

Prevalence and Clinical Characteristics of Becker's Nevi in Young Jordanian Males

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ABSTRACT

Objective: The aim of this study is to determine the prevalence of Becker's nevus among young men in Jordan and to define its clinical characteristics.

Method: We conducted a survey of all consecutive young male patients who were attending an entry medical examination for Mu'tah Military University in the years 2008 and 2012. The candidates underwent complete physical examination of the skin and the following demographic features were analyzed: age, skin phototype, district of origin, sun exposure, onset, awareness of lesion(s), site, size, hypertrichosis, and other associated features.

Results: A sample of 9,862 teenager-males, aged 18-20 years, were examined. There were 642 Becker's nevus cases diagnosed, with a prevalence of 6.5%. Only 8.1% admitted onset during preschool age. About 59.8% had onset during 12-15 years old, 13.4% during 15-20 years, and 13.1% during 6-12 years. In 36 cases (5.6%), the patient could not determine age of onset. A unilateral distribution was observed in all candidates. Upper chest and shoulders were involved in 68.3%, followed by arms (13.1%), lower trunk (8.8%), lower extremities (7.6%), forearms (1.7%), and head and neck (1.4%). Seven cases (1.1%) had Blaschkoid lines distribution. Lesional hypertrichosis was clinically evident in 484 Becker's nevi (75.4%). Candidates with origin from north of Jordan had the highest prevalence. Seven cases showed associated features consistent with Becker's nevus syndrome.

Conclusion: We believe that Becker's nevus is under-reported and has an earlier age of onset than it was believed. Our study showed a notably higher prevalence of Becker's nevus than it has been reported before. Becker's nevus syndrome should be always considered and searched for when examining patients with Becker's nevus.

Key words: Becker's nevus, Becker's nevus syndrome, Nevoid melanosis

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Introduction

Becker's nevus is an organoid hamartomatous nevus characterized by hyperpigmented patches having unilateral distribution. Though it may first appear in childhood or rarely be congenital, it is usually first noticed during adolescence. Few studies have evaluated the statistics of BN in general population, which ranged between 0.25 and 4.19%.

Becker's nevus (Becker's melanosis) is considered an organoid hamartoma of ectomesodermal tissues. It was first described by Samuel William Becker in 1949 and carries his name as a "concurrent melanosis and hypertrichosis in the distribution of nevus unius lateris".⁽¹⁾ It is characterized by one or more irregular hyperpigmented patches that, in contrast to most other epidermal nevi, does not classically

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follow the lines of Blaschko, but instead is arranged in a checkerboard pattern with geographic configuration.⁽²⁾ The term Becker nevus syndrome (BNS) was postulated in 1997 to define the presence of Becker's nevus (BN) in association with ipsilateral breast hypoplasia or other cutaneous anomalies and musculoskeletal defects.⁽³⁾ Becker's nevus has been described in all races and phototypes.⁽⁴⁾ It has been reported to be 4-6 times more common in males than in females,⁽⁵⁾ but the sex ratio probably does not deviate from unity with an under-reporting in females. Previous studies showed higher incidence in adult males but this was not found in children.⁽⁶⁾ A preponderance of cases in males can be explained by the androgen dependence of this nevus producing a more intense pigmentation and a characteristic hypertrichosis in postpubertal period, which render lesions more conspicuous. Though it may first appear in childhood or is rarely congenital, it usually develops in the peripubertal period, when it becomes darker and hairy to acquire persistent irregular and sharply demarcated patches.⁽⁶⁾ Although spontaneous regression of the lesion may occasionally occur⁽⁷⁾ the persistence of the lesion is the rule. Familial occurrence has been reported but the phenotype usually occurs sporadically.⁽²⁾ Very little information is available about epidemiologic data of BN. To date, very few studies have evaluated the prevalence of BN in a general population which ranged (0.25-4.19%).^(4,8-11) Although the etiopathogenesis of BN remains unclear, it has been hypothesized that androgen may play a role. A segmented increase in androgen receptors and probable heightened sensitivity to androgen have been postulated. This could explain its onset during or after puberty, male preponderance, hypertrichosis, and occasional development of acneiform lesions within the patch.⁽¹²⁾ The aim of this survey is to determine the prevalence of BN among males who attended the medical entry exam for Mu'tah military university in Jordan and to study its clinical characteristics, relation to skin phototype, age of onset, and its geographical variations in Jordan.

Method

We conducted a survey of 9,862 consecutive young male patients (aged 18 to 20 years) who

were attending an entry medical examination for Mu'tah Military University in the years 2008 and 2012. The candidates underwent complete physical and skin examination by two dermatologists. The demographics of patients and characteristics of BN were documented, which include: The age of onset, skin phototype, and districts of origin, sun exposure, and size of lesions, awareness and localization of lesions, and presence of hypertrichosis and other associated features. Patients with features of BN (based on clinical grounds) were included in the study. Pathological and radiological investigations were not done. Simple statistical analyses (mean, frequency, and percentage) were used to describe the study variables. Ethical committee of the Royal Medical Services approved the study.

The aim of this study is to determine the prevalence of Becker's nevus among young men in Jordan and to define its clinical characteristics

Results

A total of 9862 teenager-males, aged 18 to 20 years, were examined and 642 (6.5%) BN cases were diagnosed. The prevalence rates of BN in relationship to skin phototypes are shown in Table I. Although the majority of the cases were found in patients with skin phototype IV but the percentages of BN were almost the same in types I to IV (about 6.5%) and zero in type VI. Table II demonstrates the age of onset of BN and it shows that in 60% it started between the age of 12 and 15 years. 5.6% could not determine the age of onset of BN because the lesion was on unseen parts of the body such as lower back and buttock. Of the later, 28 patients (4.4%) denied any awareness about the lesions before the evaluation during the survey. Table III shows the distribution of the BN. Upper chest and shoulders (Fig. 1a,b) were involved in 68.3%, followed by arms (Fig. 2a), lower trunk (Figure 1c,e), lower extremities (Fig. 2 b), forearms (Fig. 1f), and head and neck (Fig. 3), respectively. A unilateral distribution was consistently observed in all candidates. Seven cases (1.1%) had Blaschkoid lines distribution (Fig. 1c). The BN lesions were more frequently reported on the right side (63%). The diameter ranges from few to 22 cm. Lesional hypertrichosis was clinically evident (Fig. 1, 2b) in 484 BN (75.4%) and it covered most of the

Table I: Becker's nevus and skin phototypes

Skin type	Candidates (9862) , N (%)	BN (642), N (%)	% of BN to skin type
I	219 (2.2)	15 (2.3%)	6.8
II	918 (9.3)	61 (9.5%)	6.6
III	3280 (33.3)	213 (33.2%)	6.5
IV	5124 (52.0)	342 (53.3%)	6.7
V	289 (2.9)	11 (1.7%)	3.8
VI	32 (0.3)	0 (0%)	0

Table II: Age of onset of Becker's nevus

Age of onset (years)	No. of cases	%
0 – 6	52	8.1
6 - 9	22	3.4
9 – 12	62	9.7
12 – 15	384	59.8
15 – 20	86	13.4
undetermined	36	5.6

Table III: Localization of Becker's nevus (642)

Site	Patients, n (%)
Face	6 (0.9)
Neck	3 (0.5)
Trunk	489 (76.2)
Anterior chest	76 (11.8)
Shoulders and scapular region	356 (55.5)
Lower back	26 (4.0)
Abdomen	31 (4.8)
Arms	84 (13.1)
Forearms	11 (1.7)
Buttocks	29 (4.5)
Thighs	13 (2.0)
Legs	7 (1.1)

Table IV: Districts' distribution of Becker's nevus cases

Districts	Candidates (9862) , N (%)	BN (642), N (%)	% of BN to Districts
Amman	894 (9.1)	47 (7.3)	5.3
Zarqa	1067 (10.8)	52 (8.1)	4.9
Balqa	912 (9.2)	58 (9.0)	6.4
Mafraq	514 (5.2)	31 (4.9)	6.1
Irbid	2634 (26.7)	227 (35.3)	8.6
Ajloun	592 (6.0)	54 (8.4)	9.1
Jerash	632 (6.4)	40 (6.2)	6.3
Madaba	725 (7.4)	41 (6.4)	5.6
Karak	821 (8.3)	38 (5.9)	4.6
Ma'an	462 (4.7)	23 (3.6)	4.9
Tafielah	383 (3.9)	20 (3.1)	5.1
Aqaba	226 (2.3)	11 (1.7)	4.8

affected areas by thick pigmented hair with variable densities.

To study any geographical variation in the prevalence of BN across Jordan, we traced the district of origin (Table IV). North of Jordan, which constituted about one third of the sample, has the highest prevalence (Irbid and Ajloun, 8.6% and 9.1% respectively). Seven patients had associated clinical features consistent with BNS

as follows: Ipsilateral breast hypoplasia, supernumerary nipple (Fig. 2a), sparse hair of ipsilateral axilla, BN with significant hypertrichosis overlying plexiform neurofibroma and smooth muscle hamartoma (Fig. 2b), ipsilateral odontomaxillary dysplasia (Fig. 3), asymmetry of scapula and clavicle, segmental café au lait macules (Fig. 4).

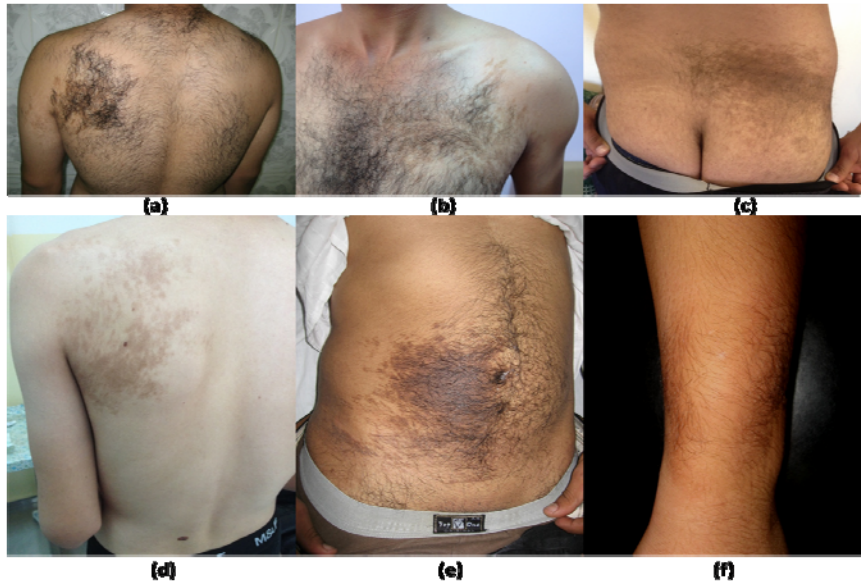


Fig.1: Localization of Becker nevi: (a) classical site over the scapula with significant lesional hypertrichosis, (b) upper chest with Blaschkoid distribution, (c) lower back extending to gluteal area with modest hypertrichosis, (d) light brown BN in checkerboard pattern over the shoulder without hypertrichosis, but in association with ipsilateral melanocytic nevi. (e) ill-defined BN over the abdomen not crossing the midline. (f) well-demarcated light-brown over distal forearm.

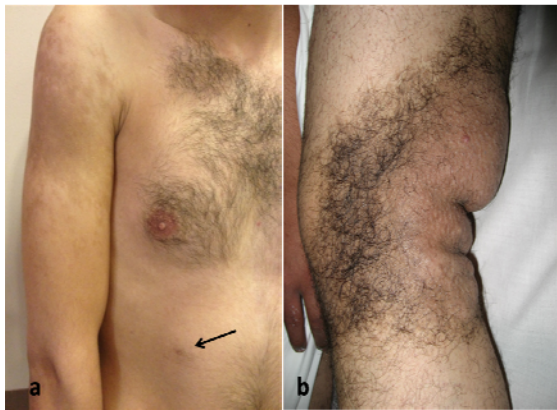


Fig. 2: BNS: (a) right arm BN with ipsilateral supernumerary nipple (arrow), (b) BN with significant hypertrichosis overlying plexiform neurofibroma and smooth muscle hamartoma involving popliteal fossa and knee in a patient of NF-1.



Fig. 3: Unilateral facial and cervical BN (a) in association with odontomaxillary dysplasia; Hypodontia, microdontia, and enamel hypoplasia (b).

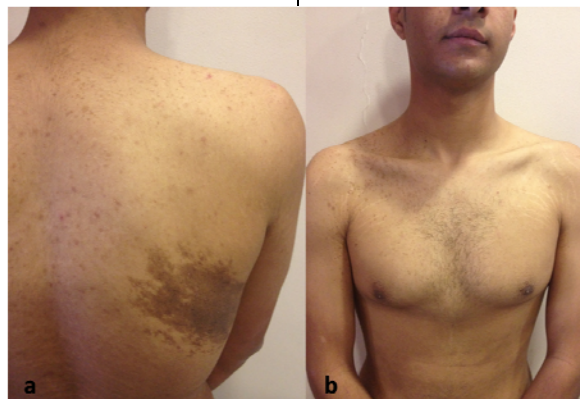


Fig. 4: BN on the scapula in association with ipsilateral segmental multiple café au lait macules (NF type 5) over the shoulder and pectus carinatum

Discussion

This is the first Jordanian study and the third largest survey ever done to determine the prevalence and characteristics of BN.⁽⁸⁻¹¹⁾ Our results showed a very high prevalence (6.5%) of BN in the studied population of young Jordanian males when compared with previously reported data. In a study conducted in eastern France, Tymen *et al.* reported the frequency of BN to be 0.52% in a survey of 19,302 male military recruits between the ages 17 and 26.⁽⁹⁾ In a dermo-epidemiologic study on young Italian men, BN was observed in 70 out of 27,954 with a prevalence of 0.25%.⁽⁸⁾ Another survey reported a prevalence of 2% among 1,146 schoolchildren with European origin residing in Vancouver, British Columbia, Canada.⁽¹⁰⁾ In a very recent study, 2,266 Brazilian teenager males were examined and 95 BN cases were diagnosed, with a prevalence of 4.19%.⁽¹¹⁾ Another study reported a prevalence of 2.1% among 5,837 young Italian males.⁽⁴⁾ In the abovementioned studies, variations in prevalence among different skin phototypes and ethnic groups were documented. Almost all our studied candidates were from the same ethnicity and with different skin phototypes and the sample was highly representative of all the districts in Jordan. As in any dermatoses of skin of color, subtle pigmentary changes can be easily missed in cases having skin types IV and V. In contrary to few previous reports,⁽¹⁴⁾ our study shows no correlation between prolonged sunlight exposure and BN. A very recent study of BN in children revealed that 26.3% of cases were of congenital origin.⁽⁶⁾ From our candidates' history, 21.2% reported onset during childhood period, which is supporting the early onset of this nevus. A significant percentage of them did not seek any medical advice before adolescence due to the benign and asymptomatic nature of lesions. We have to admit that, most of the studies done, including our survey, recruit young male candidates to join military service, so hiding facts by the majority of them about the onset and the course of the lesions in order not to be disqualified is expected. Four percent of cases denied any awareness about the lesions before assessment. Many candidates were really not aware of their lesions as they were found in hidden areas with subtle pigmentary and hypertrichotic components in prepubertal period.

Few of them interpreted the lesions as a normal congenital nevus or a result of a scald burn. Others had weird social beliefs regarding their origin. Becker's nevus can affect any part of the body. The usual sites are shoulder, anterior chest or scapular region. In few reports, BN might occur at other sites of the body. In concordance with other studies, our data illustrates a strong preponderance to the upper trunk in 2/3 of cases where scapula and shoulder area constitute more than 50% of all cases (Table III). Head and neck were the least areas to be involved in this survey (<2%). The presence of BN on the lower limb is unusual, and hypertrichosis is not always a feature. At least 15 cases of BN on the lower limbs of adolescents were identified in the English literature (11 males and 4 females).^(11,15) Our data revealed that 7.6% (59 cases) showed predilection for lower limbs; buttocks in 4.5%, thighs in 2.5%, and legs in 1.1%. In a very recent article of childhood series of BN, 15 cases have been documented on legs (12.8%).⁽⁶⁾ Hair density may be variable and may even be absent. In this study, significant hypertrichosis was observed in 284 patients (75.4%), which is a high incidence compared to other studies. Hypertrichosis with terminal hairs was observed on the BN of 70% of young Italian men,⁽⁸⁾ and in 56% of young French males⁽⁹⁾ but only in 23.1% of Brazilian teenager males.⁽¹¹⁾ In a very recent study of BN in children, hypertrichosis was seen in 31.3% of 118 patients; the majority of patients with hairless BN were younger than 10 and more than 50% had mild hypertrichosis which was located only on the center of the lesions.⁽⁶⁾ These observations could be explained by the early age of the examined population and reaffirm the etiopathogenetic role of androgen's hyperresponsiveness in the development of BN during adolescence. Becker nevus syndrome involves extremely subtle clinical findings and many cases may have remained undetected.⁽⁷⁾ A spectrum of cutaneous and musculoskeletal features of BNS were reported. The associated features are consistently ipsilateral and mostly hypoplastic.⁽¹⁶⁾ Clinically, ipsilateral breast hypoplasia is more easily noted in women, which is why Becker nevus syndrome is less frequently detectable in men.⁽²⁾ In 1% (7 cases) of our studied population, well documented BNS cases were clinically detected. We are reporting one

case with histologically confirmed BN on the scapula and ipsilateral segmental multiple café au lait macules over the shoulder leading to the association of BN and NF type 5 (Fig. 4). Another case showed a hypertrichotic BN overlying giant plexiform neurofibroma and smooth muscle hamartoma (Fig. 2b), which reflect the organoid hamatomatous origin of BN. Few cases of type 1 neurofibromatosis, one in association with plexiform neurofibroma, and several cases with one or two café au lait macules have been reported in association with BN and in children.^(6,17)

Limitations of the study

The study included male patients between 18 and 20 year only. We performed only skin and general examination, it was beyond the scope of our survey to have pathological or imaging studies and we were not be able to review in depth the associated BNS.

Conclusion

The prevalence of BN among young Jordanian males is higher than what is published in other studies and it has an earlier age of onset than it was believed. Unilateral distribution was seen in all cases. BNS should be always considered and searched for when examining patients with BN. Further comparative studies are warranted to determine the characteristics and prevalence of BN in a matched group of females with further thorough evaluation for evidence of BNS.

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