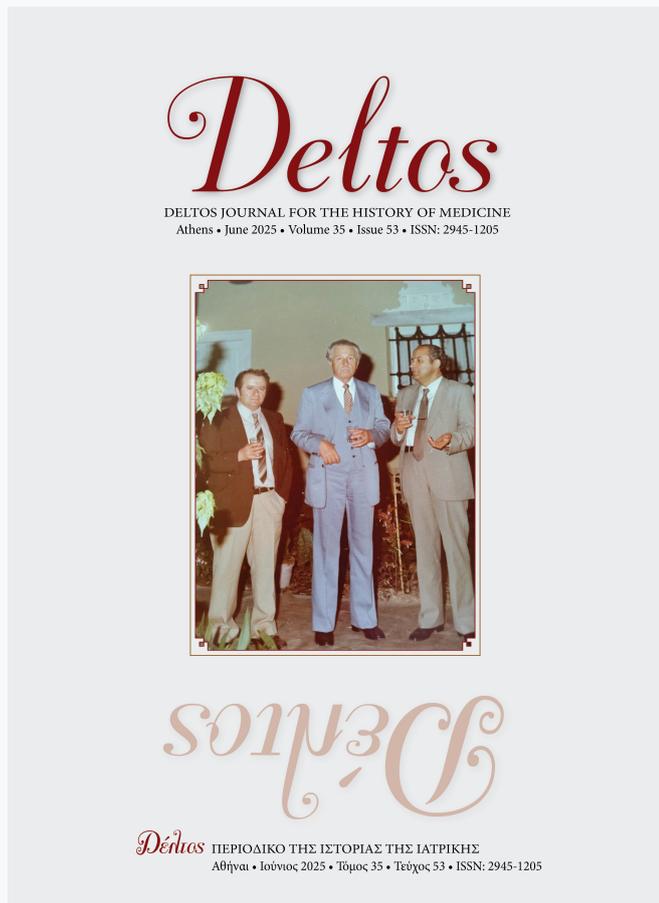


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### Dr. Alexandra Belkind: Pathmaker in Women's Health in the Holy Land/Land of Israel 1905-1912

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# Dr. Alexandra Belkind: Pathmaker in Women's Health in the Holy Land/Land of Israel 1905-1912

Shifra Shvarts<sup>1</sup>, Zipora Shehory-Rubin<sup>2</sup>, Pnina Romem<sup>3\*</sup>, Yitzhak Romem<sup>4</sup>



Figure 1. Alexandra Belkind (on the right) as a medical student in Geneva, 1903

## Abstract

In 1906, a women's clinic was established in Jaffa- the first of its kind in the Holy Land / Land of Israel under Ottoman rule. The establishment of this clinic, which operated between 1906-1914 was revolutionary, serving as a catalyst for change in societal attitudes towards women's health, particularly within the Muslim community. During the operation of her women's clinic, Dr. Belkind treated approximately one thousand women whom she diagnosed and/or treated for female-specific conditions (gynaecology, maternity and mental health) alongside general medical concerns such as influenza and various inflammatory disorders. The clinic provided medical care on a non-sectarian basis without discrimination on racial or religious grounds, and over half of her patients were Muslims, while the remainder were equally divided between Jewish and Christian women. The clinic's patient files constitute a unique primary source of information documenting how women's health issues were viewed and addressed at the start of the 20th century in the Holy Land / Land of Israel under Ottoman administration. In her medical reports, Dr. Belkin addressed in particular issues such as

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sexual relationships, abortion, domestic violence as well as malnutrition, and high infant mortality and suicide among women. She provides details on the impact of forced adolescent marriage on women's health and the link between child marriages and secondary infertility, psychological problems and stillbirths. As a compassionate listener, Dr. Belkind, recorded their complaints in her files, noting in detail the psychosocial significance of the contents of her conversations. The study, based on Dr. Belkind's medical files on female patients she treated in this area between 1906-1914, provides valuable insights regarding the specific health problems faced by Muslim women in particular in the early 20th century in the Land of Israel and into the complex interface between Western medicine and women from a traditional society.

**Key Words:** *Women's health, infertility, child marriage, palestine, folk medicine –*

## Introduction

Health and disease were pivotal concerns for the survival and continuity of the Jewish community in the Land of Israel in the 19th century<sup>a</sup>.

In the mid-19th century, the Jewish community was small and far from robust, numbering approximately 55,000 individuals, residing in Jerusalem, Hebron, Safed and Tiberias and in a handful of Jewish agricultural villages in the vicinity of Jaffa. Most Jews made a modest living as artisans or small-scale merchants, supplemented by charitable stipends from Jewish communities abroad. Living conditions were harsh, characterised by overcrowding and an absence of basic sanitation. Sewage flowed freely down the centre of the streets, drinking water was obtained from rainwater cisterns during the winter, and only the affluent could afford spring water transported from outside the cities. Even poorer conditions prevailed in Arab urban and rural communities. Consequently, the population of the Land of Israel suffered from a high prevalence of disease and elevated mortality rates throughout the 19th century. Women's health, shaped by repeated pregnancies, childbirth, and child-rearing in adverse conditions, was particularly precarious. The hardship endured by women and its toll on their health were documented by pilgrims and other travellers to the Holy Land during this period.

Dr. Titus Tobler, a Swiss physician and avid Orientalist, travelled four times to the Land of Israel during the 19th century. In a medical monograph published in 1855, he observed that the onset of menstruation - and therefore fertility - in the Land of Israel took place very early, contributing to the widespread custom of teenage marriage. He noted that: "*14-year-old mothers were common*".<sup>12</sup> He also remarked that women's fertility ended early, typically in their forties, causing great concern amongst women in the Land of Israel. Fertility was a major concern for both women and men,

and Tobler reported it was common for inhabitants to turn to folk healers to solve their problems. Tobler's reports on Jewish women's health quotes Dr. Simon Fraenkel - the first Jewish doctor in the Holy Land - who had been sent to the Land of Israel in 1843 by philanthropist Sir Moses Montefiore to open a clinic in Jerusalem. Tobler highlighted the dangers posed by untrained midwives, whose reliance on unregulated folk remedies and birthing customs often resulted in harm to mothers. He also reported high infant and maternal death rates during childbirth, particularly in Jerusalem.

Ita Yelin, a resident in the Old City in Jerusalem at the close of the 19th century, described in her 1929 memoir *For My Offspring*<sup>3</sup> the arduous lives of the women of her generation - fetching water from cisterns, unrelenting household chores, and childrearing under extremely poor conditions. Yelin emphasised the devastating emotional toll of losing children, noting that on average four out of every five infants did not survive their first year. This profound grief had a lasting impact on the physical and emotional health of mothers.

A similar depiction emerges in the descriptions of Jewish philanthropist Karl Netter (1826-1882)<sup>b</sup>. Following a visit to the country in 1868, Netter reported that he had not encountered a single teenage girl over the age of 15 who was not married. In his view, such child marriages were the primary factor behind the poor health status of women in the Jewish community in Israel as a whole. Because financial assistance from Jewish communities in Europe to their Jewish brethren in the Holy Land was allocated on a family basis, families had an invested interest in marrying off their children when they were still young in order to receive additional financial support for the new family unit.

<sup>b</sup> Karl Netter was one of the leaders of the "Universal Israelite Alliance", an international Jewish organisation founded in 1860 in Paris to modernise Jewish life, primarily through education, and was also the founder of the first agricultural school in the Land of Israel - Mikveh Israel - in 1870.

<sup>a</sup> The Land of Israel was part of the Ottoman Empire's Greater Syria governate until 1918.

Because the young couple - usually a 13-year-old girl and 17-year-old boy - continued to live within the family home, the arrival of their children only exacerbated already overcrowded living conditions, compounding the existing hardships. In practice, the additional financial support did not alleviate poverty but rather intensified the families' difficulties. In Netter's view, such child marriages led to higher rates of divorce, increased frequency of second and third marriages, physical and mental frailty, and even infertility<sup>4</sup>. Initiatives to delay the age of marriage for such child brides failed. The Evelina de Rothschild Secondary School in Jerusalem set a 200-French franc incentive grant for any girl who completed three years of schooling and reached the age of fifteen before marrying. Nevertheless, only a small number of pupils qualified for the award<sup>5</sup>.

Dr. Bernhard Neumann who worked in Jerusalem as a private physician from 1847, and later served as director of the city's Rothschild Hospital, noted the same problems<sup>6</sup>. In a book he published in 1877 entitled *The Holy City and Its Inhabitants*<sup>6</sup>. Neuman said women's health was one of the most difficult medical problems in the Jewish community, writing:

Reaching sexual maturity occurs in southern lands earlier than in northern ones, achieving womanhood among girls in Jerusalem in particular and in Syria in general already at the age of 11-13 years. It is not incidental at all that young women aged 14 years bear children, and just as their menstrual cycle appears early, thus it disappears earlier and together with it their fertility ceases: at age 35 or at the most 40 years of age cessation of menstruation already appears.

Out of more than a thousand births that I recorded... widespread fertility emerges at age 15-20... and at age 31-40 [fertility] increasingly becomes rare, and after this age it ceases entirely. ...that child marriages had a harsh impact on women's health, particularly among young girls. The direct leap from childhood to motherhood without any opportunity to experience their youth was detrimental to the soul and the health of such child mothers. Depression, secondary infertility, inability to function as required, and more...<sup>7</sup>

Jerusalem appeared frequently in various reports on the health status of women in the Land of Israel.

Most women gave birth at home, assisted by a midwife. A combination of poor nutrition, early marriage and childbirth, multiple pregnancies and offspring,

high infant mortality and widespread poverty, took a harsh toll on women's health and led to high mortality among both women and children.

Aware of the lack of access to modern medical practice, Alexandra Sonia Belkind resolved to study medicine abroad, in Geneva.

### **Dr. Alexandra Sonia Belkind**

Alexandra Sonia Belkind was born in 1872 in Minsk, Belarus, then part of the Russian Empire, to Shifra and Meir Belkind. In 1883, the Belkind family immigrated to the Land of Israel and initially settled in the fledgling agricultural village of Rishon-le-Zion ('First in Zion') established southeast of Jaffa in 1882.

In 1898, at age 26 - considered a spinster by the standards of the time - Alexandra decided to study medicine in Geneva. After completing her medical studies in Geneva with honours, she moved to Paris to begin a residency specialising in gynaecology. Her letters from this period testify to the emotional stress she experienced, expressing homesickness for her family and homeland - feelings of melancholy that were further intensified by the sorrow of a romantic relationship that ended in separation.

In 1906, Dr. Alexandra Belkind returned to the Land of Israel, determined to effect a transformative change in women's health. The medical license granted to her by the Ottoman authorities bore the serial number 29, testifying to the acute shortage of doctors at the time.

### **Women's Health: Findings**

In that same year, Dr. Belkind opened her own private clinic in Jaffa, intending to focus on treating women, who, indeed, began seeking her care in large numbers.

She said:

At the beginning my work was limited solely to healing women's diseases. But after one year, my clientele began to expand little by little - and they began coming to me also about manners of other pathologies besides women's diseases<sup>8</sup>.

Following the establishment of her clinic, Dr. Belkind was also appointed by the Ottoman authorities to serve as an expert witness in court cases concerning women's health, including claims for compensation for loss of virginity, annulment of marriage contracts due to infertility problems, and similar issues.

In her personal journal, she recorded:

Little ones [sic. single-betrothed girls] come to me for virginity checks [i.e. to establish they were

<sup>a</sup> The first Jewish hospital in the Land of Israel, founded in 1854.



Figure 2. Dr. Belkind's MD Diploma, 1905.

still virgins] in all sorts of cases of irregularities [in their anatomy], for this purpose they are brought by their parents or sent by the powers-that-be. Such [virginity] checks were 14 in number.

Between 1906 and 1912, Dr. Belkind kept a detailed record of one thousand women who visited her clinic. These records include patient backgrounds, diagnoses and treatments, and also serve as a continuous 'personal journal' reflecting her psychosocial and cultural observations regarding her patients.

She subsequently transformed these six years of clinical notes into a body of qualitative and quantita-

tive data, which she presented at the inaugural conference of the Medical Federation in the Land of Israel, convened in 1912. To the best of our knowledge, this was the first data-based study on women's health in the Land of Israel to be presented at a scientific conference and subsequently published in its proceedings.

According to Dr. Belkind, the majority of clinic visits (60%) were one-time consultations, while only 20% of the patients returned regularly. Of the one thousand women treated, 600 sought help for various infections. Most of them were Muslim women<sup>9</sup>.

The second most common reason Muslim women



Figure 3. Dr. Belkind in her clinic in Jaffa, 1905.

visited her clinic related to fertility issues. In her 1912 research report, she noted the cultural backdrop and psychosocial context underpinning these concerns:

The native woman rarely attends to her health and reproductive organs as long as she continues to bear children. Many times, I heard expressions such as this: I don't care if I'm ill as long as I can get pregnant... Infertility is just the opposite, particularly for the Arab woman, in requests from her doctor. The Arab woman doesn't suffice with the number of children she has. Some of them already have given birth to 6-7 children and they come to the doctor and request a medication to bear more [children]<sup>10</sup>.

An infertile woman in countries of the East is a miserable soul second to none because she can be sure her husband will marry another woman, and therefore she turns on blind faith to the first midwife she comes across and listens totally submissively to everything she is ordered to do...provided she will ovulate and give birth to sons<sup>11</sup>.

Belkind reported that 128 (13%) of the one thousand patients who turned to her were totally infertile and 26 were mothers to an only child. More than two-thirds of individuals in her files were Arab women, for whom Dr. Belkind was the only option for medical care, advice and assistance at the time, since in Arab Israeli culture it was not customary for Arab women to consult male doctors for "female matters"<sup>12</sup>:

The numbers demonstrate that most of my work was with native-born Muslim women, the reason resting on religious tradition that a Muslim woman (save very few exceptions) would not agree under any circumstances to be examined by a male doctor. Moreover, this being so despite cases of illness being a lot more prevalent among them than among other women because the Muslim women don't have the slightest idea about the simplest laws of health and therefore are liable to be affected by all sorts of afflictions and infectious diseases<sup>13</sup>.

Dr. Belkind said that the fact most of her patients were uneducated created special challenges:

It is very difficult to cure a patient who lacks education. The doctor can't always know from what she [sic. the patient] says, what happened to the patient, whether she followed the doctor's orders correctly and to what degree the medical treatment she received worked. In most cases, she quickly disappears in the middle of the curative process from the doctor's eyes, or the doctor hears about her from others [i.e. second-hand]...<sup>14</sup>

The age of the women who were cured by me was very different [sic. widespread], they [ranged] from 10-year-old girls up to 60 and more. If you ask an Arab woman: How old is she? she won't know how to answer precisely. The physician must judge her age according to external appearance or on a few conjectures<sup>15</sup>.

Dr. Belkind reported a particularly high number of women who sought psychotherapeutic support, seeking treatment not only for physical ailments but also for emotional distress and mental health concerns. She described the difficulties experienced by women in menopause (then occurring around the age of 40), as well as by those coping with stillbirths, spontaneous or induced abortion, and both primary and secondary infertility. Further challenges included emotional and functional distress among women whose husbands practised polygamy, and among those subjected to mental and physical domestic abuse. In her "research report", Belkind stressed in particular the problems of young girls aged 12 and 13 who were forced into marriages with older men and suffered sexual abuse.

I'll mention here that I was many times summoned to the city to treat little girls who were married off and after the first sexual intercourse their genitalia were torn and bled profusely...As well, more than once or twice that I was called to treat little ones who were married off to a man before they reached womanhood and were infected with gonorrhoea, as well as all the repercussions of this...<sup>16</sup>

Belkind noted the high prevalence of venereal disease in general, and the variations in incidence across ethnic and sub-ethnic groups. Thus, she noted the low incidence of syphilis among Jewish women compared to Arab women, and the high incidence of gonorrhoea among Sephardic Jewish women compared to Ashkenazi Jewish women.

She recorded performing 72 induced abortions in cases where pregnant women were experiencing severe haemorrhaging. She cited cases where she conducted surgery to "repair and stitch-close the hymen" in order to protect girls from retaliatory violence by male family members [so-called 'honour killings'], particularly among Arab families<sup>17</sup>.

Belkind detailed countless futile attempts to convince Arab women to let her assist them in delivering their babies, and to agree to repair vaginal tears from childbirth - a new procedure she had learned in Europe. In six years of practice and a thousand patients, only 18 women agreed to have their vaginal tears stitched

up, and only several dozen women agreed that she, a doctor, would deliver their babies in lieu of a local midwife. In addition, she cited 19 cases of childbirth fever that came into her care.

More than anything the Arab midwives bring [upon the women giving birth] affliction out of their ignorance, causing bad outcomes post-partum and tears in reproductive organs that subsequently result in defects and pathologies to those organs [...]<sup>18</sup>

These midwives permit themselves to do everything: They heal the sick, dispense medications for infertility and so forth. I'm not well versed in the medicines and remedies that these midwives employ in healing but I had cases healing women who found themselves contaminated by makeshift cotton 'plugs' (tampons) that contained all sorts of material that had been chewed with the teeth, and including even onions and the likes.

In total, Dr. Belkind reported treating 634 Muslim women, 229 Jewish women and 137 Christian women. Among them were Syrians, Greeks, Germans and Italians. Notably, however, only six of the thousand women in her patient registry were Yemenite Jews, despite the presence of several hundred Yemenite Jews in the region at the beginning of the 20th century.

Thus, Dr. Belkind's report at the conference was not only (as already noted), the first scientific study to focus on women's health issues in the Land of Israel, but also remarkable in its scope. Her documentation encompassed women from all the major ethnicities and religions in the country.

### Postscript

The outbreak of the First World War in 1914 disrupted Dr. Belkind's focus on gynaecology and led to the closure of her women's clinic. When she reopened her private clinic in Jaffa in 1918, Dr. Belkind chose to broaden its scope, treating anyone who sought her services as a private family doctor.

Alexandra Belkind married late in life, at the age of 57, to Mendel Henkin, the brother of her brother-in-

law. She lived in a joint two-story Tel Aviv residence with her sister Olga and her brother-in-law in Tel Aviv until her death in 1943.

Although she had no children, Dr. Belkind bequeathed a sum in her will to establish a rest home for doctors and promote the building of a home in Tel Aviv for the doctors' professional organisation, including conference facilities. This came to be known as the "Physicians' House".

### Dr. Belkind - Statistical Notes:<sup>19</sup>

634 Moslem women 63.4%  
229 Jewish women 22.9%  
137 Christian women 13.7%

The majority of the women were illiterate, mainly the Muslims, and ignorant of the basics of body hygiene

60% of the patient visits were a single visit  
20% 2 to 3 visits  
20% regular visits

The main motivation to consult with a doctor was infertility even in cases of secondary infertility with 6-7 children

### Symptoms diagnosed in the files<sup>20</sup>

Infertility 15.4%  
Primary infertility 12.8%  
Secondary infertility 2.6%  
Infections: 600 cases out of 1000 patients  
Venereal diseases: mainly gonorrhoea  
Tumours  
Myomas of all kinds  
Uterine prolapse

### Infertility<sup>21</sup>

50% mechanical infertility  
Morbid obesity  
Congenital malformations  
Early menopause  
Gonorrhoea  
Male factor  
Vaginismus (painful spasm of the vagina)

## ΠΕΡΙΛΗΨΗ

### Dr. Alexandra Belkind: Πρωτοπόρος στην υγεία των γυναικών στη Γη του Ισραήλ 1905-1912

Shifra Shvarts<sup>1</sup>, Zipora Shehory-Rubin<sup>2</sup>, Pnina Romem<sup>3\*</sup>, Yitzhak Romem<sup>4</sup>

Το 1906, ιδρύθηκε στην Πάφα μια γυναικολογική κλινική – η πρώτη του είδους της στο Ισραήλ που τελούσε υπό οθωμανική κυριαρχία. Η ίδρυση της κλινικής, η οποία λειτούργησε κατά την περίοδο 1906-1914, υπήρξε επαναστατική, λειτουργώντας ως καταλύτης για την αλλαγή των κοινωνικών αντιλήψεων σχετικά με την υγεία των γυναικών, ιδίως εντός της μουσουλμανικής κοινότητας. Κατά τη διάρκεια λειτουργίας της κλινικής της, η Δρ. Μπελκάντ παρέιχε ιατρική φροντίδα σε περίπου χίλιες γυναίκες, τις οποίες διέγνωσε ή/και θεράπευσε για παθήσεις που αφορούσαν αποκλειστικά το γυναικείο φύλο (γυναικολογία, μητρότητα και ψυχική υγεία), καθώς και για γενικότερα ιατρικά ζητήματα όπως η γρίπη και διάφορες φλεγμονώδεις παθήσεις. Η κλινική παρέιχε ιατρική περίθαλψη χωρίς διακρίσεις, ανεξαρτήτως φυλής ή θρησκευάτος: πάνω από το ήμισυ των ασθενών της ήταν μουσουλμάνες, ενώ οι υπόλοιπες διαιρούνταν ισόποσα μεταξύ εβραίων και χριστιανών γυναικών.

Οι φάκελοι των ασθενών της κλινικής αποτελούν μοναδική πρωτογενή πηγή πληροφοριών για την προσέγγιση στην αντίληψη των ζητημάτων υγείας των γυναικών στην αυγή του 20ού αιώνα στο Ισραήλ. Στις ιατρικές της αναφορές, η Δρ. Μπελκάντ εστίασε, μεταξύ άλλων, σε θέματα όπως οι σεξουαλικές σχέσεις, η άμβλωση, η ενδοοικογενειακή βία, ο υποσιτισμός, καθώς και η υψηλή βρεφική θνησιμότητα και τα ποσοστά αυτοκτονιών μεταξύ των γυναικών. Περιέγραψε λεπτομερώς τις επιπτώσεις του καταναγκαστικού γάμου στην εφηβεία στην υγεία των γυναικών, καθώς και τη σύνδεση μεταξύ των γάμων σε παιδική ηλικία και της δευτερογενούς υπογονιμότητας, των ψυχολογικών διαταραχών και των αποβολών. Ως συμπονετική συνομιλήτρια, η Δρ. Μπελκάντ κατέγραφε τις αφηγήσεις των γυναικών στους φακέλους της, σημειώνοντας με προσοχή τη ψυχοκοινωνική βαρύτητα των περιεχομένων των συζητήσεών της.

Η παρούσα μελέτη, βασισμένη στους ιατρικούς φακέλους των γυναικών που περιέθαλψε η Δρ. Μπελκάντ μεταξύ 1906-1914, προσφέρει πολύτιμες γνώσεις για τα ιδιαίτερα προβλήματα υγείας που αντιμετώπιζαν, ιδίως οι μουσουλμάνες γυναίκες στις αρχές του 20ού αιώνα στο Ισραήλ, καθώς και για τη σύνθετη διασύνδεση μεταξύ της δυτικής ιατρικής και των γυναικών μιας παραδοσιακής κοινωνίας.

**Λέξεις Κλειδιά:** *Υγεία των γυναικών, υπογονιμότητα, παιδικοί γάμοι, παλαιστίνη, παραδοσιακή ιατρική*

## REFERENCES

- 1 Lev E. (2004) 'The Turning Point from an Archaic Arab Medical System to an Early Modern European System in Jerusalem according to the Swiss Physician Titus Tobler (1806–77)'; *Canadian Bulletin of Medical History*, pp. 159–182. Available at: <https://www.academia.edu/104589575> (Accessed: [03/03/2025]).
- 2 Stern S. (1999) 'A Description of Medicine in Jerusalem in the mid-19th Century by Dr. Titus Tobler', in Lev, E., Amar, Z. and Shvartz, J. (eds) *Medicine in Jerusalem Through the Ages*. Tel Aviv: Eretz Publishers, Tel Aviv University, p. 117.
- 3 Yelin I. (1941) *For My Offspring*. Jerusalem.
- 4 Ha-Levanon (1869/70) [Newspaper], p. 2.
- 5 Zeiss S. (ed.) (1989) *Jubilee Yearbook of Evelina de Rothschild School*. Jerusalem, p. 10.
- 6 Neumann B. (1949) *The Holy City and Its Inhabitants*. Jerusalem: Rav Kook Institute, p. 26.
- 7 Neumann B. (1949) *The Holy City and Its Inhabitants*. Jerusalem: Rav Kook Institute, p. 26.
- 8 Belkind A. (1913) 'Some statistical conclusions from my gynaecological work in Jaffa 1906-1912. Memories of the Hebrew Medical Association in Israel, Lecture at the conference May 2-3, 1913', in Shehory-Rubin, Z., Shvarts,

S. and Romem, I. (eds) *Alexandra Belkind: The Story of a Pioneering Jewish Woman Doctor*. Zichron Yaakov: Itay Bahur Publication, pp. 79-88.

- 9 *ibid*, p. 80.
- 10 *ibid*, pp. 80-81.
- 11 *ibid*, pp. 84-85.
- 12 *ibid*, pp. 85-86.
- 13 *ibid*, pp. 85-86.
- 14 *ibid*, p. 80.
- 15 *ibid*, p. 81.
- 16 *ibid*, p. 81.
- 17 *ibid*, p. 81.
- 18 *ibid*, pp. 80-81.
- 19 *ibid*, p. 79.
- 20 *ibid*, pp. 84-86.
- 21 *ibid*, p. 86.

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