med Doctor Arslonov» klinikasi va «DAVR» xususiy klinikasi. Laboratoriyalarning me'yoriy qiymatlari deyarli bir xil bo'ldi: TTG 0,30–4,50 mXB/l, erkin T4 11,6–22,5 pmol/l, erkin T3 3,07–6,45 pmol/l. Subklinik gipotireoz (SGT) TTG  $> 4,5$  mXB/l va erkin T4 me'yorda bo'lganda, manifest gipotireoz TTG  $> 4,5$  mXB/l va erkin T4  $< 11,6$  pmol/l bo'lganda qayd etildi [4]. Erkin T3/erkin T4 nisbati hisoblandi. Qalqonsimon bez ultratovush tekshiruvda diffuz va o'choqli (tugunli) o'zgarishlar baholandi.

Tadqiqot Xelsinki deklaratsiyasi tamoyillariga muvofiq o'tkazildi, barcha ishtirokchilardan yozma xabardor rozilik olindi. Tadqiqot Farg'ona jamoat salomatligi tibbiyot instituti etika qo'mitasi tomonidan ma'qullangan (bayonnoma № 13, 16.04.2025).

**Statistik tahlil.** Natijalar  $M \pm SD$  yoki mediana [Q1–Q3] shaklida keltirildi. Guruhlar Kruskal–Uollis mezonini, ulushlar  $\chi^2$  mezonini bilan solishtirildi. Bog'liqliklar Spirmen korrelyatsiyasi ( $r$ ), yosh va hudud hisobga olingan chiziqli va logistik regressiya bilan baholandi.  $p < 0,05$  ahamiyatli deb qabul qilindi. Hisob-kitoblarni Python (SciPy, statsmodels) dasturida bajarildi.

## Natijalar

Umumiy tanlanmada SYK mediani 85 mkg/l [65–110] bo'ldi. 111 nafar (63,4%) shaxsda yod tanqisligi aniqlandi: og'ir – 2 (1,1%), o'rtacha – 24 (13,7%), yengil – 85 (48,6%) nafarda. Yod bilan yetarli ta'minlangan shaxslar 63 nafar (36,0%), talabdan yuqori – 1 nafar (0,6%) bo'ldi. Hududlar bo'yicha ko'rsatkichlar 1-jadval da keltirilgan.

**Table 1.** Iodine status and thyroid parameters by district.

**Jadval 1.** Hududlar bo'yicha yod bilan ta'minlanganlik va qalqonsimon bez ko'rsatkichlari

| Hudud              | n   | SYK, mkg/l, Me [Q1–Q3] | SYK $< 100$ mkg/l, % | TTG, mXB/l, $M \pm SD$ | Erkin T4, pmol/l, $M \pm SD$ | Gipotireoz, % |
|--------------------|-----|------------------------|----------------------|------------------------|------------------------------|---------------|
| Beshariq tumani    | 29  | 90 [61–110]            | 58,6                 | $4,86 \pm 1,42$        | $15,26 \pm 3,51$             | 55,2          |
| Dang'ara tumani    | 29  | 85 [55–110]            | 62,1                 | $4,79 \pm 1,40$        | $15,07 \pm 3,35$             | 58,6          |
| Farg'ona shahri    | 30  | 89 [80–115]            | 63,3                 | $4,45 \pm 1,30$        | $14,42 \pm 2,13$             | 60,0          |
| O'zbekiston tumani | 30  | 82,5 [65–115,5]        | 66,7                 | $4,46 \pm 1,52$        | $14,10 \pm 2,86$             | 53,3          |
| Quva tumani        | 27  | 81 [62,5–100]          | 70,4                 | $5,18 \pm 2,07$        | $13,31 \pm 3,15$             | 59,3          |
| Yozyovon tumani    | 30  | 82,5 [54–110]          | 60,0                 | $4,83 \pm 1,21$        | $15,31 \pm 2,97$             | 66,7          |
| Jami               | 175 | 85 [65–110]            | 63,4                 | $4,75 \pm 1,50$        | $14,59 \pm 3,06$             | 58,9          |
| p                  |     | 0,76                   | 0,95                 | 0,68                   | 0,10                         | 0,93          |

*Izoh: Gipotireoz – TTG  $> 4,5$  mXB/l (subklinik va manifest shakllar birgalikda).*

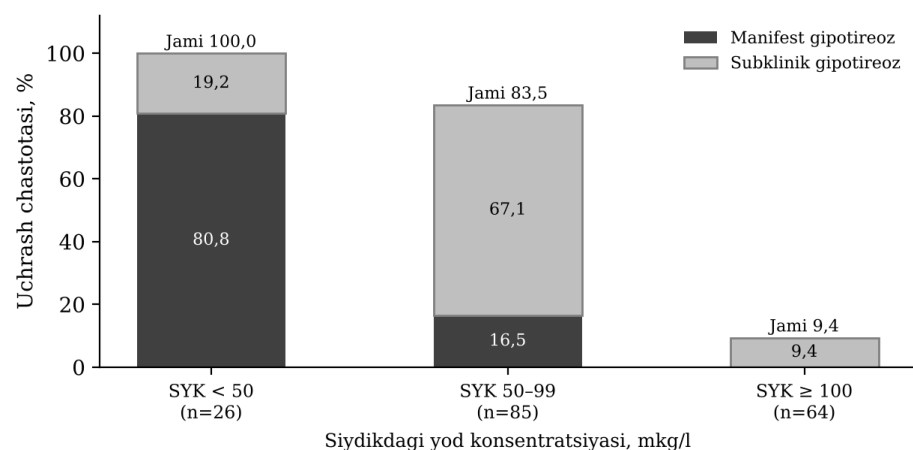
Hududlar o'rtasida SYK, TTG, erkin T4 va gipotireoz uchrashi bo'yicha statistik ahamiyatli farq aniqlanmadi (barchasida  $p > 0,05$ ); bu hududlarning to'liq bir xil ekanini isbotlamaydi, balki mavjud tanlanmada hududiy farqlar aniqlanmaganini bildiradi. Umuman olganda, 103 nafar (58,9%) shaxsda gipotireoz aniqlandi: subklinik – 68 (38,9%), manifest – 35 (20,0%) nafarda.

SYK TTG bilan kuchli teskari ( $r = -0,88$ ;  $p < 0,001$ ), erkin T4 bilan to'g'ri ( $r = 0,69$ ;  $p < 0,001$ ) bog'liqlikka ega bo'ldi, erkin T3 bilan esa bog'lanmadi ( $r = 0,06$ ;  $p = 0,45$ ). Yosh va hudud hisobga olinganda SYK har 10 mkg/l ga kamayganda TTG o'rtacha 0,34 mXB/l ga oshdi (95% IO 0,30–0,37;  $p < 0,001$ ), erkin T4 esa 0,58 pmol/l ga kamaydi (95% IO 0,49–0,67;  $p < 0,001$ ). Yod bilan ta'minlanganlik darajasiga ko'ra ko'rsatkichlar 2-jadval da keltirilgan.

**Table 2.** Thyroid parameters by urinary iodine concentration.**Jadval 2.** Siydikdagi yod konsentratsiyasiga ko'ra qalqonsimon bez ko'rsatkichlari

| Ko'rsatkich                                | SYK < 50 mkg/l<br>(n=26) | SYK 50–99 mkg/l<br>(n=85) | SYK ≥ 100 mkg/l<br>(n=64) | p      |
|--------------------------------------------|--------------------------|---------------------------|---------------------------|--------|
| SYK, mkg/l, mediana                        | 30                       | 76                        | 120                       | –      |
| TTG, mXB/l                                 | 6,81±0,87                | 5,26±0,76                 | 3,25±0,86                 | <0,001 |
| Erkin T4, pmol/l                           | 10,73±1,70               | 14,08±2,58                | 16,85±2,03                | <0,001 |
| Erkin T3, pmol/l                           | 4,66±0,59                | 4,88±0,55                 | 4,72±0,63                 | 0,35   |
| Erkin T3 / erkin T4                        | 0,448±0,100              | 0,356±0,068               | 0,284±0,050               | <0,001 |
| UTTda qalqonsimon bez o'zgarishlari, n (%) | 26 (100)                 | 84 (98,8)                 | 9 (14,1)                  | <0,001 |
| Subklinik gipotireoz, n (%)                | 5 (19,2)                 | 57 (67,1)                 | 6 (9,4)                   | <0,001 |
| Manifest gipotireoz, n (%)                 | 21 (80,8)                | 14 (16,5)                 | 0                         | <0,001 |

Yod tanqisligi chuqurlashgan sari gipotireoz uchrashi keskin oshdi (1-rasm): SYK ≥ 100 mkg/l bo'lganda 9,4%, 50–99 mkg/l da 83,5%, 50 mkg/l dan pastda 100%. Manifest gipotireoz yod bilan yetarli ta'minlangan shaxslarda umuman uchramadi, SYK < 50 mkg/l bo'lganda esa 80,8% ni tashkil etdi.

**Figure 1.** Prevalence of hypothyroidism by urinary iodine concentration, %.**Rasm 1.** Siydikdagi yod konsentratsiyasiga ko'ra gipotireoz uchrash chastotasi, %.

Yosh va hudud hisobga olinganda SYK har 10 mkg/l ga oshganda gipotireoz ehtimoli 3,2 baravar (OR=0,31; 95% IO 0,21–0,45; p<0,001), manifest gipotireoz ehtimoli 2,8 baravar (OR=0,36; 95% IO 0,25–0,52; p<0,001) kamaydi. Erkin T3/erkin T4 nisbati eutireozda 0,288±0,051, SGT da 0,340±0,057, manifest gipotireozda 0,462±0,077 ni tashkil etdi (p<0,001). UTTda qalqonsimon bez o'zgarishlari bo'lgan 119 nafar shaxsdan 27 nafarida (22,7%) o'choqli yoki tugunli o'zgarishlar, 3 nafarida autoimmun belgilar qayd etildi. Logistik regressiya modellarining to'liq natijalari 3-jadval da keltirilgan.

**Table 3.** Logistic regression models for hypothyroidism and overt hypothyroidism.**Jadval 3.** Gipotireoz va manifest gipotireoz uchun logistik regressiya modellari

| Model va ko'rsatkich                            | $\beta$ | SE    | OR   | 95% IO    | p      | n   |
|-------------------------------------------------|---------|-------|------|-----------|--------|-----|
| Gipotireoz (TTG > 4,5 mXB/l): SYK, har 10 mkg/l | -1,171  | 0,194 | 0,31 | 0,21–0,45 | <0,001 | 175 |
| Manifest gipotireoz: SYK, har 10 mkg/l          | -1,022  | 0,187 | 0,36 | 0,25–0,52 | <0,001 | 175 |

*Izoh: ikkala model yosh (yil) va hudud bo'yicha moslashtirilgan; n – tahlilga kiritilgan ishtirokchilar soni.*

## Munozara

Tadqiqot o'rganilgan tanlanmada – Farg'ona viloyatining 6 ta hududidan jalb qilingan o'rta yoshli erkaklar orasida – yod bilan ta'minlanganlikning yetarli emasligi tez-tez uchrashini ko'rsatdi: tekshiriluvchilarning 63,4% ida SYK 100 mkg/l dan past bo'ldi. Viloyat bo'yicha ayollarda aniqlangan SYK mediani 119,3 mkg/l bo'lgan edi [7], bizning tanlanmada esa mediana 85 mkg/l ni tashkil etdi. Bu farq erkaklar yod profilaktikasi dasturlaridan kamroq qamrab olinishi yoki yodlangan tuz iste'molining kamayishi bilan bog'liq bo'lishi mumkin, biroq tanlanmalar tuzilishidagi farq ham hisobga olinishi kerak [3,7]. Hududlar o'rtasida statistik ahamiyatli farq aniqlanmagani ularning to'liq bir xilligini isbotlamaydi, biroq muammo alohida tumanlar bilan cheklanmasligini ko'rsatadi.

SYK va TTG o'rtasidagi kuchli teskari bog'liqlik ( $r=-0,88$ ) hamda gipotireoz uchrashining yod tanqisligi darajasiga qarab bosqichma-bosqich oshishi yod tanqisligi va qalqonsimon bez funksiyasi pasayishi o'rtasidagi dozaga bog'liq aloqani ko'rsatadi. Bu populyatsiyalarda yod iste'moli qalqonsimon bez kasalliklari tarqalishining asosiy belgilovchisi ekanligi haqidagi ma'lumotlarga mos keladi [6]. Shu bilan birga, bog'liqlikning bunchalik yuqori darajasi tanlanmaning maqsadli tuzilishi hamda gormonlar turli laboratoriyalarda o'lchangani bilan ham bog'liq bo'lishi mumkin, shuning uchun uni ehtiyotkorlik bilan talqin qilish lozim. Respublikaning boshqa hududlarida aholining 21,2% ida gipotireoz aniqlangan [2]; bizning tanlanmada bu ko'rsatkich yuqoriroq (58,9%), chunki tanlanmaga qalqonsimon bezida o'zgarishlari bo'lgan shaxslar maqsadli ravishda kiritilgan.

Erkin T3 ning yod tanqisligida o'zgaray qolishi va erkin T3/erkin T4 nisbatining oshishi muhim kompensator mexanizmni aks ettiradi: yod yetishmaganda qalqonsimon bez kamroq yod talab qiladigan T3 ni ko'proq ishlab chiqaradi va periferik to'qimalarda T4 ning T3 ga aylanishi kuchayadi [10]. Shuning uchun yod tanqisligi hududlarida faqat erkin T3 ga tayanish gipotireozni aniqlashda yetarli emas, TTG va erkin T4 ni birgalikda tekshirish zarur.

Manifest gipotireozning yod bilan yetarli ta'minlangan shaxslarda uchramagani, SYK < 50 mkg/l bo'lganda esa 80,8% ga yetgani SYK ni oddiy va arzon skrining ko'rsatkichi sifatida qo'llash mumkinligini ko'rsatadi. Shu bilan birga, bir martalik siydik namunasidagi SYK individual tashxis vositasi emas; u faqat qo'shimcha skrining ko'rsatkichi sifatida, TTG va erkin T4 bilan birgalikda baholanishi kerak.

**Tadqiqot cheklavlari.** Tanlanma qalqonsimon bezida o'zgarishlari bo'lgan va bo'lmagan shaxslardan maqsadli (tasodifiy bo'lmagan) ravishda tuzilgan, shuning uchun aniqlangan ulushlar aholi o'rtasidagi tarqalishni aks ettirmaydi va viloyat bo'yicha tarqalish ko'rsatkichi sifatida umumlashtirilmaydi. Tadqiqot faqat o'rta yoshli erkaklarni qamragan. SYK bir martalik ertalabki namunada aniqlangani sababli individual yod statusi haqidagi xulosalar taxminiy xarakterga ega. TTG, erkin T4 va erkin T3 turli laboratoriyalarda o'lchangan; laboratoriyalararo analitik farqlar aniqlangan bog'liqliklar kuchiga ta'sir qilgan bo'lishi mumkin. Avvaldan mavjud qalqonsimon bez kasalliklari, levotiroksin yoki yod saqlovchi dori vositalari, amiodaron va litiy preparatlari, yodli kontrast moddalar, avvalgi qalqonsimon bez operatsiyasi hamda autoimmun tireoidit kabi omillar tahlilda alohida hisobga olinmagan va qalqonsimon bezga qarshi antitanachalar tekshirilmagan; shu sababli qoldiq konfauding ta'sirini istisno qilib bo'lmaydi.

## Xulosa

O'rganilgan tanlanmada, yodlangan tuz dasturiga qaramay, o'rta yoshli erkaklar orasida yod bilan ta'minlanganlikning yetarli emasligi va u bilan bog'liq gipotireoz tez-tez uchradi; ular ko'pincha klinik belgilarisiz kechadi va aniqlanmay qolmoqda. Olingan natijalarni viloyat aholisiga umumlashtirish uchun populyatsion tasodifiy tanlanmaga asoslangan tadqiqotlar zarur. Yod profilaktikasini kuchaytirish va yod tanqisligi hududlarida kattalar orasida qalqonsimon bez funksiyasini faol skrining qilish bu muammoni hal etishning asosiy yo'llaridan biridir.

1. Farg'ona viloyatining 6 ta hududidan jalb qilingan erkaklarning 63,4% ida yod bilan ta'minlanganlik yetarli emasligi aniqlandi (SYK mediani 85 mkg/l); hududlar o'rtasida statistik ahamiyatli farq aniqlanmadi.
2. SYK TTG bilan kuchli teskari ( $r=-0,88$ ) va erkin T4 bilan to'g'ri ( $r=0,69$ ) bog'liqlikka ega; gipotireoz uchrashi yod tanqisligi darajasiga qarab 9,4% dan 100% gacha oshadi.
3. SYK 50 mkg/l dan past bo'lgan shaxslarning 80,8% ida manifest gipotireoz aniqlandi; ular yuqori xavf guruhini tashkil etadi.

4. Yod tanqisligida erkin T3/erkin T4 nisbati oshadi, erkin T3 esa o'zgarmaydi; shu sababli gipotireozni aniqlashda TTG va erkin T4 ni tekshirish tavsiya etiladi.

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Konseptualizatsiya, M.J.; original matnni yozish, M.J.; yozish va tahrirlash, M.J. va N.M.; rahbarlik, N.M. Barcha mualliflar qo'lyozmaning nashr etilgan versiyasi bilan tanish va u bilan rozi.

### **Authors' contribution**

Conceptualization, M.J.; writing—original draft preparation, M.J.; writing—review and editing, M.J. and N.M.; supervision, N.M. All authors have read and agreed to the published version of the manuscript.

### **Moliyalashtirish**

Tadqiqot uchun tashqi moliyalashtirish olinmagan; tadqiqot mualliflarning shaxsiy mablag'lari hisobidan o'tkazildi.

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### **Ethics approval**

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the Fergana Medical Institute of Public Health (protocol No. 13, 16.04.2025).

### **Nashrga xabardor qilingan rozilik**

Barcha tadqiqot ishtirokchilaridan yozma xabardor rozilik olindi.

### **Consent for publication**

Written informed consent was obtained from all subjects involved in the study.

### **Ma'lumotlar mavjudligi to'g'risidagi bayonot**

Tadqiqot protokoliga muvofiq bemorlardan yig'ilgan ma'lumotlarni taqdim etish imkoni yo'q.

### **Data Availability Statement**

In accordance with the study protocol, the patient data collected in this study cannot be made available.

### **Rahmatnomalar**

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Mualliflar manfaatlar to'qnashuvi yo'qligini e'lon qiladi.

### **Conflict of interest**

The authors declare no conflicts of interest.

### **Qisqartmalar**

SYK siydikdagi yod konsentratsiyasi  
TTG tireotrop gormon  
SGT subklinik gipotireoz  
UTT ultratovush tekshiruvi

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