Review

Methods used in cross-cultural comparisons of psychological symptoms and their determinants

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Abstract

This paper is the second in a series of reviews of cross-cultural studies of menopausal symptoms. The goal of this review is to compare and contrast methods which have been previously utilized in cross-cultural midlife women's health studies with a view to (1) identifying the challenges in measurement across cultures in psychological symptoms and (2) suggesting a set of unified questions and tools that can be used in future research in this area. This review also aims to examine the determinants of psychological symptoms and how those determinants were measured. The review included eight studies that explicitly compared symptoms in different countries or different ethnic groups in the same country and included: *Australian/Japanese Midlife Women's Health Study (AJMWHS), Decisions At Menopause Study (DAMeS), Four Major Ethnic Groups (FMEG), Hilo Women's Health Survey (HWHS),Penn Ovarian Aging Study (POAS), Study of Women's Health Across the Nation (SWAN), Women's Health in Midlife National Study (WHiMNS), and the Women's International Study of Health and Sexuality (WISHeS) and.*

This review concludes that mental morbidity does affect vasomotor symptom prevalence across cultures and therefore should be measured. Based on the review of these eight studies it is recommended that the following items be included when measuring psychological symptoms across cultures, f*eeling tense or nervous, sleeping difficulty, difficulty in concentrating, depressed and irritability along with the CES-D scale, and the Perceived Stress Scale.* The measurement of these symptoms will provide an evidence based approach when forming any future menopause symptom list and allow for comparisons across studies.

Keywords:
Menopause
Cross-cultural
Methodology
Symptom reporting
Psychological symptoms
Depression

Contents

1 Introduction

Cross-national epidemiological surveys of depression suggest that females have approximately double the lifetime rates of males (1). This sex difference begins in adolescence, increases during the reproductive years and is largest in middle age, peaking before menopause for women (2). Literature ranges from assertions that psychological symptoms increase across the menopausal transition, to menopausal depression is more highly correlated with previous depression, to more complex biopsychosocial etiological models (3). Because views of menopause as a risk factor for psychopathology often derive from clinical studies, data on psychological symptoms in general populations are needed.

Large cross-cultural studies have provided detailed information about the prevalence of menopausal symptoms and have enabled variables from previous studies to be examined as predictors of psychological menopausal symptoms. It is difficult, however, to ascertain whether life circumstances or the menopausal transition is associated with psychological symptoms at midlife (4). In Thailand, - feelings of depression or sadness increased from 26.19% among pre-menopausal women to a peak of 58.88% among peri-menopausal women and then dropping to 43.10% among post-menopausal women (5).

Differences in psychological symptoms across cultures may result from different instruments used to measure symptoms across different studies. Psychological symptoms have been explored in varying ways with different results. The following review identifies how psychological symptoms have been measured across cultures, and suggests a set of unified questions and tools that can be used to further cross cultural research in psychological symptoms at midlife.

2. Methodological Considerations

The studies included in this review are described in an overview article (6).

Here, determinants of psychological symptoms are presented (Table 1), with attention paid to the measurement of these determinants. Bivariate results and the significance of country/ethnic differences in relation to psychological symptoms by each of the studies are presented in Table 2, with multivariate results shown in Table 3. Recommendations for a set of questions and tools are made in the conclusion that can be used in future research in the measurement across cultures of psychological symptoms.

3. Results

3.1 Measures of psychological symptom frequencies

Symptom checklists used to assess frequencies of psychological symptoms

The measures used for psychological symptoms in the eight studies identified above were all subjective measures (self report). Several specific menopausal symptom scales have been used, including *The Greene Climacteric Scale*, several versions of the *Everyday Complaint Checklist*, the Menopause Rating Scale, the Women's Health Questionnaire, the *Kupperman Menopausal Index* and the *Menopause-Specific Quality of Life Questionnaire*. Other self report scales which have been used to measure psychological symptoms include: *the CES-D*

Scale to measure depression, *the Zung Anxiety Scale* to measure anxiety, and *The Perceived Stress Scale* to measure current stress.

[INSERT TABLE 1 HERE]

The *Greene Climacteric Scale* (7) was used in the AJMWHS (8-10). The Greene Climacteric Scale has strong psychometric properties, including: reliability of the psychological scale 0.87; content validity; and construct validity which have been confirmed in relation to psychological treatment.

This scale measures the extent to which an individual is affected by 21 symptoms for the present time. A psychological factor score can be computed from the Greene Climacteric Scale. Symptom reports, recoded as yes/no, and psychological factor scores are compared in Table 1. For comparison across studies, scores in Table 2 represent women who indicated any symptom experience. Calculation of a Psychological Scale is the sum of symptoms 1-11 (recorded above). The psychological scale can be further subdivided to give measures of: Anxiety – sum of items 1-6, and Depression- sum of 7-11.
The *Everyday Complaint Checklist* (11, 12) was used as the base for the symptom list in DAMeS (13), HWHS (14), and SWAN (15). Percentages in Table 2 reflect the number of women who said they had experienced the symptom, regardless of frequency (e.g., regular or occasional). In DAMeS, the scale includes a symptom checklist consisting of 25 items, and covers a variety of manifestations for psychological symptoms.
The Hilo Women's Health survey used a modified version of the *Everyday Complaint Checklist with t*he items related to psychological symptoms. The *Everyday Complaint Checklist* was modified and used as the base for the 12 item symptom list used in SWAN. The list was tested in focus groups of European, African, Japanese, Chinese, and Hispanic women (15). Sleep was measured with one item asking about the quality of a typical night's sleep in the past two weeks (very sound/ sound/ average or restless/ very restless) taken from the Women's Health Initiative. Further psychosocial scales included 1) the Center for Epidemiological Studies (CES-D) scale (16), with a cut point for depression of 16 or above; and 2) the perceived stress scale.

The FMEG used the Midlife Women's Symptom Index to measure 73 symptoms, including psychological symptoms.

The *Women's Health Questionnaire* (WHQ) (17) was used in the MAHWIS (18) to measure depressed mood and anxiety. The WHQ is a 36-item questionnaire developed to assess nine areas of current (past 2 weeks) symptom experience in middle-aged women. It has good psychometric properties including high internal reliability (Cronbach's alpha 0.7-0.84 and high test-retest reliability: 0.78-0.96). Provisional multi-trait analysis suggests that the internal reliability of the subscales is reasonable. Cronbach alpha levels were as follows: depressed mood (.7), anxiety (.77), sleep problems (.73); depression and anxiety subscales. The psychological symptoms measured are scored on a four point scale from "yes definitely" to "no, not much at all" (19).

The Penn Ovarian Aging Study (POAS) used the *Kupperman Menopausal Index* to develop a Menopause Symptom List (MSL) (20). Each of the study symptoms was queried using the validated symptom list that was embedded in the structured interview questionnaire. The psychological symptoms questioned included: depressed mood and poor sleep. A sleep quality factor score derived from St Mary's Hospital Sleep questionnaire, was adapted for the

population. Participants were asked if 12 symptoms occurred in the past month, the frequency of each symptoms, and severity (0 none to 3 severe), (20); however, in published study results, frequencies are not given for each symptom. Trouble sleeping loaded onto a Psychological Factor.

In addition to the MSL, a daily symptom rating (DSR) form included 20 common menopausal complaints, rated from 0 (not present) to 4 (very severe) (symptoms listed in Appendix 1) (21)). The following psychological symptoms were included: anxiety, tension, "on edge", "nerves"; irritability, persistent anger; depression, feeling sad, down or blue; insomnia, (trouble sleeping); difficulty concentrating. The DSR was completed each day for one menstrual cycle (n=308). DSR scores were calculated by summing item ratings for follicular days (6–12) and late luteal days (23–28)(21). The reliability of the DSR was estimated at 0.94 for Cronbach's coefficient alpha.

Depression, anxiety and stress were also measured using the following scales. The CES-D Scale assessed current depressive symptoms. Subjects rated 20 items that relate to depressed mood from 0 (not at all) to 4 (most of the time); the ratings were summed for a total score. Scores greater than 16 were classified as indicating depression (22). The Zung Anxiety Scale assessed current anxiety. Subjects rated 5 affective and 15 somatic symptoms on a four-point scale ranging from none (0) to all of the time (4). The ratings were summed for a total score, with higher scores signifying more anxiety. The CES-D Scale and the Zung Anxiety Scale are both well established validated measures of depression and anxiety. The Perceived Stress Scale was also used to measure psychological symptoms and is a 14-item validated measure to assess current stress. Subjects rated the items on a five-point scale from 0 (never) to 4 (very often).

The WHiMNS study used a symptom questionnaire derived and modified from two questionnaires: the Revised Illness Perception Questionnaire (IPQ-R) (23) and a menopause specific quality of life questionnaire (24). Depression symptoms were measured by a short form of the CES-D depression symptoms index (25).

The WISHeS study used the *Menopause-Specific Quality of Life Questionnaire*. This was developed as a self-administered instrument to measure the impact of menopausal symptoms on quality of life of middle aged women. The questionnaire includes 7 psychosocial items. The questionnaire asks each respondent whether she had experienced the symptom in the previous month and to indicate how bothered she was by the symptoms on a 7-point Likert scale. The investigators of WISHeS added seven symptoms to the original 29 items of the scale.

3.2 Determinants of psychological symptoms across studies

Table 2 presents the frequencies of the various psychological symptoms and the significance of country/ethnic differences in relation to the psychological symptoms studied.

[INSERT TABLE 2 AND 3 HERE]

In the area of individual symptoms measured with the scales mentioned previously, *difficulty in sleeping* and *feeling tired or lacking in energy* were found to be statistically different amongst the different cultures; Beirut/Rabat/Madrid/Massachusetts ($P<0.01$) [DAMeS]; Euro American/Japanese American ($P>0.01$) [HWHS]; UK Caucasians/UK Asians/Deli Asians

(P>0.01)[MAHWIS]; and Jewish/Soviet Immigrants/Arab Israelis (P>0.01) [WHiMNS]; and Australian/Japanese women (P<0.01) *difficulty in sleeping only* [AJMWHS];

In the area of *feeling tense or nervous* five of the studies measured this symptom with 4 of the 5 studies revealing statistical differences in the different cultures; Beirut/Rabat /Madrid/Massachutess (P<0.01) [DAMeS]; UK Caucasians/UK Asians/Deli Asians (P>0.01)[MAHWIS]; and Jewish/Soviet Immigrants/Arab Israelis (P>0.01) [WHiMNS]; Australian/Japanese women (P<0.01) [AJMWHS].

In the area of *depression*, in all the studies that used the *CES-D depression scale score* as a measure significant differences were seen across cultures; African American/Euro American (P>0.01) [POAS]; African American/Hispanic/Chinese/Japanese/European (p>0.01) [SWAN]; and Jewish/Soviet Immigrant/Arab Israelis (P>0.01) [WHiMNS]. This finding in depression was also supported in 3 out of the 5 studies which asked about *feeling unhappy/blue or depressed;* Beirut/Rabat/Madrid/Massachutess (P<0.01) [DAMeS]; Australian/Japanese women (P<0.01); African American /Hispanic /Chinese /Japanese /European (P>0.01) [SWAN]. In the AJMWHS between Australian and Japanese women, there was also a statistically significant difference in the *depression* component of the psychological factor of the Greene Climacteric Scale (P<0.05).

There were marked differences in prevalence between countries for certain psychological symptoms (WISHeS, HWHS). POAS found that African American women when compared to white American had increased psychological symptoms severity OR 1.41 (1.02-1.96) P=.04. In SWAN feeling tense, depressed and irritable were associated with country/ethnic group, age, menopause status, education, ability to pay for basics and self-assessed health. There was also a statistically significant ethnic difference in psychological symptoms (F=7.10, p<.01) with NH Whites reporting larger numbers of psychological symptoms than NH Asians. There was also a statistically significant difference in the total severity of psychological symptoms among the four ethnic groups measured including HH Whites, NH Asians, Hispanci and NH African Americans (F=7.01, p<.01)(26).

4. Discussion

The menopause can be conceptualised at several levels, including hormonal, menstrual, and symptomatic. All of these can lead to different experiences of the menopause. Included in this complexity are psychosocial and cultural factors that can also have considerable impact on the perceptions and evaluations of women during the menopausal transition. Dennerstein et al., found that psychological symptoms declined with age from a maximum prevalence before age 40 (27). It has also been found that women who are peri- and post-menopausal attributed more psychological symptoms to the menopause than those women who were pre-menopausal (27). Relationships have been found between psychological symptoms and somatic complaints (28); anxiety and hot flushes and previous depression and menopausal depression [WISHeS] [POAS]. These findings highlight the importance of including psychological, somatic, sexual and vasomotor symptoms in cross cultural studies to strengthen the reporting of Menopause and Ageing.

Some interesting cross-cultural studies have not been included in this analysis but are important to mention. Firstly *The Cross-cultural and intra-cultural comparison in Germany and in Papua New Guinea Study* (GPNGS) compared women living in Germany with women

living in Papua New Guinea (29). The authors stated that significant differences between the cultures were seen in depression, however, the actual frequencies for the symptoms were not provided in the article. In a study across four continents variability existed across women's experience of psychological symptoms with women reporting varying rates of depressive mood: Europe 50.7%; USA 55.5%; Latin America 55.6%; and Indonesia 39.6%. Reports of anxiety were not significant. The study combined countries into continents, making their sample recruitment incomparable across studies, even though they have used the same Menopausal Rating Scale (30). Another study conducted by Im et al, 2009, 2010 used a cross-sectional Internet survey among 512 midlife women using a convenience sampling technique, her findings supported ethnic differences in the number and total severity of psychological symptoms; and found that within the U.S., Asian women were found to experience the smallest number of psychological symptoms (31, 32).

The psychological items measured by the menopausal scales include the following: *feeling tense or nervous, difficulty in sleeping, excitable, attack of panic, difficulty in concentrating, feeling tired or lacking in energy, loss of interest in most things, feeling unhappy or depressed, crying spells, irritability, anxiety, memory loss, mood swings/mood changes, forgetfulness, dissatisfied with personal life, wanting to be alone and heart beating quickly or strongly.* Exploring these further there are several items which were asked in just one or two of the eight studies: excitable, attack of panic, loss of interest in most things, forgetfulness, dissatisfied with personal life, wanting to be alone and heart beating quickly or strongly, crying spells, memory loss and mood swings. Feeling tired or lacking in energy was asked in three of the eight studies. The most frequently asked items across all or most of the studies included: feeling tense or nervous, difficulty in sleeping, and difficulty in; feeling unhappy or depressed (asked very clearly in all the eight studies) and irritability which was asked across all the studies (asked as "impatient with other people" in WISHeS and attached to "persistent anger" in POAS and "grouchiness" in SWAN). Comparisons of the eight studies and the results presented reveal 6 different symptom lists and one Daily Record Score, therefore comparisons between the different checklists is difficult. Most of the studies present percentage scores for the different symptoms however in some studies, only significant differences are recorded or composite total scale scores, these scores then could not be compared to results from other studies.

In conclusion, our review reveals that mental morbidity influences other psychological symptom prevalence across cultures and therefore should be measured. The seven symptoms most linked to menopausal hormonal changes in the WISHeS study may provide an evidence based approach when forming any future menopause symptom list. The study, however, needs to be replicated with women in each country, including non-western countries, being found by more formal population-sampling techniques. There is a need to record actual date of final menstrual period and biological data such as hormone levels.

Other scales used to measure psychological symptoms including the CES-D scale, The Zung Anxiety scale and the Perceived Stress scale. These scales may be useful tools to include in further cross-cultural studies which measure menopausal symptoms as they provide a reliable and valid scale score providing a meaningful measurement which could be comparable. It is important that future studies consider not combining psychological items (i.e. irritability with grouchiness) and state the item to be measured in a clear way, eg: irritability. This will allow for comparisons across studies. Reviewing all the eight studies it is recommended that the following items be included when measuring psychological symptoms across cultures, along with the CES-D scale, and the Perceived Stress Scale;

- Feeling tense or nervous
- Sleeping difficulty
- Difficulty in concentrating
- Depressed
- Irritability
- Anxiety

In summary it is clinically important that psychological symptoms at midlife are studied. Psychological symptoms may considerably impact the quality of life of women and are important to review and understand. Psychological symptoms also need to be studied for their relationship with other symptoms such as vasomotor, as depression and anxiety have been shown to influence rates of vasomotor symptoms (27, 33-37).

List of Tables

Contributors and their role

Paper conception, review, data extraction, drafting of manuscript and preparation of tables were done by DA. Critical review and editing was done DA, MKM, LLS, and CMO.

Competing interests

None.

Provenance and peer review

Commissioned and externally peer reviewed.

Table 1 Measures used to measure psychological symptoms in Cross-Cultural Midlife Women's Health Studies

Studies	Instruments	Questions	List symptoms
Australian/ Japanese Midlife Women's Health Study (AJMWHS) (8)	Greene Climacteric Scale	The extent to which you are bothered at the moment by the following symptoms	1. Heart beating quickly or strongly; 2. Feeling tense or nervous; 3. Difficulty in sleeping; 4. Excitable; 5. Attack of panic; 6. Difficulty in concentrating; 7. Feeling tired or lacking in energy; 8. Loss of interest in most things; 9. Feeling unhappy or depressed; 10. Crying spells; 11. Irritability
Decision At Menopause Study (DAMeS) (38)	The Everyday Complaint Checklist	Whether they had experienced symptoms over the past month, and whether this was occasional or regular	1. Emotional; 2. Anxiety; 3. Depression; 4. Irritability; 5. Difficulty concentrating; 6. Memory loss
Four Major Ethnic Groups (FMEG) (31)	The Midlife Women's Symptom Index	The presence and severity of symptoms during the past 6 months	1. Frequent crying; 2. Mood swing; 3. Panicky; 4. Difficulty in concentration; 5. Forgetfulness; 6. Feeling tense (retrieved from Table 3 (31))
Hilo Women's Health Survey (HWHS) (39)	The Everyday Complaint Checklist	Thinking back over the past 2 weeks, have you ever been bothered by any of the following symptoms	1. Trouble sleeping difficulty in concentrating; 2. Feeling blue or depressed; 3. Irritability; 4. Mood swings/mood changes; 5. Nervous tension
Mid-Aged Health in Women from the Indian Subcontinent (MAHWIS) (40)	The Women's Health Questionnaire	How often did you experience the following symptoms in the past few days	1. Depressed mood (6 items); 2. Anxiety/fears (4 items); 3. Sleep problems (3 items); 4. Memory/concentration (3 items)
Penn Ovarian Aging Study (POAS) (21)	The Kupperman Menopausal Index (modified version) used in a Daily Symptom Report CES-D Scale: Depression The Zung Anxiety Scale: anxiety The Perceived Stress Scale:	Whether each of the symptoms occurred in the past month, the frequency and severity rated on a four point scale from 0 (none) to 3 (severe).	1. Anxiety, tension, "onedge"; "nerves" ; 2. Irritability, persistent anger; 3. Depression, feeling sad, down or blue; 4. insomnia, (trouble sleeping)

	current stress St Mary's Hospital Sleep questionnaire		
Study of Women's Health Across the Nation (SWAN) (41)	The Everyday Complaint Checklist (modified version) Center for Epidemiological Studies (CES-D) scale Perceived stress scale	How frequently they had experienced each of the 4 mood symptoms in the previous 2 weeks.	1. Forgetfulness; 2. Feeling tense or nervous; 3. Feeling blue or depressed; 4. Irritability or grouchiness; 5. Heart pounding or racing
The Women's Health at Midlife National Study (WHiMNS) (42)	The revised Illness Perception Questionnaire A Menopause Specific Quality of Life questionnaire.	How bothered they were on a 4 point scale in the last 6 months of the following symptoms	1. Irritability/moods; 2. Memory loss
Women's International Study of Health and Sexuality (WISHeS) (27)	Menopause-Specific Quality of Life Questionnaire	Whether they had experienced the symptom in the previous month on a 7 points Likert-Scale	1. Dissatisfied with personal life; 2. Anxious or nervous; 3. Depressed; 4. Impatient with other people; 5. Wanting to be alone; 6. Feeling tired or worn out; 7. Mood swings

Table 2: Frequencies (yes/no) of various psychological symptoms (%), and mean values for psychological factor scores

	AJMWHS[a]		DAMeS				HWHS		FMEG				SWAN					POAS	
	Austr. n=863	Japan n=830	Beirut n=301	Rabat n=299	Madrid n=300	Mass. n=293	Euro-Am n=203	Jap-Am n=249	NH White n=	Hispanic n=	NHAA n=	NH Asian n=	African-am n=750	Hispanic n=239	Chinese n=218	Japanese n=198	European n=1418	Afr-Am n=126	Euro-Am n=182
Feeling Tense or nervous [b]	56^{++}	67	69^{++}	42	62	59	25^{++}	10					46	60	39	34	56		
Difficulty in sleeping[c]	65^{++}	53	52^{++}	31	48	60	48^{++}	36	67^{++}	56	61	41							
Excitable	45	49																	
Attack of panic	27^{+}	33																	
Difficulty in concentrating[d]	59	61	43^{++}	18	34	38	29^{++}	14	43^{++}	32	31	22							
Feeling tired or lacking in energy	82	85	79^{++}	61	42	46	51^{++}	37	62^{+++}	69	70	36							
Loss of interest in most things	33^{++}	53																	
Feeling unhappy/ blue or depressed	47^{++}	53	41^{++}	28	26	32	40^{++}	18	45^{+}	38	42	27	41	52	32	22	40		
Crying spells[e]	28^{++}	22	83^{++}	62	67	68			34^{++}	29	25	15							
Irritability	55^{+}	61					37^{+}	28					51	44	43	40	56		
Anxiety			58^{++}	44	26	38			49^{+}	43	36	33							
Memory loss			54^{++}	34	46	46													
Mood swings/mood changes							31^{++}	15	54^{++}	54	50	32							
Forgetfulness									67^{++}	58	53	46							
Heart beating quickly or strongly	35^{++}	42	47^{++}	34	29	29	12+	7											
CES-D Depression Scale Score													31^{++}	46	5	12	6	16^{++}	13
The Zung Anxiety Scale Score																		35^{+}	33
The Perceived Stress Scale Score (median IQR)[f]													8	11	8	9	8	21	20
Psychological factor score Greene Climacteric Scale (GCS)	6.66	7.05																	
Anxiety (GCS)	3.62	3.66																	
Depression (GCS)	3.10^{+}	3.40																	
Daily Symptoms Report (DSR) Psychological Scale Score																		52	50.0

[a]Numbers computed into yes/no frequencies from Anderson et al. (2004), but significance is across 4 categories of not at all, a little, quite a bit, and extremely
[b]Asked as "nervous tension" in HWHS and as "anxiety, tension, on edge, nerves" in POAS
[c]Asked as "trouble sleeping difficulty in concentrating" in HWHS and "poor sleep" and "insomnia (trouble sleeping) in POAS
[d]Asked as "combined with trouble sleeping" in HWHS, "combined with memory" in MAHWIS
[e]Asked as "emotional" in DAMeS
[f] IQR. Interquartile range
[+]significant p<0.05 ; ++ significant p<0.01; +++significant p<0.001 / Palpitations, fatigue, and dizziness are included in both psychological and somatic reviews.

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Table 3: Factors significant in multivariate models of psychological symptoms

	AJMWHS	DAMeS	HWHS	MAWHIS	POAS(36)	SWAN(41)[d]	WISHES	WHiMNS(42)[ab]
Country or ethnic group					NS	Tense, depressed, irritable	Yes for some	NS
Age					NS	Tense, depressed, irritable	Yes	NS
Menopause status					Depressed mood	Tense, depressed, irritable	Not significant (P<0.001)	Mental Scale
BMI					NS	CES-D[c]	Not significant (P<0.001)	NS
Smoking					NS			
Physical activity								
Alcohol								
Education						Tense, depressed, irritable		Mental Scale
Employment status								Mental Scale
Ability to pay for basics						Tense, depressed, irritable		
Phytoestrogen intake								
Perceived stress					Depressed mood			
E2					NS			
FSH					NS			
Self-assessed health/physical health					Depressed mood	Tense, depressed, irritable	Yes, also mental morbidity	

[a] Mental Scale combined shortness of breath, sleeping problems and memory problems

Variables entered into models

[b] cultural group, age, education, family status, menopausal status, healthy lifestyle, ever use of HRT, chronic morbidity, BMI, Levels of depressive symptoms

[c] site, baseline age, overall health, smoker, status, ethnicity, years since baseline, baseline paying for basics, hot flashes/night sweats, attitudes, psychotropic medication, social support, very stressful life events

[d] menopausal status, race/ethnicity, age, education, self-assessed health, economic strain (tense, depressed, irritable part of psycholsomatic symptoms cluster)

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