14. Let $a = 2k$ then we may take $b = k + 1$ with $c = k$, i.e. one triangle
or taking $b = k + 2$ with $c = k + 1$,k or $k - 1$ gives 3 triangles, or in general
taking $b = k + r$ we may take $c = k + (r - 1),\ k + (r - 2), \ldots, k + (1 - r)$ giving
$k + (r - 1) - \left(k + (1 - r)\right) + 1 = 2r - 3$ triangles
so total number of possible triangles is $1 + 3 + 5 + \ldots + 2N - 3$ and $2n - 3 = a - 3$
Now let $a = 2k + 1$ then we may take

$b = k + r$ with $c = k + (r - 1),\ k + (r - 2), \ldots, k + 2 - r$ giving $2r - 2$ triangles
so number of possible triangles is $2 + 4 + 6 = \ldots = 2N - 2$ $(= a - 3)$
so total number of non-degenerate triangles is
$a = 4;\ (b, c) = (3, 2)$
$a = 5;\ (b, c) = (4, 3), (4, 2)$
$a = 6;\ (b, c) = (5, 4), (5, 3), (5, 2), (4, 3)$
$a = 7;\ (b, c) = (6, 5), (6, 4), (6, 3), (6, 2), (5, 4), (5, 3)$
.e. $1 + 2 + (1 + 3) + 92 + 4) + (1 + 3 + 5) + (2 + 4 + 6) + \ldots + (1 + 3 + \ldots + 2N - 3) + (2 + 4 + \ldots + 2N - 2)$
$= (1 + 2) + (1 + 2 + 3 + 4) = (1 + 2 + \ldots + 6) = 91 + \ldots + 8) + \ldots + (1 + \ldots + 2N - 2)$
$$= 3 + 10 = 21 + 36 = \ldots = N(2N + 1) = \sum_{r=1}^{N-1} r(2r + 1) = 2\sum_{r=1}^{N-1} r^2 + \sum_{r=1}^{N-1} r$$
$$= \frac{2}{6}(N - 1)N(2N - 1) + \frac{1}{2}(N - 1)N = \frac{1}{6}N(N - 1)(4N - 2 + 3) = \frac{1}{6}N(N - 1)(4N + 1)$$
so for any value of N, the number of triangles is $\frac{1}{6}N(N - 1)(4N + 1)$
$N = 3$ gives $\frac{1}{2} \times 2 \times 13 = 13$
Check!
From above $a = 7$ gives 6 triangles, $a = 6$ gives 4, $a = 5$ gives 2 and $a = 4$ gives 1 i.e. a total of 13
Number of possible selections of thre rods is $\frac{1}{6}(2N + 1)2N(2N - 1) = \frac{1}{3}N(4N^2 - 1)$
so probability that a triangle can be formed from 3 randomly selected rods is $\dfrac{\frac{1}{6}N(N-1)(4N+1)}{\frac{1}{3}N(4N^2-1)}$
i.e. $\dfrac{(N-1)(4N+1)}{2(4N^2-1)}$ as required.