

ism isolated. Many cases and outbreaks are underrecognized and underreported.

Food contamination occurs in the presence of living pathogenic agents on food. The illness is caused by the entrance of these agents or their toxins into the body and the reaction of body tissues to their presence.¹

Foodborne disease surveillance has traditionally served three objectives: disease prevention and control, knowledge of disease causation and administrative guidance.² Ten "golden rules" for safe food preparation³ are:

- (1) Choose food processed for safety.
- (2) Cook food thoroughly.
- (3) Eat cooked food immediately.
- (4) Store cooked foods carefully.
- (5) Reheat cooked foods thoroughly.
- (6) Avoid contact between raw foods and cooked foods.
- (7) Wash hands repeatedly.
- (8) Keep kitchen surfaces clean.
- (9) Protect foods from insects, rodents, and other animals.
- (10) Use pure water.

References

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Regions	1411H (N=217)	1412H (N=270)	1413H (N=294)
Riyadh	35.5	40.4	30.3
Taif	25.8	17	19.4
Makkah	8.3	3.3	6.8
Eastern	6.5	7.8	10.9
Tabuk	5.5	0.7	1
Jeddah	3.7	2.6	1
Asir	3.7	4.4	3.4
Al Ahsa	3.7	3.7	1.7
Hail	2.8	3	3.4
Arar	1.7	0.7	0
Gizan	0.9	0	1
Qassim	0.9	3.3	0.7
Najran	0.5	2.6	2
Madinah	0.5	2	3.4
Bisha	0	5.2	10.2
Hafr al-Batin	0	2.2	3.1
Al Baha	0	0.7	1.7
Goriat	0	0.4	0

Table 1: Percentage of events by region, 1411-1413H

Brucellosis in an urban setting

Prince Salman Hospital, which serves southwest Riyadh city, noted increasing numbers of brucellosis cases during 1993 and requested a study to determine the risk factors for brucellosis in this urban setting.

We identified all positive ($\geq 1:160$) *Brucella* agglutination tests from the hospital laboratory logbook for 1993 and from those chose 52 patients (case-persons) with a clinical history of brucellosis.

We interviewed all case-persons about their exposure to dairy products, meat and livestock during the 60 days before the first symptom. We also asked about their habitual exposure to these same things.

We selected as household control-

persons two persons of the same sex and approximate age from the same household as each case. We also selected 52 community control-persons from among visitors to two primary health clinics in the same districts from which most of the cases came. We interviewed all control persons using the same questions covering the same possible exposure period for the corresponding case.

The incidence rate of laboratory-diagnosed brucellosis from the Prince Salman Hospital catchment area was 78.5/100,000 population in 1993. Males accounted for 65% of brucellosis cases.

Sixty-nine percent of case-households kept livestock, compared with

19% of community control households (odds ratio [OR] = 9.5, 95% confidence interval [CI] 3.2-24). Sick livestock were reported by 32 of 36 case households, compared with none of the 10 community control households that reported raising livestock ($p < 0.001$).

We next looked at 36 households that raise livestock for risk factors specific to contact with livestock. In these households 83% of case-persons performed general livestock care, compared with 9% of household control-persons (OR = 51, 95% CI 13-217).

Because the livestock were kept outside the city, usually only one family member was responsible for animal

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WHO goal: Eliminating neonatal tetanus

In 1989 the General Assembly of the World Health Organization set a target date of 1995 for the elimination of neonatal tetanus (NNT). This was subsequently expressed as a rate of NNT cases of below 1/1000 live births in every region of every country. Unlike the programs to eliminate smallpox or polio, the disease potential is always present with NNT even after the target is reached, due to the nature of organisms found everywhere in the environment. Continuity of surveillance and services is extremely important.

NNT is an underreported disease, with barely 5% of the cases reported. Only recently has awareness of the problem come forward, but timeliness and completeness of reporting are lagging. The program for elimination of NNT was prompted by the fact that NNT is the second-greatest killer of

children below the age of 1 (only measles is greater). In many African and Asian countries, mortality may reach as high as 5/1000 live births. Countries at risk include almost all of the African countries and countries of South and East Asia.

Immunization was identified by the Expanded Programme on Immunization (EPI) as one of the important elements of child survival and development; hence, it is crucial to maintain high immunization coverage, including tetanus toxoid (TT), for women of childbearing age.

The strategy for NNT elimination includes the following:

- * Identify high-risk areas through active search review of health records and proper case investigation to identify unimmunized women.

- * Increase TT coverage by ensuring that any prenatal care or any visit to an

EPI facility includes tetanus immunization, if needed.

- * Monitor progress toward NNT elimination by requiring monthly routine reporting of NNT by all health facilities and monthly routine reporting of the proportion of newborns protected at birth by tetanus immunization of their mothers.

- * Ensure quality of the TT used (to WHO standard) by regular evaluation of the cold chain.

Within Saudi Arabia, a standard case definition was formulated and distributed to all health units in 1992, the same year that zero reporting for NNT became required. Reporting timeliness and completeness are now monitored closely at both regional and central levels. Every case of NNT should be immediately reported and thoroughly investigated.

Since 1986, the Kingdom has

Brucellosis

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care. Among specific livestock care activities, cleaning livestock pens (OR=27, 95% CI 32-1,263) and slaughtering livestock (OR=inf) had the highest odds ratios. Other activities were attending birth of livestock (OR=40.3, 95% CI 10-177) and milking livestock (OR=82.5, 95% CI 10-1,804).

Given the strong association with livestock, we stratified additional analyses of exposure to raw meat and raw milk by livestock ownership. The OR for eating raw liver among households that raised livestock was 4.9 (95% CI 1.6-3.8).

We found no other association of brucellosis with eating raw meat, raw milk or dairy products. However, persons who had a sore or bleeding gums or other lesions in the mouth and drank raw milk in households that kept livestock had an increased risk of brucellosis (OR = 19, 95% CI 2.3-849). The association was not seen in houses without livestock or with community controls.

-- Reported by *Nashma Saleh Al-Shiban (Field Epidemiology Training Program)*

Editorial note: Brucellosis is endemic in the Middle East^{1,2}. In Saudi

Arabia, the prevalence (percent) of brucellosis, based on a nationwide survey in 1992, was found to be 2.5% in the central region, 2.3% in the southern and eastern regions, 1.6% in the northern region and 0.6% in the western region³.

In Saudi Arabia 92% of cases are due to infection with *B. melitensis* and 8% are due to *B. abortus*; *B. suis* of hogs has not been isolated¹.

This study found that the incidence of laboratory-diagnosed brucellosis in southwestern-Riyadh City (central region) was about 0.8% in 1993. However, patients with brucellosis usually undergo more than one serologic test either to confirm the diagnosis or for follow-up purposes. Moreover, serologic tests can be positive long after recovery.

Without exclusion of repeated tests, incidence rates of brucellosis may have been overestimated. The surveillance system at Riyadh Al Kharij Hospital developed a computer program to identify only newly diagnosed cases of brucellosis based on serologic tests. As a result, a dramatic fall (by about 75%) in the number of reported cases was observed⁴.

Risk factors for brucellosis in Saudi Arabia included: intake of unpasteurized (raw) milk or milk products, contact with livestock (including breeding, milking, attending birth, touching placental membranes of ani-

mals) or cutting raw meat^{2,3}. However, according to this study, drinking raw milk is not a risk factor for brucellosis. This result should be taken with caution as it presents a disagreement with other studies cited repeatedly in medical literature.

The low prevalence of brucellosis in urbanized western Saudi Arabia was attributed to the less common practice of drinking raw milk¹. However, raw milk may not serve as a good medium for brucella after it turns sour (laban).

Interventions to control the disease should include socially acceptable health educational programs to increase awareness among people about the modes of disease transmission.

References

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