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Establishing Psychometric Properties of Menopause Symptoms Inventory (MSI)

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Abstract

The literature has suggested that menopause symptoms are conveniently divided into two groups: these are psychological symptoms associated with immediate or eminent cessation of menses, and those physiological symptoms which appear after some years of menopause. The purpose of this study was to construct an inventory based on psychological and physiological symptoms which appear after some years of menopause, to obtain test-retest reliabilities of items and to factor analyze the instrument to empirically investigate the two-type of menopause. The first set of 550 items had mean test-retest reliabilities of 0.76 and yielded two clearly distinct factors in support of the two-type hypotheses. When items with factor loadings less than ±0.35 were discarded, 250 items remained and the mean test-retest reliabilities of these items was 0.78.Again, the 250 items in the second phase was reduced to 110 items in the third phase which now yielded two clearly distinct factors defining psychological and physiological symptoms consistent with the literature yielded test-retest reliabilities of 0.87. The retained items from the first inventory and the items from the second and third inventory loaded on the same factors all the times. It was concluded that two types of menopause symptoms do, in fact exist and that this study has provided a reliable means of differentiating them.

Keywords: Psychometric properties; Menopause; Symptoms and Inventory.

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1. Introduction

Menopause literally means the "end of monthly cycles" (the end of monthly periods menstruation), from the Greek word *pausis* (cessation) and the root *mean-* (month). Menopause is an event that typically (but not always) occurs in women in midlife, during their late 40s or early 50s, and it signals the end of the fertile phase of a woman's life [22]. However, rather than being defined the absence of menstrual flow, menopause is more accurately defined as the permanent cessation of the primary functions of the ovaries: the ripening and release of ova and the release of hormones that cause both the creation of the uterine lining, and the subsequent shedding of the uterine lining (the menses or the period) [11]. The indication of this is equivalent to retirement from menstrual flow and in a way stoppage of reproductive systems.

Transition from a potentially reproductive to a non-reproductive state is the result of a reduction in female hormonal production by the ovaries [5] which is normally not sudden or abrupt, but tends to occur over a period of years, as a consequence of biological aging. However, for some women, the accompanying signs and effects that can occur during the menopause transition years can significantly disrupt their daily activities and sense of well-being. The functional disorders often significantly speed up the menopausal process and create more significant health problems, both physical and emotional, for the affected women [23]. Menopause has a wide starting range, but can usually be expected in the age range of 42– 45 [5]. Meanwhile, an early menopause can be related to cigarette smoking, higher body mass index, racial and ethnic factors, illnesses, chemotherapy, radiation and the surgical removal of the ovaries, with or without the removal of the uterus. In his own opinion [19] asserted that menopause can be officially declared (in an adult woman who is not pregnant, is not lactating, and who has an intact uterus) when there has been amenorrhea (absence of any menstruation) for one complete year.

Reference [17] observed the following as preceding the cessation of menses, irregular menses, vasomotor instability (hot flashes and night sweats), atrophy of genitourinary tissue, increased stress, breast tenderness, vaginal dryness, forgetfulness, mood changes, and in certain cases osteoporosis and/or heart disease. According to them, these effects are related to the hormonal changes a woman's body is going through, and they affect each woman to a different extent. The only sign or effect that all women universally have in common is that by the end of the menopause transition every woman will have a complete cessation of menses .This in essence indicates that menopause varies from individual to individual and it also depends on a number of factors including the onset of menarche as an adolescent. In Nigeria, the most typical age range for menopause (last period from natural causes) is between the ages of 40 and 61 and the average age for last period is 51 year [2], although this varies considerably from one woman to another [26]. Women who have undergone hysterectomy with ovary conservation go through menopause on average 3.7 years earlier than the expected age.

Peri-menopause which literally means ‘’around menopause’’ precedes the menopause proper and is the transition from reproductive life to menopause, characterized by irregularities in menstrual cycle. Average age is 45 to 47, but may occur as early as 35. Some hallmark symptoms of peri -menopause include; shortening of menstrual cycle, shorter or longer duration of bleeding, heavier bleeding, increased mood disturbances, sleeplessness, or hot flashes. Two things that may influence the age of onset of natural menopause are smoking

and genetics. Daughters tend to experience menopause at nearly the same age as their mothers. This span of time is also commonly called the change of life, the change, or the climacteric.

The fluctuations in the hormone level of estrogen is what causes many physical changes during perimenopause as well as menopause [24]. Some of these changes are hot flashes, night sweats, difficulty sleeping, vaginal dryness or atrophy, incontinence, osteoporosis and heart disease. During this period, fertility diminishes, but is not considered to reach zero until the official date of menopause. The official date is determined retroactively, once 12 months have passed after the last appearance of menstrual blood. Signs and effects of the menopause transition can begin as early as age 35, although most women become aware of the transition in their mid to late 40s, often many years after the actual beginning of the perimenopausal window.

The duration of perimenopause with noticeable bodily effects can be as brief as a few years, but it is not unusual for the duration to last ten or more years. The actual duration and severity of perimenopause effects for any individual woman currently cannot be predicted in advance. Even though the process or the course of perimenopause or menopause can be difficult to predict, often the age onset is somewhat predictable. Women often, but not always will start this transitions (perimenopause and menopause) about the same time as their mom [3].

Hot flashes can be so strong that they raise the body temperature by many degrees in a very short period of time; this extreme temperature differential can cause the sufferer to feel weak and break out in heavy sweating. Despite the discomfort to the woman, hot flashes are not considered harmful by physicians. Many women manage hot flashes by dressing in ways that dissipate heat quickly (natural fibers, loose clothing, easily removable layers of lightweight garments) as well as mechanical means which help the body to remove excess heat, such as fans, drinking ice water, and staying in cool rooms [10]. Other common effects encountered during the peri -menopausal period include mood changes, insomnia, fatigue, and memory problems. Menopause may, in some women, bring about a sense of loss related to the end of fertility. In addition this change often occurs at a time of life when other stressors may be present in the life of a woman.

Post -menopause is thus all of the time in a woman's life that take place after her last period, or more accurately, all of the time that follows the point when her ovaries become inactive [22]. The reason for this delay in declaring a woman postmenopausal is because periods are usually extremely erratic at this time of life, and therefore a reasonably long stretch of time is necessary to be sure that the cycling has actually ceased completely. At this point a woman is considered infertile, and no longer needs to consider the possibility of becoming pregnant. However the possibility of becoming pregnant has usually been very low (but not zero) for a number of years before this point is reached [14].

Reference [11] stated the effects of menopause as including formication (crawling, itching, or tingling skin sensations), which may be associated directly with hormone withdrawal. Both users and non-users of hormone replacement therapy identify lack of energy as the most frequent and distressing effect [13]. Other effects can include vasomotor symptoms such as hot flashes and palpitations, psychological effects such as depression, anxiety, irritability, mood swings, memory problems and lack of concentration, and atrophic effects such as

vaginal dryness and urgency of urination.

The average woman also has increasingly erratic menstrual periods, due to skipped ovulations. In addition the duration of the flow may be considerably shorter or longer than normal, and the flow itself may be significantly heavier or lighter than was previously the case, including sometimes long episodes of spotting. Early in the process it is not uncommon to have some 2-week cycles. Further into the process it is common to skip periods for months at a time, and these skipped periods may be followed by a heavier period [19]. At the point when a woman of menopausal age has had no periods or spotting for 12 months, she is considered to be one year into post-menopause.

According to [12] menopause was found to be associated with hot flashes; joint pain and muscle pain; and depressed mood . Menopause was found not to be associated with poor sleep, decreased libido, and vaginal dryness. However, in contrast to this, it was found to have association with poor sleep quality [7]. Menopause symptoms are conveniently divided into two groups: those acute (psychological) symptoms associated with immediate or eminent cessation of menses, and those later (physiological), symptoms which appear after some years of menopause. However, it is believed that three symptoms may be regarded as truly related to menopause. The purpose of this study therefore is to attempt to develop local instrument create for understanding of signs and symptoms of Menopause as many of such instruments available are foreign ones.

1.1 Hypotheses

In order to establish the psycho-metric properties of this inventory, the following null hypotheses were formulated and tested.

H1: Psychological and physiological symptoms will not differ significantly in the women experiencing menopause.

H2: The reliability and distribution of the scores will not indicate that MSI possess psychometric capable of differentiating between the two types of menopause.

H3: The type of menopause symptoms chosen by the participants will not correlate with the three factors pattern of unrotated MSI factors to evaluate interrelationships among the items.

H4: The ranked scores of the items will not reveal a relatively continuous dimension between acute and later symptoms of menopause.

1.2 Methodology

The menopause symptoms inventory a psychometric test to differentiate between the two types of menopause was constructed by:

1) Developing items from the literature that characterized the symptoms i.e. (acute (psychological) and later

(physiological) symptoms.

2) Administering and factor analyzing these items on three separate samples.

Step 1

For the administration of the inventory to the first sample 550 items were developed from symptoms of the two types of menopause discussed in the literature. The 550 items were statements about symptoms with five response choices reflecting the degree to which the symptom is present for the participants and would select one of five alternative responses most descriptive of her. The final item had only two response choices. This item asked whether or not the participants was taking hormonal prescriptive, including oral contraceptives before the cessation of their menses. The participants constituting the first sample were 200 volunteer female teachers from 3 different schools in Ibadan North Local Government Area of Oyo State who described themselves as menopausal individuals. These participants were given the 550-item inventory once at the beginning and again at the end of a 2-week period.

After this inventory was given the second time, the participants were asked to indicate on their inventory the type that best described their experience with menopausal symptoms. The purpose of the two administrations for the first sample was to yield test-retest reliability of the items which was 0.76 after subjecting it to Pearson Product Moment Correlation Coefficient. Factor analysis was performed on the results of the second administration.

Step II

Two types of menopause symptoms emerged from and were defined by the factor analysis of the data from administration of the inventory to the first sample. This inventory was then revised by eliminating those items which were not correlated with the factors, and by rewriting items for increased clarity. The resulting, revised inventory had 250items). One hundred and twenty-five (125) of these 250 items were statements about symptoms with five response choices reflecting the degree to which the symptom is present for the participants completing the inventory.

One hundred and twenty-five (125) of these 250 items were characteristics of acute (psychological) symptoms and One hundred and twenty-five (125) characteristics of later (physiological) symptoms of menopause. This revised inventory was administered to a second sample to examine whether or not the items would continue to be reliable, and would continue to generate the same factors item inventory. The participants in the second sample were 165 female teachers from three different secondary schools in Akinyele Local Government Area of Oyo State who described themselves as having menopause symptoms, and who had not participated in the previous administrations of the 550-item inventory. These participants were given the 250-item inventory once at the beginning and again at the end of a 2-week period.

This 250-item inventory was scored so that each participant was given a score of 1-5 for each item. The score of 5 was assigned when participants responded to ‘always’ experiencing a symptom characteristic of acute

(psychological) menopause symptoms. A score of 1 was assigned if participants responded to 'never' experiencing this symptom. Conversely, a score of 1 was assigned if participants responded to 'always' experiencing a symptom characteristic of later (physiological) menopause symptoms; and a score of 5 was assigned if another participant responded to 'never' experiencing this symptom. Thus, the 125 items describing symptoms characteristic of later (physiological) menopause were scored in reverse order to those of later (physiological) menopausal stage. In this phase a correlation coefficient of 0.78 was obtained after processing the data collected with (PPMC). The scores of 2,3 and 4were assigned in order to correspond to the scoring pattern described above.

Step 111

From the responses obtained at the second step of the development of (MSI –R), the researcher further subject the items to qualitative and quantitative analysis using Item Discrimination (ID) Technique. Thus, the 250 items at the steps II were reduced to 160 divided into psychological and physiological symptoms. These items were also given to test experts and psychologist for validation. They were further reduced to 110 items that finally made up the MSI –R. These were eventually tested on 80 menopausal women in Oyo East Local Government Area. The internal consistency correlation co-efficient of the inventory was established using responses obtained from step III. The response was subjected to Pearson Product Moment Correlation Coefficient Reliability which yielded .933 and coefficient Alpha of .87. The highest possible score was 550 and the lowest possible score was 110.

The Inventory

Menopause Symptoms Inventory- Revised is a psychological and physiological instrument that contains 55 structured items of psychological symptoms and 55 items of physiological symptoms. The responses to the items are graded on a 5-point likert format.

Table 1: Internal Consistency Values of Menopause Symptoms Inventory- Revised

Items	Inter- Item R.I (T-I)	Items	Inter- Item R.I (T-I)
1.	.6320	56.	.5563
2.	.4961	57.	.5591
3.	.5348	58.	.6598
4.	.6235	59.	.7332
5.	.6354	60.	.6380
6.	.6969	61.	.5959
7.	.6704	62.	.5745
8.	.7222	63.	.6492
9.	.7226	64.	.6217
10.	.6903	65.	.6338

11.	.5510	66.	.4389
12.	.6772	67.	.6991
13.	.6363	68.	.6727
14.	.7234	69.	.5337
15.	.6363	70.	.7674
16.	.7234	71.	.7223
17.	.5739	72.	.5316
18.	.5216	73.	.5992
19.	.5443	74.	.5453
20.	.6217	75.	.5818
21.	.5121	76.	.4671
22.	.6532	77.	.7916
23.	.6827	78.	.6067
24.	.6623	79.	.6365
25.	.5681	80.	.5634
26.	.5492	81.	.5161
27.	.6540	82.	.7453
28.	.6489	83.	.7317
29.	.7857	84.	.7101
30.	.4365	85.	.5949
31.	.5719	86.	.5627
32.	.5064	87.	.6939
33.	.6517	88.	.4536
34.	.4623	89.	.6653
35.	.5313	90.	.6712
36.	.6142	91.	.6003
37.	.4903	92.	.5339
38.	.5717	93.	.6720
39.	.6218	94.	.7567
40.	.7235	95.	.7329
41.	.7162	96.	.7033
42.	.6663	97.	.6731
43.	.5412	98.	.7844
44.	.5864	99.	.4555
45.	.4608	100.	.6937
46.	.7219	101.	.6531
47.	.6967	102.	.5182

48.	.5731	103.	.5729
49.	.7553	104.	.6915
50.	.5277	105.	.5364
51.	.4393	106.	.7217
52.	.6509	107.	.6921
53.	.6848	108.	.5863
54.	.5163	109.	.6535
55.	.6290	110.	.5159

Equal Length Spearman – Brown = .7391

Unequal Length Spearman – Brown = .7533

Guttmann Split Half = .7769

Coefficient Alpha = .7925

Table 2: Factor pattern of the three unrotated MSI-R factor

Items	Factor 1	Factor 2	Factor 3	H2
1.	-0.241	0.676	-0.287	0.674
2.	0.590	0.319	0.366	0.538
3.	0.189	0.505	-0.298	0.384
4.	0.438	0.318	0.344	0.409
5.	0.319	0.514	0.316	0.467
6.	0.579	-0.267	-0.230	0.455
7.	0.622	-0.248	0.322	0.550
8.	0.416	-0.289	-0.313	0.356
9.	-0.268	0.565	0.294	0.477
10.	0.499	-0.284	-0.212	0.368
11.	0.247	0.486	0.357	0.419
12.	0.588	0.317	0.327	0.548
13.	0.300	0.484	0.320	0.426
14.	0.596	0.230	0.396	0.560
15.	0.470	-0.278	0.412	0.461
16.	-0.211	0.590	-0.019	0.395
17.	0.256	0.496	-0.236	0.365
18.	0.610	-0.277	0.401	0.614
19.	0.344	0.434	0.346	0.430

20.	0.320	0.580	0.350	0.563
21.	0.522	0.316	0.327	0.477
22.	0.270	0.469	-0.249	0.350
23.	0.237	0.412	0.300	0.312
24.	0.488	-0.249	-0.273	0.366
25.	0.596	-0.597	0.387	0.865
26.	0.632	0.503	-0.217	0.671
27.	0.513	0.319	0.461	0.583
28.	0.419	-0.276	0.293	0.382
29.	0.537	-0.291	0.346	0.406
30.	0.461	0.468	0.311	0.472
31.	0.585	0.371	0.315	0.453
32.	0.569	0.320	0.292	0.551
33.	-0.286	0.593	0.218	0.352
34.	0.491	0.287	0.375	0.473
35.	0.372	0.694	0.329	0.386
36.	0.271	0.422	0.369	0.491
37.	0.553	-0.229	0.421	0.518
38.	0.641	0.579	-0.039	0.462
39.	0.597	0.393	-0.236	0.506
40.	0.313	0.233	0.407	0.416
41.	-0.417	0.483	0.351	0.359
42.	0.611	0.515	0.327	0.365
43.	0.337	0.363	-0.273	0.641
44.	0.417	0.541	0.387	0.403
45.	0.343	0.592	0.313	0.536
46.	0.627	0.534	0.316	0.417
47.	0.631	0.436	-0.213	0.310
48.	0.540	0.363	0.357	0.322
49.	0.484	-0.217	0.396	0.367
50.	0.439	0.381	0.402	0.651
51.	-0.219	0.411	0.353	0.413
52.	0.616	0.372	0.294	0.533
53.	0.573	0.329	0.289	0.427
54.	-0.243	0.667	-0.237	0.473
55.	0.289	0.391	0.316	0.352
56.	0.438	0.513	0.478	0.465

57.	0.317	0.381	0.692	0.433
58.	0.597	0.517	0.605	0.465
59.	0.614	0.367	0.477	0.526
60.	0.461	-0.251	0.600	0.363
61.	-0.263	-0.298	0.631	0.561
62.	0.492	0.655	0.578	0.491
63.	0.274	-0.248	0.568	0.432
64.	0.303	0.468	0.619	0.624
65.	-0.212	0.319	0.567	0.574
66.	0.271	0.448	0.446	0.359
67.	0.237	0.231	0.239	0.423
68.	0.512	-0.279	0.432	0.487
69.	0.481	0.509	0.410	0.610
70.	0.611	0.469	0.408	0.588
71.	0.407	-0.273	0.637	0.413
72.	0.569	0.443	0.577	0.625
73.	0.309	0.508	0.617	0.456
74.	-0.213	0.361	0.464	0.522
75.	0.331	0.496	0.391	0.411
76.	0.342	0.416	0.322	0.373
77.	-0.266	-0.294	0.513	0.418
78.	0.329	0.579	0.291	0.316
79.	0.414	0.433	0.311	0.545
80.	0.529	0.510	0.415	0.635
81.	0.515	0.513	0.514	0.617
82.	0.412	0.667	0.435	0.617
83.	0.591	0.531	0.557	0.568
84.	0.384	0.554	0.510	0.484
85.	0.513	-0.261	0.591	0.411
86.	0.695	0.336	0.471	0.477
87.	0.362	0.565	0.568	0.451
88.	0.418	0.482	0.493	0.553
89.	-0.286	0.319	0.664	0.553
90.	0.439	0.482	0.372	0.647
91.	0.274	0.330	0.328	0.536
92.	0.566	0.627	0.537	0.541
93.	0.303	0.509	0.648	0.624

94.	0.516	0.694	0.511	0.650
95.	0.433	-0.279	0.595	0.514
96.	-0.201	0.438	0.496	0.539
97.	0.266	0.550	0.420	0.416
98.	0.613	0.613	0.449	0.340
99.	0.431	0.429	0.379	0.563
100.	0.302	0.421	0.301	0.547
101.	0.519	-0.243	0.432	0.503
102.	0.276	0.537	0.414	0.312
103.	0.372	0.511	-0.276	0.514
104.	0.581	0.444	0.563	0.527
105.	0.615	0.422	-0.236	0.514
106.	0.482	0.327	0.492	0.422
107.	0.369	0.447	0.443	0.497
108.	0.503	0.529	0.513	0.413
109.	0.662	0.318	0.431	0.540
110.	0.577	0.416	0.551	0.532S
Total Variance accounted for	33.741	25.923	11.463	71.127
Eigen values	5.717	2.991	1.005	

Table 3: List of ranked scores obtained from second pilot administration of MSI-R

Items	**Ranked Scores**	**Items**	**Ranked Scores**
1.	510	41.	394
2.	508	42.	393
3.	508	43.	390
4.	506	44.	386
5.	506	45.	384
6.	503	46.	380
7.	503	47.	372
8.	503	48.	370
9.	503	49.	366
10.	499	50.	362
11.	498	51.	360
12.	496	52.	350

13.	496	53.	344
14.	496	54.	342
15.	492	55.	340
16.	485	56.	338
17.	480	57.	332
18.	480	58.	330
19.	472	59.	328
20.	470	60.	320
21.	465	61.	318
22.	452	62.	312
23.	448	63.	310
24.	448	64.	308
25.	440	65.	300
26.	440	66.	295
27.	440	67.	292
28.	436	68.	290
29.	436	69.	288
30.	425	70.	284
31.	425	71.	280
32.	425	72.	276
33.	425	73.	273
34.	425	74.	270
35.	418	75.	265
36.	410	76.	263
37.	410	77.	260
38.	402	78.	255
39.	400	79.	252
40.	398	80.	

N= 80

2. Results

2.1 Hypotheses Testing

In this section of the paper, results of analysis of research hypotheses are presented. The 110-item inventory first underwent a correlational analysis to examine the reliability of the items over the 2-week period of time. All items yielded reliability coefficients equal to or greater than0.600 and the average coefficient based on Z-score transformation was 0.76. Following this correlational analysis, a principle components factor analysis [16] was

performed on the second administration of the inventory. This was to examine whether or not participants were responding differently to those items, theoretically characteristic of later (physiological) menopause symptoms.

The requirement that a factor possess an Eigen value greater than 1 was the criterion for the number of factors (of a limit of ten) was considered. Using this criterion, the first three factors were extracted from the correlations among items. These three factors accounted for 42.57 percent of the data's variance, while the other factors accounted for an additional 10.46 percent of the total variance. Those items with factor loading greater than ± 0.350 were assigned to one of the three factors. For those items meeting this criterion, the highest loading determined the factor to which the item was assigned. Using this procedure, no items were assigned to the third factor and 140 items which did not meet criterion were eliminated. The items which were assigned to the first factor were all characteristic of acute psychological symptoms of menopause while those items which were assigned to the second factor were all characteristic of later (physiological) symptoms of menopause.

3. Discussion and conclusions

This edition is a response to the client's observation and sensitivity to the yearnings of the therapists. Thus, the former 25 Menopause Symptoms Questionnaire (MSQ) is further developed through literature review and the fact that clients complained that some of the items lumped together, may not occur at the same time, inspire the author to extensively review current and recent literature on menopause and generated and validated additional items to read the current 110 items. The extraction of the two factors, the reliability of the items and distribution of the scores into two groups all suggest that the MSI has a psychometric capable of differentiating the two types of menopause symptoms. This finding is important for three reasons. First, it substantiates [15] assertion that there are two types of menopause symptoms – acute symptoms associated with immediate or eminent cessation of menses and those later symptoms which appear after some years of menopause.

Second, because the two types manifests at different times and require different treatments, it may be necessary to determine client's type of symptom. Third, MSI allows reliable and efficient differentiation between the two types of symptoms for future research on therapy tailored to each type, of symptom, acute (psychological) and later (physiological) symptoms. One such possible treatment is behaviour modification, which has been shown to be an effective therapy for acute (psychological) symptoms of menopause might be further explored as a treatment which may be more effective with one of the two types of the symptoms. Research has suggested that one of the physiological effects of muscle relaxation treatment is a reduction [18]. If, as asserted by [13] the discomfort in menopause symptoms is related to acute symptoms such as insomnia, the hot flush while the later symptoms is related to decline in physical and mental energy, profound sweating, then Stress Inoculation Training (SIT) may be more effective with acute psychological symptoms. Further research is necessary to ascertain whether the pairing of muscular relaxation with the onset of menopause would lead to an alleviation of the discomfort experience by women with acute (psychological) menopause symptoms.

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